



ADDIS ABABA UNIVERSITY SCHOOL OF COMMERCE

**The effect of supply chain integration on operational performance of
Ethiopian pharmaceutical supply service (EPSS)**

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ADDIS ABABA, ETHIOPIA

**The effect of supply chain integration on operational performance of
Ethiopian pharmaceutical supply service (EPSS) in ADDIS ABABA.**

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**A thesis submitted to Addis Ababa university school of commerce department
of arts' in logistics and supply chain management program in partial
fulfillment for the requirements the degree of Master of Arts in logistics and
supply chain management.**

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ADDIS ABABA, ETHIOPIA

Approval Sheet

This is to certify that, this thesis prepared by Seblewongel Teklemariam entitled “THE EFFECT OF SUPPLY CHAIN INTEGRATION ON OPERATIONAL PERFORMANCE OF ETHIOPIAN PHARMACEUTICAL SUPPLY SERVICE (EPSS)” was submitted in partial fulfillment of the requirements for the degree of Master of Arts in logistics and supply chain management at Addis Ababa university school of commerce compiles with the regulations of the school and meets the accepted standards with respect to originality and quality.

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Declaration

I, Seblewongel Teklemariam, declare that this thesis entitled "THE EFFECT OF SUPPLY CHAIN INTEGRATION ON OPERATIONAL PERFORMANCE OF ETHIOPIAN PHARMACEUTICAL SUPPLY SERVICE (EPSS)" is solely by myself and that it has not been submitted for any degree either at this university or at other university and all sources of materials used for the study have been acknowledged. It is offered for the degree of Master of Arts in logistics and supply chain management.

Declared By:

Name: Seblewongel Teklemariam

Signature: _____

Date: _____

Certificate

This is to certify that, this study entitled “THE EFFECT OF SUPPLY CHAIN INTEGRATION ON OPERATIONAL PERFORMANCE OF ETHIOPIAN PHARMACEUTICAL SUPPLY SERVICE (EPSS)” was undertaken by Seblewongel Teklemariam for the partial fulfillment of the degree of Master of Arts in logistics and supply chain management at Addis Ababa university school of commerce, is an original work and not submitted for any degree either at this university or at other university.

Research Advisor: Matiwos Ensermu (Associate Professor.)

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List of Abbreviations and Acronyms

EPSS	Ethiopian Pharmaceutical Supply Service
SCI	Supply Chain Integration
OP	Operational Performance
VIF	Variance Inflation Factor
ANOVA	Analysis of Variance

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Abstract

This paper analyzes current state of practices of supply chain integration and its effect on operational performance. EPSS was taken in this research because it is the largest and the oldest institution, it provides medicines, medical supplies, and laboratory reagents to hospitals and pharmacies. The prime aim is to investigate the effect of supply chain integration on operational performance of Ethiopian Pharmaceutical Supply Service (EPSS). Explanatory research design along with quantitative approach was employed with a sample of 385 was attained from sample respondents. Convenience non-probability sampling was applied to select the targeted respondents. Research Design was explanatory research design. The sample size was calculated based on Cochran formula and non-probabilistic sampling technique were the sampling technique. Scale validity and reliability were tested using Correlation coefficient & Cronbach's alpha. Primary data were collected using self-administered questionnaires for analysis. Both descriptive statistics & inferential statistics were used for the data analysis and presentation. Regarding the result, most of the respondents were male, have 2-10 years of experience in the organization and have educational level of degree. This indicated that the respondents of this study have good understanding about supply chain integration and organizational performance issues. The study showed that, except internal integration and supplier integration, all the other four dimensions of SCI practices such as customer integration, information integration, external integration and measurement integration are appropriate predictors to measure overall operational performance. The study concluded that SCI practices have significant and positive effect on operational performance of EPSS. Measurement integration, information integration, external integration and customer integration played significant role in enhancing operational performance of EPSS.

Keywords: supply chain integration, external, internal, supplier, customer, information, measurement, and performance.

CHAPTER ONE

INTRODUCTION

This chapter will introduce the effect of supply chain integration on operational performance of Ethiopian pharmaceutical supply Service (EPSS). It presents the background, the research gap, the objectives, significance and scope of the study.

1.1 Background of the Study

This thesis paper, demonstrates the effect of supply chain integration on operational performance of Ethiopian pharmaceutical supply service (EPSS). In supply chain, supply chain integration (SCI) helps firms to rearrange their resources and capabilities internally and externally to consolidate their supply chain effort to improve long-term performance (Huo et al, 2014).

The study on supply chain integration by empirically testing the relationship between supply chain integration and market performance moderated by the link between supply chain integration and operational performance tends to be ‘non-linear’; and the nature of the ‘nonlinearity’ is significantly influenced or the market uncertainty as an exogenous environmental factor (Lu et al, 2018).

Different types of SCI have different effects on different types of performance. Supplier integration is the most critical factor to improve schedule attainment, though internal and customer integration are related to schedule attainment. Both internal and customer integration can improve competitive performance, but internal integration has a significantly higher impact than customer integration. As to the improvement of customer satisfaction, customer integration is the most important factor, supplier and internal integration are not so important though they are also significantly related to customer satisfaction (Li et al, 2013).

Supplier integration, customer integration, process integration, and trust, are variables affecting supply chain performance. Process integration can improve supply chain performance by integrating the company's internal and external processes. Process integration must be carried out internally, namely in production and external companies, concerning supplier integration and customer integration or distributor.

1.2 Statement of the Problem

Supply chain integration has a great job for all parties involved, directly or indirectly, in the chain. The supply chain success is directly or indirectly dependent on parts in the supply chain involving the manufacturer, warehouses suppliers, transporters, retailers, and customers. All have functions in marketing, new product development, distribution, customer service and finance.(Huo. et al,2014). To compete in the competition world, organizations need to adopt advanced practices to achieve a high integration within their supply chain. Hence, understanding the level of supply chain integration is an important factor for a company to improve integration (Errassafi, Abbar and Benabbou, 2019)

Moreover, different literatures tried to reveal the gaps of integrations in an organization in their literatures.

The purpose of this thesis paper is to explore supply chain integration practices and to assess their effect on organizational performance, in the case of Ethiopian pharmaceutical supply service (EPSS). Thus, the aim of this research is to determine the effect of supply chain integration on operational performance of Ethiopian pharmaceutical supply service (EPSS) as a case study. This study touches the key variables of SCI practices, which may help the field to perform in proper. It provides the baseline information to the SCI to understand the impact of SCI variables. The basic aim of this research can be achieved through addressing the following research questions. These are:

1.3 Research Questions

In the research, the researcher answered the following research questions in this study.

- ✓ What is the effect of, supplier integration, measurement integration, information integration, internal integration, external integration and customer integration on the operational performance of EPSS?
- ✓ What is the SCI practices of EPSS?
- ✓ In what way SCI is being practiced?

1.4 Objectives

1.4.1 General objective

The general objective of the study is to investigate the effects of supply chain integration on the operational performance of EPSS.

1.4.2 Specific Objectives

The specific objectives of the study are;

1. To investigate the effect of internal integration, supplier integration, customer integration, information integration external integration and measurement integration on the operational performance of EPSS
2. To assess the SCI practices of EPSS.
3. To investigate how SCI is being practiced at EPSS.

1.5. Hypothesis of the study

The research has the following hypothesis.

H₀: Supply chain integration does not have effect on operational performance of EPSS at $\alpha \leq 0.05$.

H₁: Supply chain integration have effect on operational performance of EPSS at $\alpha \leq 0.05$.

1.6. Significance of the study

The investigation of the effects of supply chain integration on the operational performance of EPSS has a number of significances to different stakeholders such as manufacturers, suppliers, customers and others involving in supply chain, adding values to the existing knowledge, and the likes. The output of this research may benefit manufacturers, suppliers, customers and others involving in supply chain.

This study may contribute to the existing knowledge by adding values in filling the gap and helping the organization to follow appropriate integration in order to enhance proper supply chain integration; to increase the chain system efficiency and effectiveness that have had a drawback in performance achievement. Finally, the study is important for the academic body of knowledge, for researchers, scholarly. The topics covered under this research included effects of supply chain integration, such as supplier integration, information integration, external

integration, internal integration, customer integration, and measurement integration on organizational performance. It is helpful as a reference material on the subject for further study.

1.7. Scope of the Study

1.7.1 Delimitation

The scope of this study was limited geographically, conceptually and methodologically to manage it within the existing resources

The topic covers supply chain integration dimensions like internal integration, supplier integration, information integration, external integration, customer integration and measurement integration on organizational performance.

