ADDIS ABABA UNIVERSITY

SCHOOL OF COMMERCE

Department of Logistics and Supply Chain Management

The Effect of Internal Integration on Supply Chain Performance: The Case of Ethiopian Pharmaceutical Supply Service Addis Ababa, Ethiopia

A Thesis for Partial Fulfillment of the Requirements for Degree of Master of Art in Logistics and Supply Chain Management

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Addis Ababa

Declaration

I declare that this thesis is entitled "The Effect of Internal Integration on Supply Chain Performance: The case of Ethiopian Pharmaceutical Supply Service." It is my original work. I haveundertaken the research work with the guidance and support of my advisor. This study has never been submitted for any degree or diploma program at any other institution, and all sources of materials usedfor the thesis have been duly acknowledged.

Lidiya Ekubay

Signature_____ Date _____

Certification

This is to certify that Lidiya Ekubay carried out the research thesis titled "The Effect of Internal Integration on Supply Chain Performance: The case of Ethiopian Pharmaceutical Supply Service (EPSS) " and submitted it as a partial fulfilment of the requirements for the award of the degree of Master of Arts in Logistics and Supply Chain Management at Addis Ababa University. Italso demonstrates that the thesis complies with all university regulations and standards.

Advisor: Dr. Matiwos Enesrmu (PHD)

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This is to certify that Lidiya Ekubay completed the research thesis titled " The Effect of Internal Integration on Supply Chain Performance: The case of Ethiopian Pharmaceutical Supply Service (EPSS) " and submitted it as a partial fulfilment of the requirements for the award of the degree of Master of Arts in Logistics and Supply Chain Management at Addis Ababa University. It also demonstrates that the thesis complies with all university regulations and standards.

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Acronym

- ABC---------- Activity Based Costing
- ANOVA ---------- Analysis of variance
- BSC.....Balanced Score Card
- EPSS ----------Ethiopian Pharmaceutical Supply Agency
- EPSS ---------- Ethiopian Pharmaceutical Supply Service
- SCM----------Supply Chain Management
- KPIs ---------- Key Performance Indicators
- SCOR ---------- Supply chain operation reference
- SOPs ---------- Standard Operating Procedures

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Abstract

The general objective of the study is to assess the effects of Internal Integration on Supply Chain performance in the case of Ethiopian Pharmaceutical Supply Service. Both a quantitative research approach and an explanatory research design were used in this study. The data collection instrument used was a questionnaire which was administrated to a total 135 employees using a census method. A 92.6% response rate was achieved out of 135 questionnaires, with 125 valid responses. A correlation coefficient known as Pearson's product moment was calculated. The variables were found to be statistically significant, and as a result, there is a positive and moderate association between (Information integration, coordination, resource sharing and organizational relationship linkage) with supply chain performance. The results also indicated that coordination and resource sharing had the highest positive effect on supply chain performance, Therefore, for improving supply chain performance, the study recommends improving the three components of internal integration together as they are interrelated.

Key Words: Supply chain, Ethiopian Pharmaceutical Supply Service, Information integration

CHAPTER ONE

1. INTRODUCTION

1.1. Background of the study

Supply chain management (SCM) is the name given to a group of strategies for effectively integrating vendors, producers, warehouses, and retail outlets so that goods are produced and distributed in the appropriate quantities, to the appropriate locations, and at the appropriate times to reduce system costs and satisfy service level requirements (Simchi-Levi *et al*., 2008).

A technique used by businesses to put together their internal processes is called an Internal integration (C.-L. Liu & Lee, 2018) and will enable quick coordination of business activities. Among other things, a company's internal communication needs to integrate internal information. The aspects of an organization's internal communication that need to be improved include data accuracy and expanded use of information technology tools (Mustafid *et al*., 2018).

The organization promotes internal integration through a structured schedule of regular meetings by communicating and coordinating corporate goals and priorities, enabling the company to respond quickly and increase company resilience (Piprani *et al*., 2020)**.** The integration of a business can create a SC partnership between the business and its suppliers (Tarigan *et al*., 2020) Additionally, departments such as procurement, production, marketing, and finance can frequently coordinate to identify the company's objectives to boost SC resilience (Piprani *et al*., 2020).

SC relationships involving the sharing of information and the flow of raw materials are impacted by the use of the technologies by firms to carry out the company's internal integration (Gružauskas & Vilkas, 2017). In order to boost SC agility, the information system of the company is linked to speedy decision-making by evaluating, embracing, and integrating new technology (Russell & Swanson, 2018)**.** In order to promote organizational agility, it is implemented in businesses through coordinating corporate systems information at the operational level, specifically, collaboration of the structure and social (Zhou *et al*., 2018)**.**

During the redesign and reorganization of the pharmaceutical sector, SCM was one of the focus areas selected. The majority of pharmaceutical organizations have embraced supply chain as a fundamental competency to obtain

advantageous condition over rivals (Lurquin, 1996). The pharmaceutical market in Ethiopia is thought to be around USD 190 million. Nearly 85% of all medications used worldwide are imported. Only 15% of Ethiopia's pharmaceutical markets are served by the nation's 13 pharmaceutical manufacturing enterprises. More than 90% of the ingredients needed to make medications come from outside. Some inputs are purchased locally. 40% of the total cost is made up of raw materials. With the exception of carton packaging products and vacant capsules, which are made domestically, the majority of packaging materials are imported. The majority of businesses create products utilizing raw materials, classifying themselves as secondary manufacturers (Sutton & Kellow, 2010).

Integration of supply chain processes can be a powerful tool for lowering costs and enhancing customer satisfaction. To accomplish this, organizations should join an extensive, integrated supply network to do this, and they should anticipate that doing so would need for sufficient information flow and well-organized logistics for infrastructure. Therefore, the best possible efficient network is one that balances the needs for information, physical logistics, and collaboration, delivering shared benefits to the majority of partner businesses (Piprani *et al.*, 2020).

1.2. Background of the organization

The PFSA, established through Proclamation Number 553/2007, is responsible for the procurement, storage, and distribution of medical supplies to healthcare facilities in Ethiopia. By providing public health facilities "the right quantity and quality of drugs and medical supplies" at the at the most competitive price, PFSA supports the nationwide health policy and the Ethiopian health program by ensuring that public health.

Ethiopian Pharmaceutical Manufacturing (EPHARM) was created in 1972 as a public enterprise by the government of Ethiopia and English investors. It was completely nationalized by the Derg government. It changed its name to Ethiopian Pharmaceuticals Manufacturing Share Company in 2002. Currently, EPHARM has eight product lines and is engaged in the production of about 62 varieties of medicines for the local market.

The remaining 35% is supplied to private pharmacies and hospitals through private intermediaries. The PFSA have a vital role in ensuring the availability and affordability of pharmaceutical products to the general public. The production inputs used in the manufacturing process are mainly obtained from foreign sources through open tenders and from approved suppliers. All the products manufactured by the company are sold in the local market and are distributed through both private of pharmaceutical products in government-owned healthcare facilities, while the private intermediaries cater to the needs of the private healthcare sector. The inputs required for the production process are sourced from foreign suppliers through a transparent open tender process.

1.3. Statement of the Problem

Efficient supply chain management can be a substantial source of competitive advantage. After a successful SCM implementation, improved interactions between upstream suppliers and downstream customers are projected to boost customer satisfaction and corporate performance. (Ibrahim & Hamid, 2014).

According to Mwale,(2014) a successful supply chain operations are crucial to establishing and maintaining competition for the firm's goods and services. The way in which the supply chain manages and incorporates crucial informational components affects how well it performs. The enterprises must adopt information technology to establish successful supply chain integration, which will allow them to obtain competitive advantage through several aspects of the supply chain, such as quality, cost, flexibility, delivery, and profit.

Many researchers have looked into the issue and found that internal integration is essential for improved performance in order to meet and add value to the needs of organizations as they work to present goods, services, data that benefit clients and other stakeholders in today's fiercely market competition climate. Companies will be affected, nevertheless, because of things like internal integrity to the supply chain loop that the company uses. In addition to reinventing themselves to produce better goods and services, reduce waste, and try to meet market demands, businesses also need to manage their supply chains effectively (Kindie, 2017).

Integrating internal information to enhance SC is one of the elements that need to be enhanced in an organization's internal communication through joint planning, service level advancement, evolution of trust, improved data preciseness, and advanced use of information technology tools. (Mustafid *et al*., 2018). So the outcomes on supply chain through internal integration can be noticed easily. Unless integrating internal information the performance of supply chain among organizational internal communication wouldn’t be improved.

There aren't many research in Ethiopia connecting supply chain integration techniques and the performance of supply chain in the pharmaceutical sectors, despite the importance of supply chain integration among the efficiency of SC performance. Additionally, even though being an important part of SCI, customer and supplier cohesion is sometimes overlooked in favor of the critical link between within-company integration and efficiency of operation. Due to its examination of the impact of internal integration on the performance of supply chain in EPSS, this study will help close these gaps.

1.4. Research Questions

1. How the supply chain internal integration is being practiced at Ethiopian Pharmaceutical Supply Service (EPSS)?

2. What is the supply chain performance of EPSS in terms of quality, cost, flexibility, responsiveness, asset management?
3. How internal integration affects the EPSS's performance in terms of quality, cost, flexibility, responsiveness, asset management.