This study will explore the impact of supply chain integration on operational performance of EPSS. Geographically, the scope is the organization itself in Addis Ababa. This study targeted EPSS suppliers, customers and staff members that operate within EPSS network and others involving in supply chain in the fiscal year of 2021/2022.

1.7.2 Limitation of the study

The study examines the effect of supply chain integration on operational performance of EPSS. The deliberately falsifying results have limited the researcher's investigation and it has its own impact on the overall picture of the study.

1.8 Definition of terms

In this section, the researcher defined conceptual definition of supply chain integration and organizational performance, and operational definition of key indicators of supply chain integration respectively.

1.8.1 Conceptual Definition

Supply Chain Integration: Can be defined as association of customers and suppliers who, using management techniques, work together to optimize their collective performance in the creation, distribution, and support of a product. (Richter and Walther, 2016)

Supply Chain: In commerce, a supply chain refers to the network of organizations, people, activities, information, and resources involved in delivering a product or service to a consumer (Michael H. 2018).

Supplier partnership: a defined as a continuing relationship, between a buying firm and supplying firm, involving a commitment over an extended time-period, an exchange of information, and acknowledgement of the risks and rewards of the relationship. The relationship between customer and supplier should be based upon trust, dedication to common goals and objectives, and an understanding of each party's expectations and values (H. Deshpande, 2017).

Firm performance: an economic category that reflects the ability of firms in using human resources and material resources to achieve the targets of the firm (Le, 2005).

1.8.2 Operational definition

- ✓ **Internal integration:** involves the coordination, collaboration and integration of logistics activities with other functional areas in an organisation; whilst external integration requires the integration of logistics activities with those of their customer and suppliers in the supply chain (Stock et al, 1998).
- ✓ **Customer integration:** is sharing of customer's demand information, aiding producers to understand customer's demand in a better manner and expecting customer's demand as well as collaborating and cooperating with customers to design, to reach products with better quality, lower costs and greater flexibility in response to customer's demand (Yu *et al.*, 2018).
- ✓ **Information integration:** is the merging of information and technology from heterogeneous sources with differing conceptual, contextual and typographical representation (Sriyakul, Umam and Jermisittiparsert, 2019).
- ✓ **Supplier integration:** “the combination of internal resources. and capabilities of selected key suppliers through the meshing of intercompany business. processes to achieve a competitive advantage” (Sutanto and Japutra, 2021).
- ✓ **Measurement Integration:** the second type of integration that occurs to ensure that each part of the supply chain is accountable for meeting its own goals. There must be explicit direction and clear expectations regarding what is required to meet the overall Ninja Corp goals. Aug 17, 2021 (Scheinbaum, 2011).
- ✓ **External Integration:** refers to the degree to which a company understands the need of its clients and collaborates with clients and/or suppliers to develop inter-organisational

strategies and shared practices and processes, so that it manages to satisfy its clients' needs (Flynn et al. 2010a).Dec 4, 2013).

1.9 Significance of the study

The study of supply chain integration and its impact on organizational performance is an important topic for both organizations and academic scholars. This study could be considered as an initiative to explain the impact of supply chain integration on EPSS performance. The study is believed to have contributed to a better understanding of the role of supply chain integration in the performance of EPSS. The results of this study are expected to be important for future research, service industries, decision makers, and academic contributions.

1.10 Scope of the study

This study will explore the impact of supply chain integration on operational performance of EPSS. Therefore, the scope was the organization itself in Addis Ababa, its suppliers and distributors that operate within EPSA network in the fiscal year of 2021/2022.

1.11. Organization of the Study

This study is classified into five main chapters. The first chapter refers introduction of the study which includes the background, the problem statement, the research objectives, significance and scope of the study. The second chapter focuses on literature review. It contains relevant theories, conceptual and empirical discussions leading to identification of research gaps and the conceptual framework. The third chapter presents the research design, target population, sampling methods, sample size, data collection instruments to be used as well as method of data analysis and presentation. The fourth chapter presents demographic characteristics, descriptive and inferential statistics analysis, findings and their interpretations. The last chapter consists summary of major findings, conclusions and recommendations of the research study.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

This chapter explores the relevant theoretical and empirical literatures in which the conceptual framework of the study is derived. The theoretical part comprises the definitions and concepts or ideas of supply chain management practices and operational performance. The empirical literature is reviewed to back up the arguments in the theoretical review and guide the conceptual framework of the study.

2.1 Theoretical Review

The theoretical framework underlying this proposal is the effect of supply chain integration on operational performance of Ethiopian pharmaceutical supply service (EPSS)

2.1.1 Supply Chain Management

Today many organizations are forced to increase their global market share in order to survive and sustain growth objectives. At the same time, these same organizations must defend their domestic market share from international competitors. The challenge is how to expand the global logistic and distribution network, in order to ship products to customers who demand them in a dynamic and rapidly changing set of channels. Strategic positioning of inventories is essential, so that the products are available when the customer wants them (Handfield, *et al.* 2002).

Domenica (2002) also claims that supply chain should actually be efficient and effective. In this case, efficient means to minimize resource use to accomplish specific outcomes; and effective, in terms of designing distribution channels. Efficiency is measured by delivery performance, product quality, backorders and inventory level, whereas effectiveness is measured by service quality and the service needs. Long-term competitiveness therefore depends on how well the company meets customer preferences in terms of service, cost, quality, and flexibility, by designing the supply chain, which will be more effective and efficient than the competitors’.

To understand the term of supply chain management in depth, first the term of supply chain will be explained, than management and the role of management as a base for complete definition of supply chain management. According to Mentzer, *et al.* (2001) the definition of supply chain is more consolidated as definition of supply chain management. In his paper, he tried to make a

common definition of a supply chain, based on a comprehensive research study conducted by several co-authors. They came up with the following definition: “A supply chain is defined as a set of three or more entities (organizations or individuals) directly involved in the upstream and downstream flows of products, services, finances, and/or information from a source to a customer”.

Supply chains are essentially a series of linked suppliers and customers until products reach the ultimate customer (Handfield, 2002). Supply chain of a company consists of an upstream supplier network and its downstream distribution channel. Organizations can be part of numerous supply chains. Depending on how complex the supply network is, Mentzer (2001) has defined three types of supply chains: (1) direct supply chain, which consists of a company, a supplier, and a customer, (2) extended supply chain, which includes suppliers of the immediate supplier, as well as customers of the immediate customer, (3) ultimate supply chain, which includes all the organizations involved in all the upstream and downstream flows.

Although industry and academia have investigated the concept of SCM for the last decade, there is still no consistent definition of the concept. As a result, there is generally a lack of consistency in meaning and clarity across the diverse definitions of supply chain management available in the literature. Some of them are listed further on.

Bolumole (2000) has concluded that supply chain management offers an integrated philosophy for managing organizations’ purchasing and distribution processes based on a marketing perspective. In her study, Persson (1997) concluded that supply chain management is a homogenous management concept. The overall objective of supply chain management is to contribute to improvements in the company’s bottom line or profitability. Related objectives include reducing the costs mainly by reducing the inventory level and increasing the revenues by improving customer service through coordination and integration along the material flow, win-win relationships and end customer focus. These imply that in order to achieve the objectives of supply chain management individual companies should coordinate and integrate their activities with other companies along the material flow in win-win relationships and focus their joint effort on the end customer.

The supply chain consists of all stages involved, directly or indirectly, in fulfilling a customer request. The supply chain not only includes the manufacturer and suppliers, but also transporters,

warehouses, retailers and customers. Within each organization, such as a manufacturer, the supply chain includes all functions involved in fulfilling customer requests. These functions include new product development, marketing, operations, distribution, finance, and customer service. Supply chain management involves the management of flows between and within stages in a supply chain to maximize total profitability (Chopra, 2001).

Supply chain management is the integration and management of supply chain organizations and activities through cooperative organizational relationships, effective business processes, and a high level of information sharing to create high performing value systems that provide member organizations sustainable competitive advantage (Handfield, 2002).

Although definitions of Supply chain management differ across authors, they can be classified in three categories (Mentzer, 2001): a management philosophy, implementation of a management philosophy, and as a set of management processes.

2.1.2. Supply Chain Integration

Globalization and rapid development of information technology are changing today's inter-organizational relationships. Firms increasingly depend on a complicated network of global partners to deliver products in the right quantity, at the right place and time, and under persistent cost pressures (Datta and Christopher, 2011). However, long and complex supply chains are usually slow in responding to changes, and hence, they are vulnerable to supply chain disruptions. One way to solve this problem is to successfully manage supply chain integration (SCI), which requires cross-firm business processes with appropriate levels of information sharing, operational coordination, and partnerships (Leuschner, Rogers, and Charvet, 2012).

Integration has become a very important and integral part of any organization. Integration of technology, people, business and processes has become crucial for survival of any organization and especially if the organization needs to find a competitive edge in the current global economy (Arend and Wisner, 2005).

The importance of supply chain integration between a firm and its suppliers and also its customers is increasing. As is expected with any business relationship, the association should be expected to be long term and the strength of the relationship depends upon the behavior of the members in the supply chain. To succeed with integration, there must be a clear understanding of

the material bought and the core competencies, and experience of the supplier, the customer being served and the organization itself. The integration quality is always dependent upon a relationship between the organization and supplier (Wood and Brewster, 2005). Developing integration between the firm and its suppliers or a firm and its customers, aims at improving specific areas of a firm's performance, leading to savings in quality inspection costs and better integration of design efforts to meet the customer's needs (Mudambi and Schröder, 2006).

Integration among partners in a supply chain that focuses on both the customers and suppliers should be reviewed in its entirety and on a regular basis so as to develop cooperative attitudes in the chain (Goh, Lau, and Neo, 2006). In addition, integration is crucial in building trust so that the supply chain mechanisms can function effectively. More collaborative systems in integration are characterized by a closer and more mutually supportive relationship between the firm, its supplier and its customers. To enhance the integration relationship, there is need for flexibility among the partners, a broader regulatory and social environment that is characterized by both formal structures of mediation and informal networks of trust and collaboration (Panayides and Lun, 2009).

2.1.3. Organizational Performance

Every organization exists to achieve a particular goal. Organizational performance is the final achievement of an organization and contains a few things, such as the existence of certain targets, has a period of time in achieving these targets and the realization of efficiency and effectiveness (Blowfield and Dolan, 2010). Thus, efficient and effective organizational performance could be achieved through good practice of supply chain integration with all of the partners in the chain; this study acknowledges the six different dimensions of integration (external integration, internal integration, supplier integration, customer integration, information integration, and measurement integration) as an instrument that might have an impact to measure the organizational performance with respect to key indicators, such as responsiveness, reliability, flexibility, quality and delivery. Performance provides the basis for an organization to assess how well it is progressing towards predetermined objectives, identify areas of strength and weakness and decide on the future initiatives with the goal of how to initiate performance improvement (Vanweele, 2006).

Organizational performance includes multiple activities that help in establishing the goals of the organization, and monitor the progress towards the target (Kopczak and Johnson, 2003). It is used to make adjustments to accomplish goals more efficiently and effectively. Organization performance is what business executives and owners are usually frustrated about. This is because even though the employees of the company are hard- working and are busy doing their tasks, their companies are unable to achieve the planned results. Results are achieved more due to unexpected events and good fortune rather than the efforts made by the employees. However, for any business to be successful, functions must be defined and accomplished. It is important for an organization to develop strategies that are designed around the skills that would enhance the performance of the organization. Organizational performance is affected by myriad factors including: the lines of communication and command connecting these individuals (organizational authority structure and the degree of centralization), the resources and information to which the individuals have access, the nature of the task faced by the individuals, and the type and severity of the crisis under which the individuals operate (Richard and Devinney, 2005).

Financial measures do not convey the full picture of a company's performance, especially in today's competitive environment where companies are competing in terms of product, quality, delivery, reliability, after-sales service and customer satisfaction. None of these services is measured by the traditional responsibility accounting system, despite the fact that they represent the major goals of world-class manufacturing companies. Many companies are using both qualitative and quantitative non-financial indicators such as; quality, lead time, number of customer complaints and warranty claims, delivery time, non-product hours, and system down time (Bozec, 2005).

Although non-financial measures are increasingly important in decision-making and performance evaluation, companies should not simply copy measures used by others. The choice of measures must be linked to factors such as corporate strategy, value drivers, organizational objectives and the competitive environment. In addition, companies should remember that performance measurement choice is a dynamic process - measures may be appropriate today, but the system needs to be continually reassessed as strategies and competitive environments evolve (Sharma *et. al.*, 2005).

In conclusion, organisations which do not check adequately how well they are performing in their processes, procedures and plans experience low performance and higher customer dissatisfaction and high employee turnover (Artley and Strol, 2001).

2.1.4. Perspectives of Supply Chain Integration

The theoretical writing on SCI effort is diversified speaking to different points of view. The differing writing reflects the flexible idea of SCI effort including an assortment of thought processes and targets. This investigation looks at SCI effort from various viewpoints: Economic perspective, e.g. uncertainty reduction, transaction cost economics, resource based view, relational view, and extended resource based view; trust based logic; and learning and information point of view. These different viewpoints give us experiences into the nature, forms, contents, and forces of supply chain integration effort. (M. Cao and Q. Zhang, 2013)

1. Uncertainty Reduction Perspective

Uncertainty has for some time been seen as a predominant possibility and is one of the basic determinants of high exchange costs (Williamson 1975). Diminishing vulnerability by means of information flow is a key target in SCI effort (M. Cao and Q. Zhang, 2013). According to M. Cao and Q. Zhang (2013), market and technological vulnerability can viably be managed through organizations where supply chain partners share data of sudden occasions and advancements. The serious correspondence between supply chain partners additionally diminishes behavioral vulnerability (e.g., advantage) (Wuyts and Geyskens 2005). On the off chance that data isn't shared between accomplices, non-straightforward request examples will cause request amplification and bullwhip impact. This prompts poor service levels, high inventories, and incessant stock-outs (M. Cao and Q. Zhang, 2013). Hence, when confronting uncertainty, firms will have a tendency to team up with accomplices in building long haul relationship.

2. Transaction Cost Economics

Transaction cost economics (TCE) is a standout amongst the most influential hypotheses on IOS utilize and between firm joint efforts. TCE recommends that a firm compose its cross-authoritative exercises to limit generation costs inside the firm and exchange costs inside business sectors. As indicated by TCE, the choice to utilize either vertical reconciliation or

market components relies upon the relative observing costs that emerge from limited reasonability and vulnerabilities because of accomplices' self-premium and advantage. TCE conceives that IOS utilize can lessen exchange costs (e.g., observing expenses) by specific resource speculations, which decrease sharp practices. Markets and progressive systems are identified as two methods of sorting out. Coordinated effort rises as the third option. SCI keeps the issues emerging from the two markets and chains of importance. It helps firms diminish the advantage and checking costs that are inbuilt in advertise exchanges through process coordination and common trust, in this way lessen the likelihood that accomplices act sharply. SCI additionally helps firms abstain from disguising a movement that they don't exceed expectations at. Regardless of TCE's handiness, numerous researchers see its constraint. TCE is limited to the efficiency basis for SCI effort. SCI may shape for different reasons, for example, information creation. What's more, hierarchical settings (e.g. culture, power, reliance, and trust) that may influence cooperative endeavors are accepted away. In all actuality, few SCI efforts are simply in view of the thought of economic costs (M. Cao and Q. Zhang, 2013).

3. Extended Resource-Based View

Traditional RBV accept firms must possess or completely control the assets to make esteem. In the broadened asset based view (ERBV), asset availability, the privilege to utilize assets or make the most of their related benefits, empowers firms to accomplish favorable circumstances. Broadens the RBV by clarifying how interconnected firms in dyadic cooperation/partnership consolidate outside assets and interior asset blessings to accomplish upper hand for the central firm. As per (David, 2015), the upper hand of a central firm partaking in an organization together/joint effort incorporates four components: (1) inside lease (2) appropriated social lease (3) inbound overflow lease, and (4) outbound overflow lease(Ul-Hameed *et al.*, 2019).

Inside lease can be removed from the central firm's own mutual and non-shared assets. Appropriated social lease can be separated just from the mutual assets of the two accomplices. Inbound overflow lease is the lease produced from the accomplice's shared and non-shared assets through information spillage, between firm learning, relative absorptive limit, and disguise of the accomplice's practices, though outbound overflow lease comes about because of the exchange of benefits from the central firm to the accomplice. The mix of inward lease, inbound overflow lease, and outbound overflow lease frames private benefits for the central firm. Its upper hand

relies upon its private benefits and appropriated social lease (i.e., appropriated regular benefits). Conversely, synergistic favorable positions are joint upper hand and originate from a social lease, a typical benefit that collects to community accomplices. This kind of lease can't be created separately by either collective accomplice. What's more, (David, 2015) demonstrate reaches out earlier research on joint esteem creation in dyadic union by considering one-sided collection of overflow leases that deliver private benefits(Dzogbewu *et al.*, 2021).