1.5. Objectives

1.5.1. General objective

To assess the effects of internal integration on supply chain performance in the case of Ethiopian Pharmaceutical Supply Service (EPSS),

1.5.2. Specific objectives

- To assess the internal integration practices of Ethiopian Pharmaceutical Supply Service (EPSS).
- To measure the supply chain performance of Ethiopian Pharmaceutical Supply Service (EPSS) in terms of cost, quality, flexibility and responsiveness / delivery.
- To measure the supply chain performance of Ethiopian Pharmaceutical Supply Service (EPSS) in terms of cost, quality, flexibility, and responsiveness / delivery.
- To assess the effects of internal integration on supply chain performance of Ethiopian Pharmaceutical Supply Service (EPSS) in terms of cost, quality, flexibility, and responsiveness / delivery.

1.6. Significance of the Study

Management of the SC for the Ethiopian Pharmaceutical Supply Service (EPSS) is a challenging procedure with many participants. In order to ensure efficient and effective operations, each of these stakeholders needs to be supported by a strong internal integrity system that promotes responsibility and openness. Goal of the company goal is to deliver its goods to customers in a sustainable manner, as was already established. In order to do this, a number of internal issues affecting the pharmaceutical enterprises must also be taken into account. Studying how the integration of internal system affects SC management using the case of Ethiopian Pharmaceutical Supply Service is crucial. One company accelerates the integration process to develop internal integration. To increase trust across internal functions, process implementation within the organization is done through cooperative planning and activities (Mustafid *et al.*, 2018).

The implications of internal integrity on EPSS's supply chain management were the major subject of this study. The study's focus is specifically on elements like delegation, coordination, and communication that could occur within the organization. This study will examine the function of internal integrity in EPSS's supply chain management and identify any potential effects it might have on business operations through the overview of pertinent literatures and studies. The findings of this research may offer crucial perceptions on how EPSS can enhance its supply chain management and guarantee its long-term performance.

1.7. Scope of the Study

The focus of this study is only on those factors that may happen internal to the company of Ethiopian Pharmaceutical supply Service. The Ethiopian Pharmaceutical Supply Service (EPSS) is an important organization in the country's health sector and is responsible for the supply and distribution of pharmaceutical products. With the globalization of markets and the increase in the number of SC partners, it is essential that EPSS has a strong internal integrity system to ensure the efficient and strong management of its SC. This paper looked after the effect of internal integrity on the SC management of the EPSS, and how internal integrity affects the performance of supply chain of Ethiopian Pharmaceutical Supply Service (EPSS). Specifically, this study will explore the internal factors that may affect the SC and how it can be managed to maximize efficiency and effectiveness. As a support this research gap, I will draw on research from multiple sources, including academic research, industry reports, and surveys. The result of this research was used to recommend how the EPSS can improve its supply chain performance and ensure that it meets the required standards of quality control and customer satisfaction through the improvement of internal integration.

1.8. Organization of the Research

There are seven chapters in this paper. The backdrop of the study, problem statement, purpose of the investigation, research questions, significance of the study, and scope of the study are all included in the first chapter's introduction. The second chapter reviews linked literary works and includes significant discoveries from many works of literature as well as theoretical background. The study's methodology is covered in the third chapter. The study's findings are presented in chapter four along with a discussion of them. The conclusion of chapter five is based on the study's findings and suggestions for additional research. Finally, the appendix component contains the questionnaire and other relevant contents.

1.9. Operational Definitions

- **Supply chain**: The distribution of a service or a good to a consumer can be accomplished by direct or indirect ways, and these linked individual organizations are collectively referred to as a SC.
- **Supply chain management**: The crucial integration of processes business from the end user via the supplier’s processes that offer goods, services, information and so increase value for clients and other stakeholders—is what is referred to as SCM.
- **Supplier Integration**: A process of communication and cooperation between a company and its suppliers to guarantee a smooth supply chain.
- **Internal Integration**: a procedure for interaction of departmental and their collaboration that unites them into a single, well-functioning organization.
- **Supply chain performance**: the efficiency of the different procedures that make up the supply chain function of the company.

- **Internal supply chain**: refers to the series of tasks or duties performed by a corporation as a result of giving a consumer a product.

CHAPTER TWO

2. RELATED LITERATURE REVIEW

2.1. Introduction

The evaluation of pertinent conceptual framework, the review of related theories and the review of empirical to this study are the three main focuses of this chapter in this thesis. In building through prior research in this area and offering pertinent reviewed material for this report, this chapter also addresses internal integrity, SC, SC performance, Ethiopian pharmaceutical supply Service supply chain management difficulties, and organizational success.

2.2. Theoretical Literature Review

2.2.1. Supply Chain

Mason-Jones & Towill, (1999) supply chain is described as the coordinated and combined movements of goods between points of origin and destinations, as well as related information flows. A supply chain includes all steps involved in directly or indirectly fulfilling a customer request. Along with the manufacturer and suppliers, the supply chain also includes transporters, warehouses, retailers, and the actual consumers (Chopra & Meindl, 2007).

An integrated supply chain is one that transfers value from customers through original suppliers to consumers and other stakeholders through the provision of products, services, and knowledge. In accordance with the Council of Supply Chain Management Professionals (CSCMP), supply chain management (SCM) includes the scheduling and handling of all purchasing and sourcing, transformation, and logistics-related activities. SCM also entails coordinating and cooperating with channel partners, such as clients, suppliers, middlemen, and outside service providers (Fekpe *et al*., 2015).

2.2.2. Meaning and concept of Supply Chain Management

An innovative management idea from the 2000s is supply chain management (SCM). It incorporates divides from earlier management theories. SCM has been explained in a variety of ways, but none of them are universal (Aboneh, 2017). to enhance the supply chain's and individual enterprises' long-term performance as a whole,

supply chain management is the "systematic, strategic coordination of the conventional business operations and strategies employed across these business functions within a particular business and across businesses within the supply chain" (Mehmeti, 2016). Consequently, a more expansive definition created a report from the Global Supply Chain Forum has become the acknowledged standard. Supply chain management (SCM) is the integration of essential business procedures starting with the client via the original suppliers to deliver services, goods, and data that are beneficial to the final consumer and other stakeholders (Aboneh, 2017). Because the SCM concept is insufficient for being effective and competitive in the current environment, new concepts and management methods are beginning to emerge. By examining the SCM's evolutionary history, we are able to observe that there have been significant shifts in how businesses used to function in the chain and how they currently function. It should be emphasized that there are connections between the variables that have impacted how SCM has developed and the variables that have an impact on the effectiveness of the supply chain, as the chain's effectiveness has improved with the evolution of SCM. (Mehmeti, 2016).

Consequently, a more expansive definition created by the Global Supply Chain Forum has become the acknowledged standard. “Supply Chain Management (SCM) is the integration of key business process from end-user through original suppliers that provides products, services, and information that add value for customers and other stakeholders (Aboneh, 2017).

The concept of SCM is not enough for being efficient and competitive in the new environment that is why the new concept and management strategies are emerging. By looking at the evolutionary history of SCM, we see that there are huge changes in the way firms used to operate in the chain and the way they are operating now. It should be noted that there are linkages between the factors that have influenced the evolution of SCM and the factors that affect the supply chain performance because with the evolution of the SCM the performance of the supply chain has increased (Mehmeti, 2016).

2.2.3. Internal integration

The key concern in a supply chain is to coordinately managing and controlling of all the primary and support activities of the company that will be achieved with an appropriate integration of supply chain (Awad, 2010). Internal integration acknowledges that various divisions and functional areas of a company should perform as a single unit. Internal integration is considered to be related to performance because it encourages collaboration and breaks down functional boundaries to satisfy customer needs instead of operating in the functional silos associated with traditional departmentalization and specialization. Customer orders move across functions and activities even though manufacturers may maintain a functional organizational structure. The function that caused an order delay is irrelevant to customers; all they care about is if their order has been filled. This necessitates a coordinated effort amongst all related activities and functions in the client order fulfillment process. Information sharing, joint planning, cross-functional teams and working together are important elements of this process (Flynn *et al*., 2010).

2.2.4. Supply Chain Integration

Supply chain performance is widely regarded by both practitioners and scholars as being significantly influenced by supply chain integration. Edward S. Fekpe *et al.*, (2015) said that the close alignment and coordination between partners within a supply chain is the focus of supply chain integration, which aims to improve performance. Krishnapriya & Baral, (2014) cited that Integration has been effectively accepted by businesses as a crucial component of a dynamic supply chain. High degrees of commitment, trust, and information exchange are thus necessary between supply chain partners. In order to create and realize organizational goals as well as achieve inter-firm integration, it is essential for employees to develop a range of knowledge, skills, and talents.

Although there are many different types of supply chain coordination, they are all intended to help entities in the chain of end customers, or the final consumer of goods and services, be aware of the amount of actual demand so they can know how to create programs, schedule meetings, manage the amount of inventory, and create products that can be delivered to consumers at the right time and place in order to attract business (Yan & Woo, 2004).

According to Hosseini *et al.*, (2012) Studies have been done in years of 2009 and 2010 mainly emphasis on three critical dimension of supply chain integration these are

- Integration coordination
- Internal integration
- Integration collaboration

Internal integration has been characterized by many authors as a concentration on manufacturer-specific operations. In order to effectively serve its customers and communicate with its suppliers, a company must structure its internal organizational strategies, practices, and procedures into synchronized, collaborative workflows.