4. Resource Dependence Theory

Asset reliance hypothesis (RDT) contends that firms must trade with their surroundings to pick up assets (M. Cao and Q. Zhang, 2013). It fixates exclusively on assets that must be gained from outside hotspots for a firm to survive or flourish. The requirement for outer assets makes firms rely upon others. To effectively oversee conditions, RDT contends that firms must pick up control over essential assets to lessen dependence on others and increment others' dependence on them. It implies firms should attempt to expand their energy in their surroundings (M. Cao and Q. Zhang, 2013). Supply network integration effort gives such an approach to helping firms to achieve these objectives.

Broadening the rationale of asset reliance hypothesis from the firm level to the inventory network level, store network accomplices all in all are less depending on their surroundings through assets sharing. Firms work together with their production network accomplices to procure indispensable assets and to expand their energy in respect to other supply chains. In any case, the power might be uneven between accomplices on account of various responsibility for. This unbalance of energy may make conflicts between accomplices if not very much oversaw. Min *et al.* (2005) recommend the capable firm in the production network should address the less capable accomplice's issues in commonly beneficial courses of action to reinforce the aggressive energy of the store network in general.

In view of RDT, IOS are the instruments that, by effectively getting to accomplices' assets, increment the production network's control over different firms or chains. While RDT has its benefits, it has impediments in clarifying production network coordinated effort. RDT just contends that firms need to trade with their surroundings to get essential assets since no firm is independent. Exchange costs, skill advancement, and learning openings are not thought about (M. Cao and Q. Zhang, 2013).

5. The Relational view theory

Turkmen (2013) have efficiently inspected between hierarchical lease creating forms. They distinguished four sources that create social rents: Investments in connection particular resources, between firm learning sharing schedules, the consolidating of correlative assets and viable administration components. Firms can accomplish supernormal benefits by building up a particular association with their unions through these procedures. The point is to move far from a safe distance advertise connections, since contenders can undoubtedly copy this trade relationship since there is nothing one of a kind about the associations amongst purchaser and merchant. What takes after from the joint endeavors of the banding together firms in fashioning a relationship past a safe distance, is that rents are mutually produced and possessed by collaborating firms. Social rents are then piece of the system or dyad. A social lease is characterized by Turkmen (2013) as: "A supernormal benefit together produced in a trade relationship that can't be produced by either firm in disconnection and must be made through the joint peculiar commitments of the particular collusion accomplices".

6. Trust Based Rationalism

Trust based rationalism (TBR) employs a behavioral assumption of trustworthiness, fair play, responsibility, and altruism instead of betrayal, self-interest, and opportunism. It focuses on collaboration and cooperation rather than politics and conflicts as the primary interaction modes. Trust, relationship, and social capital are the key concepts in TBR. Trust is viewed as a critical determinant in establishing a relational mode of governance structure (M. Cao and Q. Zhang, 2013). Continuing supply chain collaboration is based more on trust and equity than on monitoring and control capabilities (Kim *et al.* 2005).

Social capitals and relationships between partners arise from the foundation of trust. Trust reduces transaction costs and even eliminates the need for detailed contracts and governance mechanisms. While opportunism may create short-term benefits, it incurs costs in the long run because it lacks of reputation and trust. Trust helps supply chain partners create a win-win strategy for collaborative advantage (M. Cao and Q. Zhang, 2013).

7. Learning and Knowledge Perspective

Another rationale for explaining supply chain collaboration is that firms establish partnerships to exploit opportunities for knowledge creation and organizational learning. Through knowledge creation and organizational learning, firms strengthen their competitive positions. In the face of high environmental uncertainty, it is important to have access to a broad and deep knowledge base in order to respond quickly to changing circumstances. Since great diversity of knowledge is distributed across the supply chain, collaboration provides an ideal platform for learning and facilitates partner-enabled market knowledge creation. Learning that takes place in supply chain collaboration can be divided into two kinds of activities: exploration and exploitation. Exploitation is to improve existing capabilities while exploration is to discover new opportunities (e.g., improve absorptive capacity). How much a firm can learn through supply chain collaboration is determined by the firm's absorptive capacity, "the ability to recognize the value of new, external knowledge, assimilate it, and apply it to commercial ends.". A firm's ability to learn is based on the employee quality, knowledge base, organizational culture, and the quality of IT systems. Supply chain collaboration can also be an effective means of transferring knowledge and new technical skills across organizations. A firm may find it difficult to buy a particular skill in the marketplace because of its tacit nature. It may acquire new skills and competencies by collaborating with firms that excel in that area. However, the level of privileged information sharing needed for collaboration, in fear of risky information leakage, is not adequately addressed by the learning and knowledge theory (M. Cao and Q. Zhang, 2013).

The authors discuss that Customer integration, internal integration and supplier integration are all positively and significantly related to operational performance of the manufacturer and internal integration mediates relationship between customer integration and operational performance but not relationship between supplier integration and operational performance. (Errassafi et al, 2019). The authors emphasize the importance of all four MCS measurements (broad Scope, timeliness, integration and aggregation) for maintaining strength. Under strong SCI, cost effectiveness, flexibility and quality will be strengthened in an organization (Nartey et al, 2019).

2.2 Empirical Review

Related studies conducted on the effect of supply chain integration on operational performance of EPSS would be briefly stated as below. The article suggest that SCI metrics are market-bound. It has interactive effects on direction and strong performance. Strategic supply chain communication and performance have a significant and positive relationship. The strategic supply chain connection is one of the building blocks of performance. EPSS considers quality as the number one supplier choice as a strategic relationship and the company solves problems together with suppliers. However, EPSS not involve suppliers in a series of improvement programs, planning and goal setting, and product and service development.

2.2.1. Supply Chain Integration

An efficient, integrated supply chain plays a major part in the success of the business strategies of its constituent companies. It is now recognized that, in many cases, competition is between supply chains rather than individual companies. Getting the product and service to the end consumer when they want it is critical. Consequently, the partner companies should work closely together to define and execute a supply chain strategy which will both satisfy customer needs and allow them to make an adequate return. The biggest challenge facing companies today is not the internet, by itself, or globalization or stakeholder needs. Rather, the greatest challenge is the integration of supply chains from vendors through manufacturers and distributors to satisfy end customers and obtain value for those companies. Supply chain management is the planning and flow of materials and products between a number of companies to deliver goods and services to end consumers. The insight examined in this research is that business supply chains are more likely to survive, grow and profit if they integrate the development of new products with a balanced supply chain in which each link combines to provide the goods that consumers want. To get full benefit from a supply chain it is necessary to link all the partners involved so that goods and services flow effectively to consumers. This is achieved by working collaboratively with customers, suppliers, trading partners and service providers. The overall aim is to create a flow of products exactly as required by customers, responding dynamically to changes in their orders. (Sadler, 2007).

Supply chain integration (SCI) is taken into account to be a comprehensive conception applied to varied links among functions within a firm however additionally among organizations (Chen *et al.*, 2009). There's a typical accord among researchers that because of the advanced international business setting, it's of a strategic importance for organizations to integrate activities each outwardly and internally (Danese *et al.*, 2013). In previous literature, Supply chain integration is associated to three main aspects like scope of integration, areas to integrate, and level of relationship (Näslund and Hulthen, 2012).

1. Scope of integration

Hulthen (2016) stated that the twofold scope of integration which of the foremost considered normal forms are external integration and internal integration.

Whereas each of these scopes signify a significant feature of Supply chain integration, there is an unlimited pact of overlay among them. In line with the meaning of Supply chain management, from suppliers to manufacturers to customers, and the supply chain operations reference (SCOR) model with three interconnected main processes, from source to make to delivery, it is arguing that the various scopes of Supply chain integration can be finally summarized to three main scopes: internal integration, suppliers' integration (SI), and customers' integration (CI). External integration (EI) holds together SI and CI in one. Information sharing, communication, demand coordination, relationship building, and so on have been generally combined into the II and EI ideas (Kumar *et al.*, 2017).