Despite the fact that the relative frequency of particular illnesses varies among nations, a fairly universal set of health concerns are presented to health services around the world. Additionally, there would be a significant decrease in illness-related mortality in developing regions if well chosen, inexpensive medications were available and utilized appropriately. Even in industrialized nations, effective drug supply management is crucial to bringing effective and affordable healthcare services to all people around the world. Contrarily, the experience of many nations demonstrated that real and long-lasting improvements in the availability and usage of pharmaceuticals are feasible. Past failures have demonstrated that success cannot be attained in the absence of defined objectives, strong strategies, efficient implementation, and performance monitoring (Abreham & Ensermu, 2018).

Mensah *et al.*, (2015) puts pharmaceutical industry as overlapping and complex. The pharmaceutical supply chain is complicated, involving numerous companies that often overlap but also play distinct roles in drug distribution,

and because of its complexity, pricing fluctuation among various consumer categories is a typical occurrence (Mensah *et al*., 2015). The individuals mentioned above cited the availability of pharmaceuticals as a challenging problem for policymakers. It is essential to evaluate all supply chain-related difficulties in order to comprehend this. Additionally, they listed the following as indicators of an ineffective supply chain: product discontinuity, product shortages, subpar performance, decreased patient safety, errors in medication dispensing and technology malfunctions that result in pharmacy stock shortages.

Access to medicine is a top concern for individuals, according to the World Health Organization (WHO). A sufficient supply of medicine in the right dosage, quality, quantity, and price must always be available to both individuals and communities (Ruteri & Xu, 2009). Two billion people are estimated to lack access to medications, and with the right care and medication, four million lives may be saved annually in Africa and Southeast Asia. Based on their projection, WHO and 192 governments agreed to achieving eight of the MDGs, which include lowering child death rates, enhancing maternal health, and battling diseases including HIV/AIDS, malaria, and other illnesses (WHO, 2012). The other person related to this issue is Bulajeva, (2010) She said that WHO focuses on policies, access, quality and rational use, so as to ensure medicine availability.

According to Peter *et al*., (2017), Modern pharmacy practice demonstrates an evolving paradigm shift away from traditional medication dispensing and toward more active and expanded clinical roles, including counseling, screening prescriptions, dispensing, and any other management work related to the stocky of medications activities (Peter *et al*., 2017).

Modern pharmacy practice demonstrates an evolving paradigm shift away from traditional medication dispensing and toward more active and expanded clinical roles, including clerking patients on medication counseling, screening prescriptions, dispensing, and any other management work related to the stocking of medications activities. Modern community pharmacists now place a high premium on medication counseling. pharmaceutical counseling include giving patients' or their caregivers' pharmaceutical information on how to utilize their drugs rationally, either verbally or in writing. According to studies, pharmacists who provide the proper medication counseling can spot and address any issues with drug therapy, side effects, and negative drug reactions. As a result, the patient quality of care will be optimized while also ensuring patient satisfaction with the pharmaceutical services. This implies that patient’s expectations are being met and patient quality of life equally improves (Yang *et al*., 2016).

In this part, different gaps identified from literature which are used as a resource in this paper listed as follows. Mudzteba, (2014), was able to include 10 old health centers in his study out of 50 health centers in Addis Ababa city. He had better include few new health centers for the purpose of comparison. As there are a lot of health centers under construction, the expected input from them would have been immunes for the study. It would have

been better if it is indicated by how much percent or degree the improvement is possible. Optimizing Drug Supply Chain in Hospital Pharmacy Department done by Mensah *et al*., (2015) stated a lot about different supply chain practices giving stress on wait time. But, they did not give any additional empirical findings to other parameters like product discontinuity, unavailability of products…etc. In " Analysis of Challenges of Medical Supply Chains in Sub-Saharan Africa Regarding Inventory Management and Transport and Distribution" by Woodburn, (2013).

2.2.5. Supply chain in pharmaceuticals

The role of supply chains in determining the final price and accessibility of medications is crucial. A healthy health supply chain offers economical, high-quality products to a large geographic audience. Additionally, effective supply chains function with effectiveness, flexibility, and financial integrity (Asante & Aikins, 2008). A crucial component of the pharmaceutical logistics system is efficient procurement. An efficient procurement procedure aims to guarantee the availability of the appropriate medications, in the appropriate dosages, at affordable costs, and in accordance with established quality standards.

All of the medications needed for patient treatment are always available thanks to a well-managed pharmaceutical supply chain. An efficient pharmaceutical supply chain should also be able to react to abrupt increases in drug demand, ensuring that there are sufficient supplies on hand to handle any crises that may develop (FMOH, 2010). The ultimate indicator of the success and efficiency of the other supply chain management elements, from forecasting and procurement through distribution, storage, and inventory management, is stock availability (Snow, 2022).

Business Process Reengineering (BPR), a component of the health care reform, was implemented in Ethiopian Fiscal Year 2001 with the primary goal of significantly enhancing the quality of health services through the institutionalization of accountability and transparency. One way to do this was to carefully explore separating the roles of payer, provider, and regulator in the health system (FMOH, 2011). A new service called the Food, Medicine and Health Care Administration and Control Authority (FMHACA) has replaced the former Drug Administration and Control Authority (DACA). The new Service's mission is to conduct integrated inspection and quality control of health and health-related items, buildings, personnel, and health delivery systems (HRP of FDRE, 2010). Ethiopian pharmaceutical services are governed by the National Drug Policy of 1993, which is a component of the health policy (MOH, 1993). Since the beginning of HSDP I, the Ethiopian government has been dedicated to ensuring that the community has access to necessary medications that are secure, efficient, and of guaranteed quality, including sensible drug prescription and use.

Additionally, since the implementation of HSDP III, a number of reforms have been implemented that have a big impact on the standard of pharmaceutical services. The Pharmaceutical Logistics Master Plan (PLMP), which was implemented in 2009 with the goal of ensuring the continuous supply of necessary, high-quality, and affordable

medications at all healthcare facilities, is one of the changes (FMOH, 2011). In order to accomplish this, the Pharmaceutical Fund and Supply Service (PFSA) was established with the following objectives: to provide the entire nation with Program and Essential medications, as well as to act as the distribution entity for vaccinations, other supplies for healthcare facilities, and laboratory equipment (World Bank, 2009). PFSA created the integrated pharmaceuticals logistics system, which unifies the drug, distribution, and reporting of essential pharmaceuticals that were previously managed vertically into a single mechanism, in order to carry out its mandate in the area of pharmaceuticals supply in an efficient and effective manner (Potchoo *et al.*, 2018).

2.3. Performance Measures in Supply Chain

The emphasis on achieving optimal performance in the supply chain regime has grown during the past few decades. Effective and efficient supply chain management has contributed to the success of businesses in this area. As a result, it has been emphasized over and time again how important various supply chain performance measurements are. All of them have contributed to the foundation for developing relevant metrics for supply chain performance, which have long been emphasized. According to a review of the literature on supply chain performance, several scholars have proposed various metrics and indicators to gauge supply network performance. There hasn't been any agreement on how to evaluate the success of the supply chain, and each metric has advantages and disadvantages of its own. In recent times, researchers have attempted to respond to these limitations by designing systemic and balanced performance measurements systems (Kebede, 2014).

Few attempts have been made to systematically categorize the methods for assessing the performance of supply networks in the field of performance measures. In addition, there is controversy on the best classification system for them. For instance, they have been divided into categories based on their quantitative or qualitative nature. They track both costs and non-costs (Habib, 2012).

Because of this, decision-makers and practitioners are not always sure how to utilize performance indicators to evaluate the effectiveness of supply chains. To measure supply chain performance, some academics have used the Balanced Scorecard (BSC) and Activity Based Costing (ABC) methodologies (Chopra & Meindl, 2007). Similar balanced frameworks have also been presented by other scholars, including the performance pyramid, results-determinants framework, and performance measurement matrix.

The earlier-mentioned supply chain operations reference (SCOR) model is perhaps the most well-known of them. A "systematic approach for identifying, evaluating, and monitoring supply chain performance," this was created by the Supply Chain Council in 1997 (Hussen, 2001).

It rests on the principle that a balanced approach is crucial; single indicators (e.g. cost or time) cannot be adequately taken to measure supply chain performance, which must be measured at multiple levels (Shepherd &

Günter, 2006). The SCOR model is a business process reference model. It provides a framework that includes SC business processes, performance metrics, best practices, and people features. In the SCOR model the metrics are linked with five management processes: plan, source, make, deliver, and return (Khan *et al*., 2010).

Plan: processes that adjust the expected resource need to the expected demand conditions.

Source: Processes that procure goods and service to meet planned or actual demand.

Make: processes that transform product to a finished state to meet planned or actual.

Deliver: processes that provide finished goods/services to meet planned or actual demand, typically including order management, transportation management and distribution management.

Return: Processes associated with returning or receiving returned products for any reason. These processes extend into post-delivery customer support.

With the help of channel partners, the coordination of logistical activities in an integrated supply chain is successfully expanded to include the processes of sourcing, manufacturing, and delivery. A smooth flow of demand information, supply of raw materials, and completed goods facilitates intra-firm coordination of sourcing, production, and logistical activities, which improves the ability to adapt to market volatility (Rao *et al*., 2011).

For management and decision-makers, performance assessment offers information that helps them comprehend the situation, recognize the potential and success of management methods, and take appropriate action. Performance measuring also aids in focusing management efforts, updating corporate objectives, and re-engineering business procedures. SC performance evaluation is beneficial for SCM's ongoing development (Chan, 2003).

The supply chain operation planning procedures are described in the plan processes. In order to evaluate projected capabilities and resource gaps, this involves acquiring client requirements, gathering data on the resources that are available, and balancing requirements and resources. The next step is to determine the steps needed to fill in any gaps (Pepino, 2012). Order lead time, martial usage, order entry technique, and forecasting accuracy measures were used to assess the planning effectiveness of the internal supply chain.

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

2.3.1. Flexibility

The ability of a system of an organization to react swiftly to changes that occur both inside and outside the system is referred to as flexibility. Gaining a competitive edge and satisfying consumers are an organization's ultimate goals in terms of performance. The ability of a system to make proactive and reactive changes to settings to deal with uncertainties that arise both inside and externally is an example of flexibility. The major goals of flexibility in the supply chain are to make procedures that create value more straightforward and to respond more quickly to consumer demands. Businesses nowadays must be customer-focused since business processes are becoming more complex. Companies can improve their products and become more flexible in a variety of ways, and one of those ways is to outsource portions of their product lines to other businesses (Huo et al., 2014).

2.3.2. Delivery/ Speed

The degree to which an organization's products and services live up to client expectations is known as delivery performance. It gives a hint as to the supply chain's capacity for supplying goods and services to the consumer. Delivery time and lead time are the two classic performance measurement metrics. Time, lead time, and cycle time were determined by several researches. Cycle time is the amount of time it takes for one job or task to be completed before another one of the same kind may be started. Lead time is the amount of time needed for the company and the supplier to make, transport, process, warehouse, and deliver the product or service to the ultimate customer after the client places the order (Chibba, 2007). This statistic is crucial to supply chain management because it incorporates (involves) performance measurement from the supplier to the customer. Delivery is observed in industrial sectors from both the suppliers' and consumers' perspectives. A delayed delivery will increase the supplier's procurement costs and therefore reduce revenues to end consumers.

2.3.3. Cost

Cost reduction is one of the metrics for enhancing operational performance. Cost is referred to as the total of all expenses, which includes all freight both inbound and outbound as well as warehousing, third-party, order processing, direct labor, administrative, and service expenses. Building a plan centered on lowering total costs requires maximizing resource utilization, turning over work-in-process inventory, and ceasing non-value-added operations. Effective cost management entails making the best use of resources to maximize organizational effectiveness and deliver value to customers. This justification will lead to client happiness, loyalty, and long-term wealth for the company. Making decisions that are effective in managing costs Cost control results in valuable resource endowment, which in turn creates value for the final consumers and raises consumer satisfaction (Johnson & Karlay, 2018).

2.3.4. Quality

The level of communication among supply chain participants has a strong correlation with quality. At this stage, the degree of correctness, sufficiency, level of updating, and completeness in the process of communication

among supply chain participants is used to express the quality of communication. Based on the system of information, the quality of communication is inferred; outsourcing and other associated organizational ties are seen as essential factors in the relationship between supply chain partners. The company should work to build meaningful and high-level contact with supply chain partners to improve the quality and involvement along the supply chain in order to establish and maintain effective cooperation. When it comes to integrating organizational system-related tasks, the quality of communications is crucial since it helps to integrate a sustainable supply chain. The key takeaway is that there is a favorable relationship between supply chain integration and communication quality, with both direct and indirect effects possible (Cutting-Decelle & Young, 2007).

2.4. Empirical Review

2.4.1. Internal Integration

Almost all studies concluded that the supply chain integration is considered as vital process that affects operational performance, consequently the organizations‟ general performance of the company. The integrated internal system strives to harmonize the business competencies, viewpoints, and culture, which decision-making is improved and lessens threats, cost implications, and conflicts of interest.

Hue et al., (2014) revealed that supplier integration had a weaker correlation to performance enhancement compared to customer and internal integration. Continuous information sharing in the supply chain participants allows functioning as a single organization that understands what consumers want, and so has a better degree of flexibility (Huo et al., 2014).

The operational performance of the manufacturing enterprises under study, which included 75 manufacturing companies in Morocco, is strongly and favorably connected with Integration of internal processes, external suppliers, and customers. The study's goals were to clarify how integration of SC directly impacts manufacturing organizations' operational performance as well as how internal integration mediates the connection between operational effectiveness and external integration. Internal integration was taken into account by the writers from the standpoint of organizational capabilities customer and supplier integration, as a set of intra-organizational capabilities, and inter-organizational capabilities. They focused on a set of recommended practices for integrating business processes and flows that industrial organizations must employ to offer value for the end user as well as demonstrate internal integration strategies to maximize the advantages of external integration (Errassafi et al., 2019).

In a survey conducted using a hierarchical linear regression technique of analysis, 604 Chinese manufacturers were included in the study, according to Huo et al. (2014). The ultimate objective of the article was to empirically illustrate the advantages of numerous cost leadership and differentiation tactics of various supply chain integration (SCI) approaches. The results revealed how the effectiveness of SCI approaches was significantly impacted by

competitive strategies, includes integration of internal processes and products. More specifically, internal integration greatly influenced economic success of cost leaders, whereas Process integration had a substantial impact on differentiators' financial success. However, SCI and operational success were not significantly affected one another by competing strategies (Huo et al., 2014). The study contributed by assessing the efficiency of business success under different competitive tactics of diverse SCI practices. Internal integration still has a direct impact on the supply chain's performance, though not exclusively.

2.4.2. Supply chain flexibility

By Alfalla-Luque et al. (2013) The three key components of SCI were discovered to be integrating information, collaboration and sharing of resources and organizational connection connecting. The suggested framework helps integrate the focus organization with both downstream clients and upstream suppliers. Additionally, it makes it possible to measure SCI using qualitative as well as quantitative methods. (Alfalla-Luque et al., 2013). This study suggests practitioners and researchers to recognize SCI parameters and dimensions and investigates how SCI affects the whole functioning of the supply chain (SC) through the ability to respond and effectiveness. Additionally, there has been a lot of research done on SCI, a thorough and integrated strategy is still lacking. By creating a framework for assessing SCI, this study closes the integration gap by allowing any business to determine the critical elements for incorporating their SC, measuring integration levels both subjectively and statistically, and suggesting ways to improve. Since internal integration's effects were not given much consideration.

Supply chain flexibility and resilience were all looked at in the research of Indonesian to see how they affected long-term benefit. Participants in this study came from Indonesian manufacturing firms. The industrial sector is one among those that has been most negatively impacted by the COVID-19 pandemic's abrupt upheaval in the world's order, according to the authors. They struggled to reorganize their network and relationships in the internal and external supply chains due to the lockdown policies, scenario, and unfavorable impact on the availability of raw materials. A questionnaire was utilized to gather the data, and a five-point Likert scale was used to evaluate the responses. The survey was sent to the selected group of manufacturing companies via a Google Form link, and it was also shared via email and the social media platform WhatsApp. 672 questionnaires were filled out by respondents, and 456 of them (or 67.86%) were correctly completed and so declared legitimate for further research. The Smart PLS software version 3.3 was used to analyze the data using partial least squares (PLS) regression. The findings confirmed each of the nine put forth ideas. Supply chain (SC) alliances, SC agility, and SC resilience are impacted by internal integration through interdepartmental data exchange. Additionally, SC collaborations increase SC agility, SC resilience, and SC adaptability by ensuring that resources are delivered on time and by managing shifting demand (Tarigan et al., 2021).

Small and medium business (SMEs) owners in the Abossey Okai business enclave were given questionnaires as part of a cross-sectional study that examined the SMEs performance-internal integration link and the mediating effect of external integration. Information and communication technology (ICT) mediated the relationship between internal and external integration and SMEs' performance. Based on 163 validated questionnaires, structural equation modeling was used to determine how the dimensions related to one another. Analysis of Moment Structures (Amos) and the Statistical Package for Social Sciences (SPSS) were used to analyze the data. The results then demonstrated that external integration acted as a mediator in the relationship between internal integration and SMEs' performance. Additionally, ICT positively moderated the relationships between external integration and SMEs performance as well as internal and external integration (Amoako et al., 2020). Practically speaking, this research teaches SMEs' owners and managers the value of creating internal organizational structures and strengthening connections with outside partners.

2.4. Conceptual framework

Separate areas of supply chain integration will be discussed. Aspects of SCI include organizational relationship linkage (ORL), information integration, and resource sharing (CRS) (H. L. Lee *et al*., 2000). SCI was categorized into five interconnected aspects: sharing of data and communications, collaboration leading to threat, sharing of revenue and expenditure (operational and strategic cooperation), sharing of information, thoughts, and organizational standards. (Prabir K. Bagchi *et al*., 2005). SCI's major elements were thought to be the extent of information exchange and decision-making coordination (Sahin & Robinson, 2005). Sharing resources and coordinating efforts directly improve performance. Increasing the integration of the supply chain through linking organizational relationships improves performance (Prabir K. Bagchi *et al*., 2005).