- External Integration

Related to external integration, the previous literature acknowledges two directions of integration: downstream integration (also referred to as forward integration) with customers and upstream integration with suppliers (also referred to as backward integration). Despite of the advantages acknowledged by many authors that as well as many tiers into the integrative relationships encompasses a positive result on performance of all concerned partners (i.e. increased quality and repair level, lower costs), in point of fact the two relationships are the foremost prevailing (Hulthen, 2016).

- Internal Integration

Before external integration with partners beyond the organization, the first stage of supply chain integration should be beginning at the organizational level within the various functions as well as departments of the firm. Internal integration is defined as the strategically aligned and

coordinated internal processes and functions for the purpose of achieving maximum performance of an organization; it advances the organization's performance through decreasing expenses and restricting departmental capacity which wouldn't maximize the overall goals within the organization (Kumar *et al.*, 2017).

- Supplier Integration

According to Kumar *et al.* (2017), in order to advance customer service to serve better, customer-supplier integration process is the invaluable focus of the firm on strengthening the relationships between customer and supplier for the reason of achieving supply chain surplus. When suppliers are participated concerning information of the demand forecasts, production and inventory levels decision making of the organization, the organization and suppliers have a working partnership that maximize the benefits of both suppliers and the focal firm by reducing lead times, and in advancing innovations and quality.

- Customers Integration

The integration of customers in the supply chain gives the opportunity for firms to have an overview of the requirements and their specific needs giving them the advantage of serving them better. Integrating customers in a supply chain is centered on drawing information from customers such as their buying patterns, their preference for products and their ability to purchase products which would then be used in making better decisions during the manufacturing process or sales to customers. When firms collaborate with their customers, they are able to respond in a quick and efficient manner with their customers improving their order fulfilment as well as improving visibility (Lotfi, Z., Sahran, S., & Mukhtar, 2013).

- Information Integration

According to Leuschner, Rogers and Charvet (2013), information integration refers to the coordination of information transfer, collaborative communication and supporting technology among firms in the supply chain. The next dimension in the progression is when management integrates activities in addition to the sharing of information. Information integration has been found to be a necessity for firms looking to integrate with their customers and suppliers. Information integration however is not just restrained to the efficiency and application of technology. It requires the inputs and role playing of people, technological systems to originate, sort, process, and disperse information to the designated location at the right time for effectual decision making process. When information is shared across the supply chain, data can be

collected in real time as closer communications are then created with other members in the supply chain which would lead to improved customer service and improved demand forecasting. Integration in the supply chain has been found to improve performance of the chain therefore it is important for partners in the supply chain. (Kumar *et al.*, 2017).

- Measurement Integration

It is the performance assessment of the supply chain as a whole that also holds each individual firm or business unit accountable for meeting its own goals (Scheinbaum, 2011).

2. Layers of Integration

Layers of integration lined in previous supply chain integration literature refers to, for instance, what to integrate and with whom to integrate. There are four areas of integration in supply chain which may create a chain of partnerships for parties which are collaborated through supply chain management; these areas are: flows (physical, data, financial), processes and activities, technologies and systems, and integration of actors (structures and organizations) (Hulthen, 2016). According to Barber (2008) elaborations, integration of each tangible and intangible parts must be integrated (i.e. processes, procedures, data, knowledge, innovations, and strategies).

The first task is to create a flow of information between chain partners so that physical flow takes place exactly as required. The second task is a series of physical movements: procuring parts, manufacture of the finished product and its delivery to the customer. The third task is the management of chains, and the fourth task is chain leadership. According to Hulthen (2016), it's very important to spot key processes to be joined with suppliers and customers. To integrate with all supply chain partners isn't possible and economically excusable. Thus, companies usually section their external relations and develop cooperative relationships with some supply chains partners whereas they keep arm's length with others (Lummus *et al.*, 2008).

3. Level of Integration

Constructing on the systematic ideas, reflect the connections among organizations in the supply chain. Such interactions between supply chain allies have a main impact on in what way the chain functions, by what means it flows goods or services to customers. The level of internal integration commences with a starting point of functional silos with freelance functions. within the next level the freelance silos are unit cross-functionally integrated through processes. As a result, the internal integration is affected to full integration involving seamless flow across

structure functions. Then, the integration holds suppliers and customers, said as external integration. (Hulthen, 2016).

Concerning the external integration, not all business relationships with SC partners ought to be cooperative, and it's acceptable to be concerned in an arm's-length relationship if such behavior is suitable (Gimenez and Ventura, 2005). the extent of external integration could vary from arm's length ones to collaboration and strategic alliances. Spekman *et al.* (1998) differentiate between four levels of external integration: open market negotiations, cooperation, coordination and collaboration.

The open market negotiations, additionally referred to as Arm's length relationships, represent a pure exchange style of relationship between supply chain partners. There aren't any joint commitments or operations that mean that the link is terminated once the exchange ends (Shah *et al.*, 2002). in a very cooperation style of relationship, the stress is placed on data sharing or assets sharing between SC partners and distinctive areas of joint interest (Power, 2005). It's a primary stage concerning demand harmonization and cross-functional relations, taking part of relevant parties, strong kind of responsibilities (Ajmera and Cook, 2009).

Coordination, on the opposite hand, needs SC partners to figure conjointly to realize materials and data flows potency across the supply chain through aligned higher cognitive process to realize the general supply chain objectives (Sahin and Robinson, 2002).

The very best level of relationship refers to collaboration. It engages reciprocal relationships within which each partners possess equal power to avoid forced solutions by the opposite part (Ho *et al.*, 2002). Normally, it comprises joint designing and acting of activities like supplying, development and strategic designing (Ajmera and Cook, 2009).

2.2.2. Supply Chain Integration and operational performance

The satisfaction of the end customer depends not only on the performance of the firm with which it has a relationship, but also on the performance of the other firms and quasi-organizations in the supply chain. As supply chains become leaner, containing less operational slack, there is a reduced ability for downstream operations to buffer the end customer from the effects of any upstream failings. Therefore, the move towards lean supply makes the identification of role and the measurement of performance in terms of contribution to end customer satisfaction more important(1).

2.2.3. Supply Chain Integration and Organizational Performance

The rising level of competition that exists among firms globally has brought a shift to do more than just strategy formulation and implementation but to go beyond that and seek partnerships with other firms which would lead to competitive advantage in the market place. Over the years, manufacturing firms have focused on developing strategies that would bring about the much desired level of change and operational performance in the organization. However, firms have realized that creating strategies along with integrating internal functions, suppliers and customers in a business relationship is the proper model for achieving competitive advantage. This created the platform for supply chain Integration (SCI) as practice being adopted by firms that were striving to improve firm performance with closer relationships being built among other links in the supply chain. The shift came with organizations moving from their previous strategies of vertical integration to being an association of firms that collaborate to procure, manufacture and supply products and services to their customers. supply chain integration as a concept is concerned with the synergy that exists between the internal functions of a firm and its external activities across its supply chain that leads to organizational performance. (Kumar *et al.*, 2017).

Several kinds of integration have been suggested in the existent writings, such as Internal Integration, Customer Integration, Suppliers Integration, technology and planning, measurement, relationship integration, and strategic integration. (Yanfang Huo¹, Xinyue Jiang¹, 2008).

Reflection of the scope of supply chain integration is vital to know the way that the different extents of integrations influence performance of the organizations, and also how each type of integration influence one another. Though some researches recommend supply chain integration as a unidimensional concept, others split supply chain integration into Internal Integration and External Integration, some accept extra scopes. Despite the fact that each of these scopes signify an essential feature of supply chain integration, there is a countless overlap among them. Even if by considering the meaning of supply chain management that claim the various scopes of supply chain integration can be eventually condensed to three main scopes: Internal Integration, Suppliers Integration, and Customers Integration, (which is from suppliers to manufacturers to customers, and the supply chain operations reference (SCOR) model with three linked major processes, from source to make to delivery) (Huo, 2013).

This study tries to combined different views of dimensions of supply chain integration that many authors claimed on the classification in to Internal Integration, Suppliers Integration, Customers Integration and also extra classifies as External Integration. Information sharing, technological sharing, and LSPs.

Ascertaining the article, many investigations have elected organizational performance as one of the central concepts and have been demarcated differently. Organizational performance is problematic to measure and there is no commonly known meaning. But, Organizational performance deal with the way an organizations thriving to attain both the market oriented and financial oriented goals. This definition covers both financial performance and operational performance. Previously, organizational performance has been evaluated by many researches from financial and market criteria perspectives, such as return on investment (ROI), market share, profit margin on sales, the growth of ROI, the growth of sales, the growth of market share, and overall competitive position. This study is thought to habit both financial and non-financial indicators to measure the organizational performance. A constructive relationship among SCI practices and the organizational performance have been confirmed by several studies. (Wijetunge, 2016).

A journal of the literature on industry and organizational performance recommends an extensive kind of views concerning firm performance. Chen and Paulraj (2004a) claimed that financial performance should be the foremost idea of enterprise performance since the principal objective of a business is to create profits for shareholders, and to save life in case of humanitarian organizations. The idea of financial performance has been recycled broadly as a basic theory of organizational performance. But, other scholars have stated out the restrictions of merely trusting on financial performance in SCs. For instance, identified that a statistical performance idea may not define a system's performance sufficiently and will be ambiguous and difficult to use for simple qualitative appraisals. (Huo, 2013).

While it is not within the range of this study to argument the qualities of every performance idea, given the difficulty of the performance idea matter, the researcher mostly follows one principle when we choose performance concepts, namely, a balanced approach. Such an approach, which uses a combination of qualitative and quantitative concepts (if possible) and a broader conceptualization of the performance idea, is important to present a perfect image of

organizational performance, as it has been encouraged by various scholars (Gunasekaran *et al.*, 2003). For instance, some Supply Chain Integration studies have articulated both operational and financial performance as an indicators of organizational performance (Wijetunge, 2016).

In this study, the researcher uses two broad categories of performance concepts: financial and non-financial performance. And non-financial performance is further seen from two perspectives: Customer Oriented Performance which is defined as the organization's performance in serving its customers, that is, how the organization's performs for a key customer in areas of quality, flexibility, delivery, and so forth. Suppliers' Oriented Performance refers to the organization's perception of its key supplier's performance in serving the organization, such as the performance level of the key supplier as perceived by the organization in areas of quality, flexibility, delivery, and so on. While customer oriented performance and supplier oriented performance focus on the operational aspects of companies (Huo, 2013).

The possibility to instantly assess the overall result of SCI on firm performance whether the diverging construct size varieties alter the nature, or magnitude of the broader relationship, the researchers made the dignity between distinctive dimensions of integration that explicitly focused on the operational aspect: the progress of shared operational movements with consumers and/or suppliers. SCI defined as the degree to which a manufacturer strategically collaborates with its supply chain companions and collaboratively manages intra- and inter-group processes, stressing the strategic nature of SCI. Seeing that of such divergent definitions, a more comprehensive classification of constructs is crucial. Considering the fact that SCI requires investment, the objective of administration is to look a return on that funding. All articles in the sample demonstrated this connection. In keeping with the theoretical lenses, the view SCI as a resource, which enables the firm to attain an aggressive competencies and hence results in comparably higher efficiency. After reviewing these diverging, though related, views and analyzing the big pattern of empirical reports accrued for the meta-analysis, three dimensions had been developed to examine and distinction the exact effects of SCI on firm performance. (Leuschner, Rogers and Charvet, 2013).

When administration in two organizations primary participates in SCI, they share information and know-how (Kim and Lee, 2010; Olorunniwo, and Li, 2011). As a result, (1st) knowledge integration refers to the coordination of knowledge switch, collaborative communicate and aiding science amongst organizations in the supply chain. The subsequent dimension in the

development is when management integrates events in addition to the sharing of knowledge (Kim and Lee, 2010): (2nd) Operational integration refers to the collaborative joint action development, work approaches and coordinated decision making among organizations in the supply chain. The final dimension built on the previous two and drives beyond activities by specializing in attitudes (Vander Vaart and van Donk, 2008): (3rd) Relational integration refers to the implementation of a strategic connection among organizations in the supply chain characterized with the aid of believe, dedication and long-time period orientation (Dyer and Hatch, 2006).

A considerable positive linkage between SCI and firm performance is found by several empirical studies whereas some also reveal substantial adverse effects, and the magnitude of the linkage varies considerably. To well comprehend this relationship, performance effects collected in the meta-analysis is shortened and assessed across three types (Chin *et al.*, 2014) (Qi *et al.*, 2017). Financial firm performance is measured using either revenue minus cost-based measures, such as profitability and return on assets, or purely revenue-based measures, like sales and market share. Customer-oriented performance consists of measures related to an improvement in customer satisfaction and customer loyalty, or closely related constructs. Finally, operational performance consists of improvements in key competitive capabilities including cost, quality, delivery, flexibility and innovation. Analyses were conducted both on aggregate firm performance and each separate dimension. Several studies found a significant relationship between SCI and firm performance. Thus, SCI is positively correlated with different measures of firm performance. (Leuschner, Rogers and Charvet, 2013).

2.2.4. Drivers of Supply Chain Integration (SCI Drivers)

The supply chain integration functions of planning and coordinating procurement, inventory management and logistics can be viewed as a mechanism that has allowed goods and commodities to be distributed flexibly across space, time and institutional framework. Competitive advantage requires making the end-to-end process across the value chain from requisition to payment as fast and as efficient as possible. Accelerating supply chain integration processes requires automation, although some processes will require human intervention at certain points, especially authorizations and exception handling, increasing the velocity of business requires automating as much as possible; even after automating processes, companies

need to monitor and manage them in real time to continually improve and optimize the processes (Keller Seru Lisanza, 2013).

supply chain integration has been found to improve performance of the supply chain. In the study of 125 manufacturing firms in the UK, it was found that SCI and information sharing leads to improved supply chain performance. A study found that integrating with a firm's suppliers and customers along with the firm's competitive strategy will lead to improved operations performance. The relationship between supply chain linkages involving customer, supplier, and internal processes of the firm with performance has also been studied. Many firms seek to enter into new markets to boost their profitability. This has driven them to seek for better strategic relationships to give them the platform for such marketing opportunity to a larger customer network. The quality and safety have driven firms to integrate and increase the amount of information they share with their suppliers to ensure that there is visibility across the supply chain so that food products material sourcing can be tracked. Firms want to create value activities that would reduce their operational costs and boost profitability. This would require internal and external integration of their processes (Kumar *et al.*, 2017).

Internal integration is the main strategy for cost reduction in the supply chain while supplier integration leads to better operational performance. Some performance measurements such as improved customer service, internal efficiency, demand flexibility, and product development are all indicators that firms try to improve and do so through SCI. (Hugos, M. H., 2011).

Another important driver for SC integration is the need for SCM agility. SCM agility requires an integrated infrastructure that enables rapid deployment of new solutions while leveraging existing IT investments. An agile SCM within humanitarian aid can't afford to rip and replace the existing systems. It requires real-time connectivity between people, systems, and functional entities. The need for cost reduction is also a very important driver of SCM integration. SC integration reduces wastages and costs and increases value addition. Two other important benefits that organizations gain from integrating their SCM functions are increasing successful delivery to the end user and improving overall quality and efficiency through optimization of organizational processes. (Keller Seru Lisanza, 2013).

2.2.5. Benefits of Supply Chain Integration

Integration level has a positive influence on performance outcomes; according to most of SC integration studies, the view that the level of SC integration improves quality and operating performance holds the same. SC integration influences customer responsiveness and manufacturing performance by means of the basic association among sourcing and degree of manufacturing objective achievement through empirical proof of basic causal associations in a supply chain. According to a survey of industrial equipment distributors, that strategic integration results in improved economic return for the organization. Empirically identified that manufacturers with the widest extent of SC integration should have the highest levels of performance improvements (Boche, Mulugeta and Gudeta, 2020). Specifically, they found a strong relationship from the largest level of supplier and customer integration to market share and profitability. It is suggested that integration of several functions at different organizational levels achieve above average financial and performance results. (Kim, 2009).

Both internal and external integration of operations is generally required for improved performance. simultaneous integration of internal and external operational processes infers the attainment of superior logistics performance, neither of which is a stand-alone advantage. Rodriguez *et al.* (2004) specify that higher logistics performance is interrelated to simultaneous integration of internal and external operational processes. According to Kim (2009), the greater the level of integrated upstream and downstream coordination the better the benefits proved empirically that external integration with suppliers and customers has a direct positive influence on market share, while internal integration has an influence on financial performance.