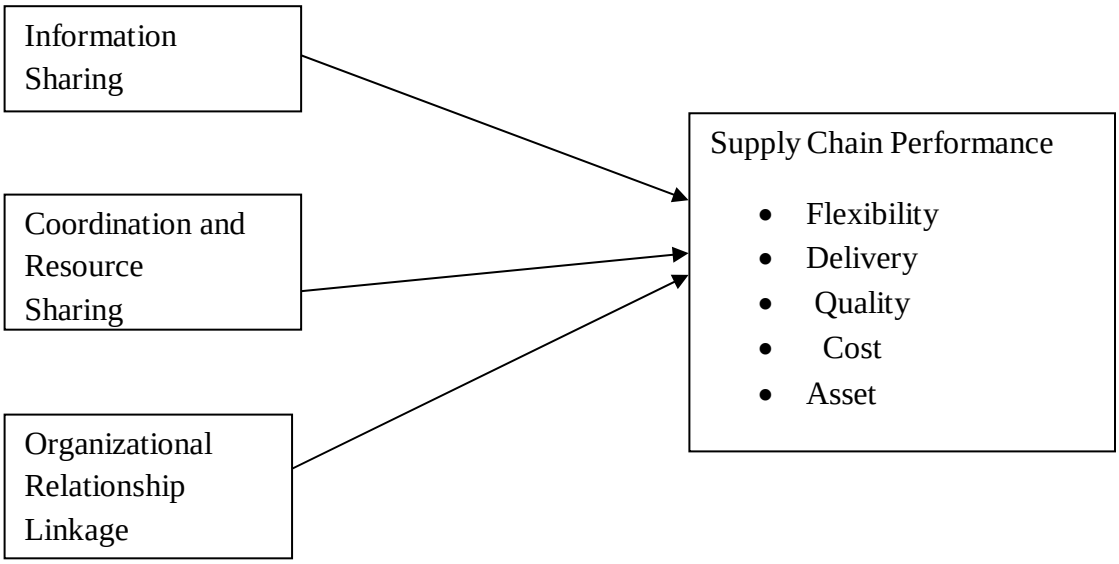

FIGURE 1: Conceptual framework (Alfalla-Luque *et al*., 2013)

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CHAPTER THREE

3. RESEARCH METHODOLOGY

3.1. Introduction

The part here defines the methodologies that were applied to this study, including the selection of a specific the study area and unit, the data type and source, the data collection methods and tools, the sample methods and techniques, and the data analysis methods all play a role in the research methodology and designs, as well as the appropriate justification for each approach.

3.2. Description of the study Area

The Ethiopian Pharmaceutical Supply Service is a government-run organization that procures all typesof medicines, medical equipment, medical supplies, laboratory reagents, and chemicals from national and international manufacturers and suppliers and distributes them to the government Health facilities through its 19 branches across the country.

The Organization is in charge of the entire healthcare supply chain for the public sector, which includes forecasting, purchasing, storing, and distributing medications, medical supplies, diagnostic chemicals and reagents, and medical equipment. Today, its operations generate close to $1 billion in yearly revenue.

3.3. Research Design

A method of research is defined as a tactical framework for action that connects research issues with its execution or application (Ornstein, 2013). The study was used descriptive and explanatory study design. Internal integration issues were explained in the explanatory research design. The factors of the study (information integration,

coordination, resource sharing, and organizational connection linkage) are supported by the causal links between them and the effectiveness of the pharmaceutical supply chain.

3.4. Research Approach

According to Creswell, (2014) There are three research approaches namely; the quantitative, qualitative and mixed approaches, Quantitative approach was used for this research. The study employed quantitative approaches to produce a theme of concepts and numerical data that can be transformed into frameworks and numbers, respectively. The study focused on counting and classifying aspects as well as producing statistical tools and figures to characterize what is observed using structured questionnaires or methodologies.

3.5. Population

3.5.1. Source Population

The targeted population included all personnel who are employed by the company known as Ethiopian pharmaceutical supply Service since the aim for the research was to evaluate the impact of internal integrity on supply chain management in the case of Ethiopian pharmaceutical supply Service. All individuals who requested EPSS service from the company were taken into account as a source population, regardless of gender, educational level, socioeconomic status, or residence area.

3.5.2. Study Population

A study's population was previously described as a sizable group of individuals, organizations, things, etc. that all share characteristics that the researcher is interested in. (Rafeedale, 2013). The study participant was all professional who have supply chain experience.

3.5.3. Eligibility Criteria

3.5.3.1. Inclusion Criteria

A professional who was employees of Ethiopian pharmaceutical supply Service and who was willing to participate in the study was counted as a study population.

3.5.3.2. Exclusion Criteria

An individual who was not employee of Ethiopian pharmaceutical supply Service in supply chain department, who was on annual or sick leave, who is not able to respond properly due to medical or related issues, who was not be willing to participate in the study and who is not selected as a study population by simple random selection was excluded.

3.6. Sample Size Determination and Sampling Procedure

According to their proximity to the primary EPSS functions, the population was drawn from the overall organizational structure. Following the selection of the respondents from Central's five directorates, a sample size

of 125 was determined. The following list includes EPSS who are specifically involved in the distribution of pharmaceuticals.

1. Warehouse 53
2. Distribution 16
3. Forecasting 22
4. Tender 19
5. Contract 25

3.7. Source of data

3.7.2. Primary Source

Primary data was collected from employees working in Warehouse, Distribution, Forecasting, Tender and contract who were directly involved in the supply chain practices of pharmaceuticals using structured questionnaires, which were only closed-ended questions.

3.7.3. Secondary Source

Journals, SOPs, reports, and any other documents that the researcher comes across while gathering dataand thinks are beneficial in enhancing the research were considered secondary sources of data in this study.

3.8. Data Collection Instruments

The gathering of data took into account internal integration practices and their impact on supply chain performance, which was examined using an organized survey based on a 5-point Likert scale score system with a score of 1 (strongly disagree) to 5 (strongly agree).

The research instrument had been designed clearly and was free from any ambiguity to achieve the specified study outcome. The research instrument was created with complete clarityto satisfy the stated study objectives. Before beginning data collection, the chosen participants were contacted for their permission. Following confirmation of participant willingness, each respondent received the prepared, self-administered, structured questionnaire. After a predetermined period,questionnaires were collected, and respondents were thanked for their involvement and their valuable time. To gather information about the effects of warehousing practices on pharmaceutical warehouse performance, a document review was carried out. The main data was gathered from the study's participants, and consequently, the collected data was tested for completeness and consistency earlier starting the analysis. There were two elements to the questionnaire that was proposed and used in this investigation. Part one of the study looked at demographics, while part two looked at internal integration practice and impact on supply chain performanc.

3.9. Statistical Analysis

Epi data version 4.2.0.0 was used to enter and code the data, and then the data was exported for cleaning and analysis to SPSS version 25.0. A Descriptive and inferential statistics was calculated. In descriptive statistical analysis, the data was summarized in percentage, frequency and/or mean and standard deviation. In inferential statistics, ordinal regression was calculated to determine the association between the dependent variable and independent variables. Then the results was described and presented using frequency tables and figures.

3.10. Validity and Reliability

3.10.1. Validity

By testing the validity, readability, clarity, and ambiguity of the statements and questions, the data collection tools were piloted on a sample of the respondents to make sure the questionnaires are valid. Through the pilot study, the investigator was capable to clarify several terminologies, and the instruments were changed as a result.

3.10.2. Reliability

Only variables with multiple measurement questions can be used to calculate Cronbach's alpha, a reliability indicator that measures the variance in the true score of the underlying construct that has been accounted for. Cronbach's test has been carried out to verify the instrument's reliability. Reliability is the trend toward consistency exhibited in repeated measurements of the same phenomenon. The extent to which all the items on a scale measure distinct aspects of the same property is referred to as internal consistency. Cronbach's alpha standard ranges from 0 to 1, and a valueof 0.7 or higher is considered internally consistent or sufficiently reliable data (Deniz and Alsaffar, 2013).

The results showed that all variables had Cronbach's alpha values over 0.70. All variables are therefore internally consistent and sufficiently reliable.

3.11. Ethical Considerations

Informed consent was the major ethical issue in conducting research. Accordingly, Respondents were therefore given the assurance that the data they submitted was private and would only be used for academic purposes. Furthermore, statements attest to the ban on questioners using their own identities or personal references. This enables respondents to express their ideas freely and lets the researcher collect responses devoid of bias. There was a lot of work put into making sure the response was confidential and that it wouldn't be utilized for any personal gain. In general, the entire study process was monitored to ensure that it adhered to acceptable

professional ethics. The finding of this study will be disseminated to AAU and Ethiopian pharmaceutical Service was receiving a copy of the final thesis report. Based on their permission the PI will present her research findings to the respective company. Furthermore, the finding will be presented at appropriate seminars, conferences, and workshops.

CHAPTER FOUR

4. RESULTS, DISCUSSION and INTERPRETATION

The study results on the impact of internal integration on the efficiency of the pharmaceutical supply chain at EPSS are presented in this chapter. Using descriptive and inferential statistics, the study's key findings have been demonstrated. In its four subsections, which include sociodemographic traits, descriptive statistics (such as frequency and percentage), correlation analysis, and lastly binary logistic regression analysis, the chapter covers all these topics.

4.1. Response rate of the study

The response rate is defined as the proportion of legitimate responses to all eligible respondents in the target demographic.125 of the 135 questionnaires provided to respondents are correctly filled out and returned to the researcher. This was a response rate of 92.6 percent. For analysis and reporting, Fincham (2008) noted that a response rate of 50% is suitable for generalization, a rate of 60% is good, and a rate of 70% or above is exceptional. The thesis' response rate was therefore trustworthy (Fincham, 2008).