Supply chain performance is an important component in supply chain design and analysis. A number of performance measures are important for the evaluation of supply chain effectiveness. These measures can be either quantitative or qualitative. The objective of an integrated supply chain strategy is to synchronize the requirements of the final customer with the materials and information along the supply chain in order to find the balance between customer service and costs. So the researcher argues that supply chain performance has two dimensions: (1) service performance and (2) financial performance. Customer service is defined as the coverage of many service dimensions that are both general as well as manufacturing service objectives. Financial performance is defined by the traditional performance measures which include Return on Assets (ROA), Return on Investment (ROI) and Return on Sales (ROS). Costs are a very important part

of these financial performance indicators. Although two dimensions of firm performance are defined, the study recognized that at the end, financial performance is the most important performance. The study goes further in defining the performance of a supply chain and identifies four dimensions: (1) cost, (2) quality, (3) flexibility and (4) time performance. Both identify one financial dimension of supply chain performance. However, the researcher specified the financial dimension into different performance indicators. And classified the service performance as qualitative and the financial performance as quantitative. (Bas Leenders, 2010).

According to Keller Seru Lisanza (2013), organizations also integrate their SCM functions because they need to collaborate with other organizations and better their relationships with key suppliers. Collaboration enables a SCM to focus on joint planning, coordination, and process integration between the firm and its suppliers, customers, and other partners such as the logistics providers. In addition to cost reduction, collaboration offers the advantages of reduced lead times, increased reliability and responsiveness.

2.3. Conceptual Framework

The conceptual framework is an abstract representation connected to research projects and direct the collection and analysis of data. It is also an analytical tool with several variables and context. Conceptual framework cross both scale of theories with distinctive organized ideas (Scheinbaum, A. C., 2011 and Hussein et al., 2014).

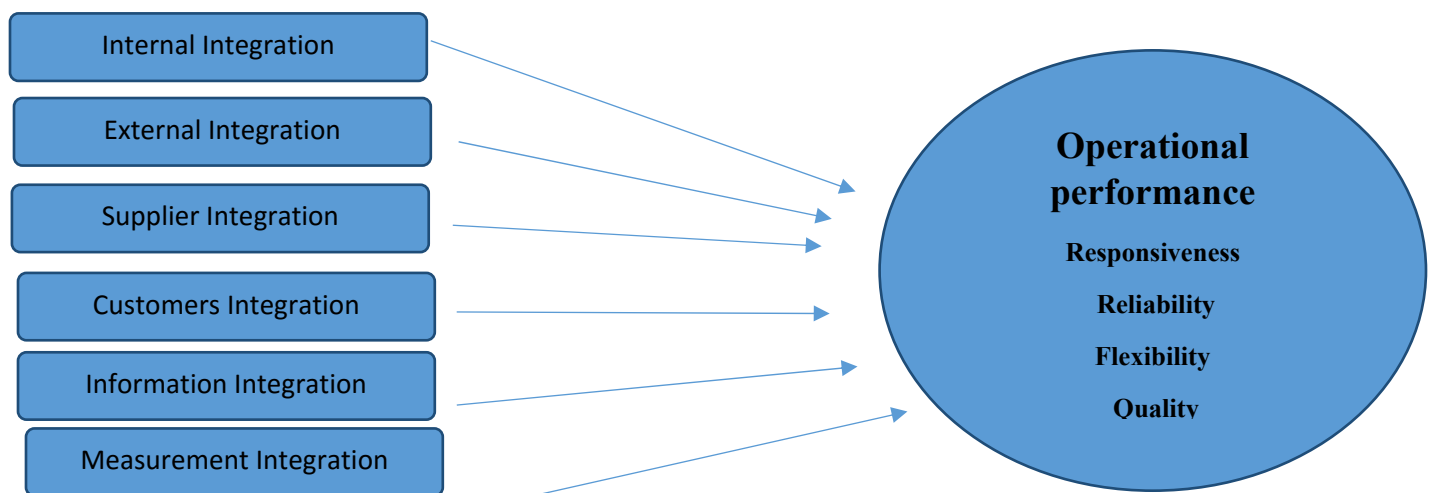


Figure 2.1 - Conceptual Framework of Supply Chain Integration (Source: Thomas, James and Clara, 2017)

CHAPTER THREE

METHODOLOGY

This chapter will describe the methodologies of the study. It covers research approach, research design, sampling techniques, sources of data collection, data collection procedures, scale validity and reliability test, methods of data analysis and presentation. Finally, ethical consideration is also included.

3.1 Research Design

There are three types of research design namely exploratory, descriptive and explanatory research. The goal of exploratory research is to discover ideas and in-sights while descriptive research is usually concerned with describing a population with respect to important variables. Explanatory research is used to establish cause-and-effect relationships between variables and causal analysis is concerned with the study of how one or more variables affect changes in another variable. It is thus a study of functional relationships existing between two or more variables (Kothari, 2004). Explanatory cross-sectional research design is used for this study. The research design will help to see the relationships between the dependent and independent variables and it also allowed to measure the effect of SCI on OP.

3.2 Research Approach

There are basically two research approaches, qualitative and quantitative. Quantitative research approach will be used in this study for the fact that it involves generation of data in quantitative form for analysis. Data will be quantified and statistical methods are used in the data analysis to seek evidence about a characteristics or a relationship between the stated variables.

3.3 Population

A population can be defined as the complete set of subjects that can be studied: people, objects, organizations from which a sample may be obtained (Shao,1999). EPSS currently has 2,535 permanent and 314 contract employees that is 2,849 employees. Moreover, 745 local and international supplier. Public pharmacy, health centers, governmental and private hospitals are its customers (<https://epss.gov.et/>). A population of EPSS is targeted as the study population. The study population, thus, constitutes the employees of EPSS, supplier of the organization and its customers

3.4 Sampling Techniques

Sampling is the process of selecting a number of study units from a defined study population (Abiy, 2009). It is economical to take representative sample for the intended investigation when conducting census is unrealistic. According to Zikmund (2000), there are two main sampling methods, probability and non-probability sample. In this study, convenience non-probabilistic sampling was applied to determine the sample size.

3.5 Sample Size

Sampling is the process of selecting a number of study units from a defined study population (Carvalho, 1984). Sample size for unknown population is selected based on Cochran (1963) who developed the formula to yield a representative sample for large population size at 5% margin of error and within 95% confidence level. It is demonstrated as:

$$n = \frac{z^2(p)(q)}{e^2}$$

Where: n- Sample size, z- Standard deviation given a corresponding confidence level of 95%
p- Estimated proportion of incidence (success rate = 0.5), q-(1 -p) or assumed failure rate (0.5), e-Proportion of sampling error or error margin in a given situation (5%)

Thus, the sample size of the intended study with 95% confidence level, probability of 50% occurrence, probability of 50% failure and 5% marginal error, will be obtained as:

$$n = \frac{z^2(p)(q)}{e^2} = \frac{(1.96)(0.5)(0.5)}{(0.05)^2} = 384.16 = 385$$

A representative sample size of 385 respondents were taken from EPSS staff, customer and suppliers to conduct the survey.

3.6 Data Sources

Generally, the data sources will be either primary, secondary data sources or both. Catherine (2017). In this study, the primary source of data will be use to meet the objectives cited. Primary Data Sources: such data sources are those had been gathered from sample respondents which would be chosen through sampling from the total study population. Structured questionnaire was used to collect primary data.

3.7 Data Collection Instrument

Questionnaire to be used must be prepared very carefully so that it may prove to be effective in collecting the relevant information. Structured questionnaires are questionnaires in which there are definite, concrete and predetermined questions (Kothari, 2004). As a primary data collection method, the research used standard self-administered and close ended questionnaire that were filled by EPSS staff, customer and suppliers. For secondary data collection mechanism, the research used data that had been collected from journal articles, books, online websites and others as a secondary data collection method.

A hierarchical questionnaire, based on a 5-point Likert scale, is used as a main tool for collecting data. There are three parts of the questionnaire. The first section contains information on the demographic characteristics of the respondents; the second section contains information on the independent variables of the sample i.e. external integration, information integration, measurement integration, internal integration, supplier integration, and customer integration. The third section deals with the dependent variable OP. The attributes were calculated using a 5-point Likert scale of 1-for "strongly disagreed" to 5-for "strongly agreed."