Statistical analysis that aids in meaningfully describing, displaying, or summarizing data is known as descriptive analysis. It is crucial because, especially if there is a lot of raw data, it would be difficult to understand what the data was indicating. Therefore, descriptive statistics help the researcher display the data in a more understandable fashion, making it easier to analyze the data.

4.2. Sociodemographic Characteristics of Respondent

The general information on gender, age, educational background, occupation of the in charge, and work departments in EPSS is covered in this section.

Table 1: Sociodemographic Characteristics of Participants

Table 1 show that out of 125 respondents, 95 (76.0) were men and 30 (24.0) were women. According to the data, the majority of respondents were men. According to the figures, 21 of the 125 respondents—or 16.8 percent—were younger than 26 years old. 29 respondents, or 23.2 percent, were in the 26- to 30-year-old age range. 30

(24.0%) respondents were between the ages of 31 and 35, 21 (16.8%) were between the ages of 36 and 40, 15 (12.0%) were between the ages of 41 and 45 and 09 (7.2%) were over the age of 45. Therefore, according to the calculated statistics, the majority of respondents (24.0%) were in the age range of 31 to 35 years, which is referred to as the youthful age group. This indicates that the respondents are able to comprehend the questions and provide accurate information. In addition, 18 (14.4%) respondents had a diploma, 75 (63.0%) had a BA/BSc, and 32 (23.7%) had an MSc/MA, according to the results. This shows that the respondents can give the pertinent and precise data required for the study on the impact of internal integration on the effectiveness of the pharmaceutical supply chain.

16 (12.8%) of respondents said they had experience working for < 1 years, 54 (43.2%) said they had experience working for 1 to 5 years, and 34 (27.2%) said they had experience working for 6 to 10 years. 21 (16.8%) of those surveyed have experience spanning more than 10 years. According to the findings, the majority of respondents have between one- and five-years' worth of job experience. The respondents provided the precise and exact information required by the researcher for the study since they were aware of the contemporary application and implications of supply chain procedures.

In order to fairly assess their ability to answer the research questions, it is vital to identify the respondents' precise professional credentials. According to the research, in order to comprehend the practice of internal integration, personnel must possess supply chain qualifications and training. This is because grasping internal integration prospects demands expertise. Accordingly, out of the 125 responses, pharmacists made up the biggest number with 75 (60%). 15 (12.0%) druggists, 20 (16.0%) medical laboratory technologist, 10 (8.0%) biomedical engineers and 05 (4.0%) made up the remaining professions. Twenty four of the pharmacists had master's degrees in logistics and supply chain management. All of the respondents had a thorough understanding of internal integration because the majority of them had studied supply chain in school.

Table 1: sociodemographic data

Variables	**Category**	**N (%)**
Gender	Male	95 (76.0)
	Female	30 (24.0)
Age (in Years)	19 – 25	21 (16.8)
	26 – 30	29 (23.2)
	31 – 35	30 (24.0)
	36 – 40	21 (16.8)
	41 – 45	15 (12.0)

	> 45	09 (7.2)
Which department do you now work in?	Inventory and Warehouse Management	50 (40.0)
	Procurement and Tender	18 (14.4)
	Distribution and Fleet	10 (8.0)
	Forecasting and Market Shaping	22 (17.6)
	Contracting	25 (20.0)
What is your field of study /Specialization?	Druggist	15 (12.0)
	Pharmacist	75 (60)
	Medical Laboratory Technologist	20 (16.0)
	Biomedical Engineer	10 (8.0)
	Others	05 (4.0)
Maximum Educational Status	Diploma	18 (14.4)
	B.Sc./BA	75 (60.0)
	M.Sc./MA	32 (25.6)
Work Experience (in Years)	< 1	16 (12.8)
	1 – 5	54 (43.2)
	6 – 10	34 (27.2)
	> 10	21 (16.8)

4.3. Internal Integration in EPSS

A measure of central tendency like mean provides a broad overview of the data without needlessly comparing each observation in the data set to every other. The average response rates for each internal integration dimension indicate that there is a generally positive or negative response to each dimension. In this instance, the overall internal integration of EPSS was determined by calculating the mean of each item together with their corresponding dimension overall mean/average mean. The 5-point Likert scale was used to calculate the items' mean statistical values (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree). Mean scores of 3.80 and higher are high, 3.40 to 3.79 are moderate, and 3.39 and lower are low (Pihie & Bagheri, 2011).

Table 2: Internal Integration in EPSS (N = 125)

The extent of internal integration in EPSS was a question that participants who indicated "yes" for the application were asked about. Accordingly, the majority of participants (54.5%) indicated that internal integration in EPSS is

moderate, while 5.5% of the participants indicated that internal integration in EPSS is very high. The remaining 18.2% and 21.8% rated EPSS's internal integration as high and low, respectively.

When asked how they would grade EPSS's use of internal integration, respondents gave their opinions in a 78.2% to 21.8% ratio, with 21.8% disagreeing with the majority.

We asked respondents for their perspective on how internal integration affects the effectiveness of the pharmaceutical supply chain. The standard deviation ranges from 0.96 to 1.21, with the mean value being between 3.79 and 4.92. The overall mean of the impact of internal integration on the efficiency of the pharmaceutical supply chain was 4.27, indicating that respondents generally concur that internal integration has a greater impact on efficiency.

"Improve understanding of market trends and customer needs" came in second with a mean of 4.87, closely following "Enhance value to the customer" with a mean of 4.92. Internal integration had an impact on "Reduce total cycle time" with a mean of 4.06. Internal integration had a mean effect on "Reduce total logistics costs" and "Reduce days of stock out" with mean values of 4.01 and 3.98, respectively. With a mean score of 3.79, the item "Improve identification of ways to improving supply chain performance" was the least affected by the other items.

Table 2: Internal Integration in EPSS

Internal Integration	**Mean**	**SD**
Improve understanding of market trends and customer needs	4.87	1.21
Improve identification of ways of improving supply chain performance	3.79	1.01
Reduce total cycle time	4.06	0.96
Reduce total logistics costs	4.01	1.06
Enhance value to the customer	4.92	1.11
Reduce days of stock out	3.98	1.05
Grand mean	**4.27**	**1.07**

4.4. Internal Integration Practices

Information integration, coordination and resource sharing, and organizational relationship linkage were independent variables that were statistically examined in the current study.

The mean and standard deviations for the questions posed to assess the performance of the pharmaceutical supply chain at EPSS are shown in ***Table 3*** below. The mean scores fall between the ranges of 2.3 and 3.7. The findings revealed that the availability of a common computerized data base system and employees' use of IT tools to speed up information access have respective mean values that are higher than the other mean values.

Pharmaceutical inventory information access by functional departments has a mean value of 3.1 and a standard deviation of 1.23. Different departments' participation in information exchanges had the lowest mean scores, 2.3 ± 1.09. At EPSS, the total mean value for information integration is 3.02, which is considered to be low.

In order to achieve an integrated supply chain, information sharing across the chain is a crucial and crucial component. Information integration is thought to increase collaboration, reduce uncertainty, speed up material flow, expedite order fulfillment, reduce inventory costs, increase customer satisfaction through reliable and quick delivery of goods, improve performance, and increase operational effectiveness. Therefore, EPSS's low level of information integration adoption has a negative impact on the organization's supply chain performance (Gu *et al*., 2021).

The coordination and resource sharing questions have mean scores that vary from 2.9 to 3.6. The statement "Employees regularly interact with each other through such means as meetings, email" got the highest score of all the others (3.6 ± 1.01). The next statement is "The activities in various departments are coordinated centrally" (3.5 ± 1.22). The average mean value of resource sharing and coordination (3.25 ± 1.13) showed that there is little resource sharing and coordination within EPSS. The outcome showed that EPSS was negatively impacted by ineffective resource sharing and coordination. Resource integration has an impact on the performance quality of the supply chain (Kumar *et al*., 2017). Table 3 below has the remaining numbers.

The organizational relationship linkage items' average value ranges from 2.54 to 3.01. The highest mean value (3.01 ± 1.32) was assigned to "The pursuit of various departmental objectives is harmonized," while the lowest mean value (2.54 ± 1.11) was given to "Information systems in different departments are connected into a single department." Organizational relationship linkage has a low level overall mean value of 2.85 ± 1.16. As far as organization relationship linking is concerned, EPSS has poorly implemented coordination, resource sharing, and information integration.

Table 3: Internal Integration Aspects of EPSS

Aspects	**Statements**	**Mean**	**SD**

Information Integration	All employees are allowed to access all information they may require in execution of their tasks	2.4	1.32
	Employees utilize IT tools in facilitating information access	3.6	1.42
	Different departments engage in information exchanges	2.3	1.09
	All functional departments have information access to inventory level of pharmaceuticals	3.1	1.23
	Common Computerized database system available	3.7	1.33
	There is strong information sharing strategy	3.01	1.13
Grand mean		**3.02**	**1.25**
Coordination and Resource Sharing	Employees regularly interact with each other through such means as meetings, email	3.6	1.01
	The activities in various departments are coordinated centrally	3.5	1.22
	The resources required in task execution are shared among the different departments	3.2	1.18
	There is an essence of collaboration between different departments and employees in the organization	2.9	1.02
	There is use of cross functional teams in demand forecasting	3.04	1.2
Grand mean		**3.25**	**1.13**
Organizational Relationship Linkage	Information systems in different departments are connected in to a single department	2.54	1.11

	Departmental plans and objectives are set jointly	2.87	1.04
	The pursuit of various departmental objectives is harmonized	3.01	1.32
	Linkages have been established across various departments with the use of integration tools such as ERP systems	2.99	1.17
Grand mean		**2.85**	**1.16**

4.5. Supply Chain Performance Dimensions of EPSS

For the current analysis, four supply chain performance factors were considered. These include quality, cost, delivery, and flexibility. The standard deviation ranges from 0.94 to 1.22, and the average mean of the dependent dimensions was between 2.95 and 3.22, all of which point to poor supply chain performance in the EPSS. With an average mean value of (3.10 ± 1.03, 2.91 ± 1.03, 3.22 ± 0.97, and 3.05 ± 1.06), respondents indicated that EPSS's flexibility, delivery, cost, and quality are all subpar.

Respondents were given four questions on the first dimension of flexibility, and the answers for each question revealed a value for "The organization can quickly modify the supply chain process to meet customer's requirements" (2.97 ± 0.98), "The organization can quickly introduce new products into the market" (3.03 ± 1.03), "The organization can quickly respond to changes in customer demand" (3.21 ± 1.12), and "The organization can quickly adjust and refill unexpected (emergency) need from customers" (3.12 ± 0.99).

The survey also evaluated the delivery procedures, and the respondents noted that the pharmaceutical products were delivered to clients on time and as needed (2.98 ± 1.11) and the low time required to meet consumer demand (2.91 ± 0.94) were both strengths. With a low mean value (2.85 ± 1.05), the respondents were likewise divided on whether the organization's on-time delivery recorded.

Cost is the other dimension of supply chain performance that was anticipated to receive responses, and the mean value for the question regarding the decrease of logistics costs is (3.22 ± 0.97), which is still in the lower range.

The respondents gave their opinions on the organizations' capacity to deliver better service quality (2.95 ± 0.99) and a high level of customer service (2.97 ± 1.22) in response to the questions posed under the quality dimension of supply chain performance. The figures also show that EPSS offers poor-quality services.

The aggregate mean of the four supply chain performance metrics is 3.07, which indicates that EPSS's supply chain performance is subpar. This is a result of the internal integration dimensions' subpar implementation. A beneficial impact of internal integration on performance was discovered by previous studies (Huo, 2012; C. W. Lee *et al*., 2007; Thai & Jie, 2018) in terms of profits, delivery speed, and transportation costs.

Table 4: Supply Chain Performance Dimensions of EPSS

Dimensions	**Statements**	**Mean**	**SD**
Flexibility	The organization can quickly modify the supply chain process to meet customer's requirements	2.97	0.98
	The organization can quickly introduce new products into the market	3.03	1.03
	The organization can quickly respond to changes in customer demand	3.21	1.12
	The organization can quickly adjust and refill unexpected (emergency) need from customers	3.12	0.99
Grand mean		**3.1**	**1.03**
Delivery	The organization has an outstanding (excellent) on-time delivery record to customers	2.85	1.05
	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	2.91	0.94
	The organization delivers pharmaceutical products to customers on time and when needed	2.98	1.11
Grand mean		**2.91**	**1.03**
Cost	The organization reduces logistics cost	3.22	0.97
Quality	The organization provide better quality of service	2.95	0.99

	The organization provides a high level of customer service	2.97	1.22
Grand mean		**3.05**	**1.06**

4.6. Correlation Analysis

The association between two variables is known as correlation. Therefore, the researcher is interested in learning more about the type, importance, and direction of the bivariate relationship between the variables used in the study. The pair-wise associations for a collection of variables are computed by the bivariate correlations process, and the results are shown as a matrix. The degree and direction of the link between variables can be ascertained using this information. The direction, intensity, and significance of the bivariate connections between each study variable are shown in a Pearson correlation matrix.

A very helpful way to express the relationship between two variables in a single number that ranges from -1 to +1 is to utilize the correlation coefficient. The correlation coefficient is commonly represented by the letter "r". Therefore, a perfect positive relationship (r= +1) denotes a direct relationship, a perfect negative relationship (r= -1), and a zero "r" value denotes no relationship at all between the variables.

According to the specific assumption regarding the correlation coefficient, there is little correlation if "r" is between zero and 0.3 (-0.3). Low positive (negative) correlation is considered for "r" values between 0.3 and 0.5 (-0.3 and -0.5). High positive (negative) correlation is indicated by an "r" value between 0.7 and 0.9 (-0.7 and -0.9), whereas moderate positive (negative) correlation is indicated by an "r" value between 0.5 and 0.7 (-0.5 and -0.7). "r" values between 0.9 and 1 (-0.9 and -1) are indicative of extremely high positive (negative) correlation (Mukaka, 2012). A two-tailed test of statistical significance at the level of 95% significance, $p < 0.05$, was utilized in this study to assess the association between variables using the bivariate Pearson Coefficient (r).

Table 5: Pearson correlation of study variables

Variables	**Category**	**Information Integration**	**Coordination and Resource Sharing**	**Organizational Relationship Linkage**	**Supply Chain Performance**
	r	1	0.566**	0.602**	0.634**

Information Integration	p		0.002	0.001	0.001
Coordination and Resource Sharing	r		1	0.666**	0.643**
	p			0	0.001
Organizational Relationship Linkage	r			1	0.624**
	p				0.002
Supply Chain Performance	r				1
	p				

Supply chain performance and information integration have a somewhat moderate link, according to the results of the bivariate Pearson correlation analysis (r = 0.634**). Similarly, information technology integration and supply chain performance were found to be positively and directly correlated in previous studies (Kim, 2017; Vickery *et al.*, 2003). Moreover, Supply chain performance is somewhat positively correlated with the other two independent variables, coordination and resource sharing and organizational connection linkage, with r = 0.643** and r = 0.624** respectively. Information technology and coordination have also been found to have a direct beneficial association with supply chain performance by another studies (Shukla, 2022; Singh & Teng, 2016).

Therefore, at a 99% level of confidence, the results of the correlation analysis demonstrate a positive relationship between all independent variables (information integration, coordination, resource sharing, and organizational linkage) and the dependent variable supply chain performance. Since the correlation coefficients between the three independent variables are all moderate, boosting these independent variables will help. The researcher rejected the null hypothesis and accepted the alternative hypothesis, which states that internal integration dimensions (information integration, coordination, resource sharing, and organizational linkage) have a direct positive relationship with supply chain performance. Implementation results in increased EPSS supply chain performance.

4.7. Regression Analysis

To get a predicted value or variable estimations and cause-and-effect inferences, a regression analysis must be utilized to establish the relationship between the explanatory factors and the explained variable. Regression analysis in this study uses three explanatory variables, making it a multivariate regression analysis. When there

are two or more independent variables on the chosen model, a multiple regression analysis is performed (Bettis et al., 2014).

4.11. Multiple linear regression assumptions

4.11.1. Multi collinearity Test

Multi-collinearity is defined as a condition in which the inter correlations between independent variables in a multiple regression model are extremely high, resulting in misrepresentations of regressionanalysis results. If the value of r = 1, it means that the predictor variables are exactly multi collinear, resulting in inaccurate inferences regarding the association between the independent and dependent variables (Kim, 2019). The data is free of multi collinearity issues if the tolerance and variance inflation factors are greater than 0.1 and less than 10, respectively (Kim, 2019).

Model	Collinearity Statistics	
	Tolerance	VIF
Coordination and Resource Sharing	0.46	2.86
Information Integration	0.711	1.75
Organizational Relationship Linkages	0.58	1.994

To identify the multicollinearity issue, before performing the regression analysis, the VIF method is used. As presented in Table 4.9, the values of VIF are well below 10, indicating that multicollinearity among the study's independent variables is not an issue.

4.11.2. Normality Test

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.

	N	Skewness		Kurtosis		Fisher skewness Coefficient	Fisher Kurtosis Coefficient
	Statistic	Statistic	Std. Error	Statistic	Std. Error		
Information Integration	125	.166	.233	-.489	.461	1.2334	1.886
Coordination and Resource Sharing	125	.426	.233	.084	.461	1.8766	1.338
Organizational Relationship Linkage	125	.277	.233	-.045	.461	-1.2534	.855
Supply Chain Performance	125	.314	.233	-.463	.461	0.8673	.845
Valid N (listwise)	125						

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). The study 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).

4.12. Regression Analysis

Regression analysis is a way of predicting an outcome variable from one predictor variable (simple regression) or several predictor variables (multiple regressions).

Table 4.10: Coefficient of determination

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.771[a]	0.595	0.582	.21363
a. Predictors: (Constant), Information Integration, coordination and resource sharing, organization relationship				
b. Dependent Variable: Supply chain Performance				

Source: SPSS own Survey (2023)

Analysis of Variance (ANOVA)

The F ratio enables us to check whether the entire model is suitable for the research paper. As seen in the table, the level of significance is less than 0.05 (0.01), thus explaining the existence of a statistically significant relationship between independent variables and dependent variables. Internal Integration have significantly predicted the Supply Chain performance of the organization by F = 60.5 times, at a sig. value ofless than 0.01. As a result, the entire model is important and a good fit for the research.

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.172	3	2.057	60.5	.000[b]
	Residual	4.199	121	.034		
	Total	10.37	124			

Regression Coefficient

As can be seen from the model summary above, the letter "R" stands for the multiple correlation coefficient value of 0.771, which indicates a very strong correlation between the independent and dependent variables and allows a high level of prediction. The effects of Internal Integration on the supply chain performance of the Ethiopian Pharmaceutical Supply Service are investigated using the coefficient of determination (R square value) analysis. Compared to R squared, which can only go up, adjusted R squared can go down with the addition of fewer relevant factors, making it a more reliable and precise measurement than R2. The

model can explain 58.2% of the variance in the supply chain performance of pharmaceuticals, according to the adjusted R-square (0.582), which was obtained by combining all predictor (Supply Chain Performance) variables linearly. The remaining factors, which were not considered in this study, are responsible for 41.8% of the change or influence on the supply performance of the organization, necessitating further research.

In general, the three variables of Internal Integration practices, namely: Information Integration, coordination and resource sharing, organization relationship are good explanatory variables in predicting the organization's supply chain performance.

Table 6: Regression coefficient in the multivariate regression analysis

	Coefficients [a]				
Model	Unstandardized Coefficients		Standardized Coefficients	t	p-value
	B	SEM	B		
(Constant)	0.221	0.111		1.032	0.342
Coordination and Resource Sharing	0.321	0.099	0.311	3.67	0.001
Information Integration	0.303	0.087	0.298	3.54	0.002
Organizational Relationship Linkage	0.265	0.075	0.278	2.55	0.004

Dependent variable: Supply chain performance

Table 6 showed the significance of the explanatory variables in relation to the explained variable as well as the beta coefficients for the independent variables. The results of the study show that coordination and resource sharing, information integration, and organizational relationship linkage all have a substantial impact on the supply chain performance of EPSS (at a 95% significant level). According to the statistics, an increase in information integration will result in a 0.303 rise in EPSS supply chain performance while maintaining organizational relationship linkage, coordination, and resource sharing at zero.

The standardize beta value displays the number of standard deviations that will vary with every prediction change of one standard deviation. The direct comparability of the standard deviation units gives them a better understanding of the significance of a predictor in the model. The dependent variable can be predicted more

accurately when an independent variable's large beta coefficient value is present. For the coordination and resource sharing dimension, the average beta value is 0.311. This suggests that this characteristic is more significant than others for analyzing the impact of internal integration. Information integration and organizational relationship linking have conventional beta values of 0.29 and 0.27, respectively.

The standardized coefficient $\beta = 0.311$, $p = 0.001$, which is significant at 95 percent, rules out the null hypothesis (H0 = coordination and resource sharing have no direct effect on pharmaceutical supply chain performance at EPSS). The coefficient is additionally positive. As a result, the alternative hypothesis (H2 = coordination and resource sharing have a direct impact on the pharmaceutical supply chain performance of EPSS) is accepted, and the null hypothesis is thus rejected. As a result, the study rejects H0 while accepting H2 at a 95% level of significance.

Information integration also showed a significant influence on EPSS's pharmaceutical supply chain performance at a 95 percent level of significance ($\beta = 0.298$, $p = 0.002$). Since information integration has a direct and significant impact on EPSS's pharmaceutical supply chain performance, the study accepted H1 at a level of significance of 95%. Accordingly, earlier research revealed that internal integration enhances the performance of the entire supply chain (Danese et al., 2013; Ganbold et al., 2021; Huo, 2012).

Organizational relationship linkage is the final factor that influences supply chain performance. Organizational relationship linkage also significantly influences EPSS's pharmaceutical supply chain performance, with $\beta = 0.278$, $p = 0.004$ at 95 percent significant level. As a result, the alternative hypothesis is accepted, and the null hypothesis is rejected.

Operational coordination is positively associated with operational performance and business performance in Huo's study (Huo, 2012). Furthermore, Liu et al Findings indicated that while information sharing benefits operational performance, business performance is not significantly impacted directly. (H. Liu et al., 2013). Sharing resources and coordinating efforts directly and favorably affect performance also demonstrated by previous findings (Chang & Hong, 2000; Pazirandeh & Maghsoudi, 2018). Linking organizational relationships favorably impacts supply chain integration, which in turn influences performance. (Li et al., 2006). The results of the thesis demonstrate that internal integration can have a considerable impact on a firm's supply chain performance, supporting the findings of earlier studies.

CHAPTER FIVE

5. CONCLUSION, RECOMMENDATION AND DIRECTION FOR FUTURE RESEARCH

5.1. Conclusion

The findings indicated that EPSS has a poor level of implementation of the internal integration dimensions (organizational connection linkage, information integration and coordination, and resource sharing). This suggests that EPSS has a low internal integration implementation rate. The organization has relatively low supply chain performance, which needs to be improved, according to the mean value of supply chain performance. This is a result of internal integration being implemented at a low level.

5.2. Recommendation

The results showed that EPSS's supply chain performance can be considerably impacted by the internal integration dimensions. Therefore, in order to address the issue of internal integration in EPSS, the low level execution of organizational relationship linkage, coordination, resource sharing, and information integration needs to be transformed to a high level. Through the use of IT technologies for information access, granting employees access to information, involving many departments in information exchange, and developing a solid information sharing plan, information integration can be strengthened.

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. Forming cross-functional teams to work on tasks like demand forecasting, planning, and problem-solving. Bringing together employees with diverse expertise from different departments to foster collaboration and knowledge-sharing.

Additionally, Identifying and optimizing the sharing of critical resources (e.g. equipment, facilities, personnel) across the organization and developing clear policies and processes for resource allocation and utilization as well as Implementing resource management systems to enhance visibility and coordination will enhance the overall supply chain performance.

The final dimension organizational relationship linkage can be improved by using integration tools such as ERP systems. EPSS needs to focus on strengthening the linkages and connections between its various departments and functions by leveraging integration technologies like ERP systems. This would help improve information sharing, coordination, and resource allocation across the organization, which are key aspects of internal integration. As the thesis result indicates, overall EPSS have a lot to work on internal integration to improve its supply chain performance.

5.3. Areas of future research

The findings about EPSS's poor internal integration implementation are useful, but they are limited to just one pharmaceutical organization. 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 EPSS.

Expanding the research to additional pharmaceutical sector players would provide a broader perspective. It could reveal whether the internal integration challenges faced by EPSS are more widespread in the industry, or if there are pharmaceutical companies that have managed to implement stronger internal integration practices.

This expanded scope of research would give greater confidence in the findings and allow for more robust recommendations on how pharmaceutical companies can enhance their internal integration and, in turn, improve overall organizational performance.

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. Evaluating progress over time by revisiting the same pharmaceutical sector and organizations repeatedly, researchers can assess whether there has been any progress or improvement in implementing internal integration practices.

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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7. APPENDIX

Annex 1- consent

ADDIS ABABA UNIVERSITY SCHOOL OF COMMERCE DEPARTMENT OF LOGISTICS AND SUPPLY CHAIN MANAGEMEN

I am a postgraduate student on Addis Ababa University, School of commerce conducting on logistics and supply chain management research work on Effect of internal integration on supply chain performance: The case of Ethiopian Pharmaceutical Supply Service (EPSS), Addis Ababa, Ethiopia hub. The objective of this study is to assess the effects of internal integration on supply chain performance in the case of Ethiopian Pharmaceutical Supply Service. It is purely an academic exercise for the partial fulfillment of master's degree in logistics and supply chain management.

It is allowed to refuse if you do not want to participate in the study. Being a participant may not have a specific benefit for the participant.

I would like to extend my deep appreciation to your organization and you for the willingness and cooperation in undertaking this valuable research. Taking part in this study you will contribute towards alleviating the problem of distribution system. I request your cooperation to fill and respond truthfully for the asked Questions.

Thanks.

,

Annex 2- questions

Section1. Socio-demographic data

For this section, I kindly request you to indicate your response by putting a (√) mark in the corresponding boxes or in writing on the lines that follow the items

1. Sex: Male □ Female □
2. Age Group:

19-25□ 26 – 30 □

31-35 □ 36-40□

41-45 □ above 45 □

3. In which department you are working currently?

Store manager☐ dispatch officer ☐ deliverer ☐

Storage and distributior☐ forecasting and capacity building ☐

Health center customer hospital customer ☐ Private medical center ☐

Private hospital customer ☐ other □, Specify_____

4. What is your current position in your organization? _____
5. What is your field of study /Specialization? _____
6. Please indicate your highest level of qualification.

Diploma □ BSC/BA □

MSC/MA □ □ others, namely: _____

7. Your work experience in years including your experience in other company.

Less than 1 year □ 1-5 Years □

6-10 years □ Greater than 10 years □

Section 2 Internal integration in EPSS

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:

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
	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					
Information integration	There is strong information sharing strategy					
	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					
Coordination and resource sharing	There is use of cross functional teams in demand forecasting					
	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					
Organizational relationship linkage	Linkages have been established across various departments with the use of integration tools such as ERP systems					

Part 3 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
	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.					
Flexibility	The organization can quickly adjust and refill unexpected (emergency) need from customers					
	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.					
Delivery	The organization delivers pharmaceutical products to customers on time and when needed					
Cost	The organization reduces logistics cost					
	The organization provide better quality of service					
Quality	The organization provides a high level of customer service					