3.8 Scale Validity and Reliability

Validity, on the other hand, is concerned with whether the conclusions are really exactly what they seem to be. Validity is defined as the degree to which data collection methods accurately measure what they intended to measure (Saunders and Thornhill, 2003). Reliability can be defined as the degree to which measurements are free from errors and, therefore, yield consistent results. Operationally, reliability is defined as the internal consistency of a scale, which assesses the degree to which the items are homogeneous. To ensure the validity and reality of this research, the researcher utilizes the criterion argued by Bryman and Bell (2007) to test the process of the research. First of all, the internal validity will be fulfilled by the consistency between the research data collection and the theoretical framework. On the other hand, the external validity, which will also be met by this formal theory generated, represents that the findings would be used in more general area. Secondly, the researcher makes an adequate agreement in the process of the research, and the extent of the agreement determines the internal reality. Reliability was computed using Cronbach's alpha coefficient for the entire set of factors affecting the adoption of brand personality and customer loyalty. The use of Cronbach

Coefficient to measure reliability of instrument enabled to identify the strength of items included in the questionnaire such that measure between 0.7 and 1.0 signifies a strong consistency of item used in questionnaire (Mugenda, 2003). However, the acceptable Alpha value that meets the statistical prerequisite for the instrument to be characterized as reliable should be between 0.70 and 0.9 as the value more than 0.9 could be an implication of redundant variables measuring same subject (Travakol, 2011).

3.9 Data collection procedure

A pilot survey was conducted at EPSS prior to administrating the questionnaire to the targeted sample respondents so as to check whether the questioner is clear, easy to understand and straightforward to ensure that the respondents able to answer the questions with no difficulty. This was administered to test the appropriateness, validity and reliability of the questioner. . Based on the sample size computed on the above formula, self-administered questionnaires were distributed to willing respondents to collect total responses. The questionnaire were collected from the respondents and finally, the analysis of the data using different statistics on SPSS version 26 was made and this paper is produced.

3.10 Data Analysis and Presentation

Data in this study were analyzed using both descriptive and inferential statistics. Descriptive statistics is used to interpret data in general and for testing hypothesis and investigating research objectives inferential method is used using statistical package for social science (SPSS) version 26. Descriptive statistics is applied to interpret demographic variables of the respondents and to discover the frequencies of each dimension whereas inferential statistics is used for hypothesis testing such as correlation and multi-regression. Tables and graphs are used to present analysis results pictorially.

3.11 Ethical Consideration

In order to keep the confidentiality of the data given by respondents, the respondents are not required to write their name and assured that their responses were treated in strict confidentiality. The purpose of the study is disclosed in the introductory part of the questionnaire. Furthermore, the researcher tried to avoid misleading or deceptive statements in the questionnaire. . In addition to this, respondents are informed that any information that was collected via the instrument would never be used for any other purpose other than its academic intent i.e. the data would be kept confidential. Lastly, the questionnaires were distributed only to volunteers after having their full consents in verbal or written form.

CHAPTER FOUR

DATA ANALYSIS AND INTERPRETATIONS

This chapter encompasses the data analysis, interpretation and presentation of the results. The analyses comprised of both descriptive and inferential statistics in which the former describes the demographic profile of respondents' analysis of responses under each attribute; whereas the latter includes scale reliability test; correlation and multiple regression Analysis.

The data collected through self-administered questionnaire featured personal information of the respondents. After distributing questionnaires to the targeted group, questionnaires were collected. Finally 385 valid questionnaires usable for statistical analysis was found . The responses further screened for error correction and then encoded accordingly to make them suitable for data analysis. SPSS 26 was used to organize and prepare the collected data for analysis; pretested the measurement scale validity and reliability before collecting the required data; and analyzing the multiple linear regression model enabled to test a set of factors simultaneously. Finally, the research questions were addressed according to the results from the regression model analysis and the findings are discussed for each specific objective. After carried out all the required data preparation, then analyzed, interpreted and then findings are presented as follows.

4.1 Descriptive Statistics

The descriptive statistics is used to describe the demographic characteristics of the respondents and the summary of each study variables based on their responses.

4.1.1 Demographic Characteristics of the Respondents

The first part of the questionnaire consists of demographic characteristics of the respondents. It requested a limited amount of information related to their personal and socio- demographic status.

Table 4.1 Demographic Characteristics of the Respondents

Dimensions		Frequency	Percent
Age	20-29	133	34.5
	30-39	175	45.3
	40-49	55	14.2
	> 49	22	5.7
Sex	Male	244	63.2
	Female	139	36.0
Educational Qualification	Certificate	8	2.1
	Diploma	93	24.1
	Degree	229	59.3
	Masters	55	14.2
Relation with EPSS	Staff	199	51.6
	Supplier	48	12.4
	Customer	138	35.8
Years stayed with EPSS	<2	89	23.1
	2-5 Years	119	30.8
	6-10 Year	136	35.2
	>10 years	41	10.6

Sex

The gender orientation of the study presents, out of the 385 respondents, 63.2 %of the participants of the survey result is male while female respondents are account for 36 % of the study. This implies that majority of respondents were males.

Educational Qualification

Regarding the educational qualification, most of respondents of the study 59.3%, were a graduate of first degree. The least academic qualification is certificate with 8 respondents (2.1%), 14.2 % of the respondents have master's degree and 24.1% of the respondents have diploma. This could be taken as a good opportunity for SCI and organizational performance issues.

Relation with EPSS

The respondents were asked to indicate the relation with EPSS they had, the findings in the table above indicated that Staff, Supplier and Customer are 51.6%, 12.4% and 35.8% respectively. This is an indication that the respondents of this study have good understanding about supply chain integration and organizational performance issues.

Years stayed with EPSS

The respondents were asked to indicate the duration they had known the organization. The findings shown on Table 4.1 indicated that a majority (35.2%) indicated 6-10 years that they had known the organization followed by 30.8% who indicated 2-5 years. 23.1% reported less than two years they had known the organization. 10.6% of the respondents had known the organization for >10 years. The result indicates that the majority of the respondents have 2-10 years' experience regarding the company and their response could be considered genuine which has direct relation with data quality.

4.1.2 Description of study variables

Under the description of study variables, summary of supply chain integration practices (Internal Integration, Suppliers Integration, Customers Integration, Information Integration, External Integration and Measurement Integration) are presented as follows.

4.1.2.1 Internal integration

Results of the findings on Table 4.2 indicates that majority of the respondents agreed that Internal meetings have organized among departments in adding value in quality (mean 3.94). Most of the respondents responded that departments in EPSS share information about new operational processes to each other (mean 3.86), Sharing of information about new product exists among each other (mean 3.75), each departments recognize schedules of the organization (mean 3.74), departments share their plan to each other (mean 3.72) and departments in EPSS have clear information about duties and tasks of each other (mean 3.31).

Table 4.2 Respondents' perception on internal integration practices

Description	Mean	Std. Deviation
Departments in EPSS share information about new operational processes to each other.	3.86	.891
Each departments recognize schedules of the organization.	3.74	.857
Departments share their plan to each other.	3.72	.843
Departments in EPSS have clear information about duties and tasks of each other.	3.31	.845
Sharing of information about new product exists among each other.	3.75	.961
Internal meetings have organized among departments in adding value in quality	3.94	.983
Grand Mean	3.72	0.897

Source: Survey Data, 2022

4.1.2.2 Supplier integration

Results of the findings on Table 4.3 indicates that majority of the respondents agreed that EPSS has long-term relationships with its suppliers (mean 4.00). Most of the respondents responded that EPSS and its suppliers have transparent information about their schedules, innovations and operational systems (mean 3.90), EPSS and its suppliers have transparent information about their schedules, innovations and operational systems. (mean 3.75), EPSS and its suppliers have transparent information about their inventory status (mean 3.17) . (mean 2.98) and (mean 2.41) disagree for EPSS and its suppliers have transparent information about their inventory status and EPSS shares demand forecasts with major suppliers respectively.

Table 4.3 Respondents' perception on Supplier integration practices

Description	Mean	Std. Deviation
EPSS keeps communication line open for suppliers on research and development activities.	3.90	.923
EPSS and its suppliers have transparent information about their inventory status.	3.17	1.010
EPSS and its suppliers have transparent information about their plans.	2.98	.860
EPSS and its suppliers have transparent information about their schedules, innovations and operational systems.	3.75	.974
EPSS has long-term relationships with its suppliers.	4.00	.868
EPSS shares demand forecasts with major suppliers.	2.41	1.243
Grand Mean	3.368	0.979

Source: Survey Data, 2022

4.1.2.3 Customer integration

Results of the findings on Table 4.4 indicates that EPSS keeps communication line open for customers on research and development activities (mean 2.44). EPSS and its customers have transparent information about their inventory status. (mean 2.74). Majority of the respondents had responded that they share their plan with each other (mean 3.74). Most of the respondents agreed that EPSS and its customers share technical information with each other if required (mean 3.67). (Mean 2.78) had neutral response on EPSS has systematic way of constantly measure customer satisfaction. EPSS has networked linkage in information sharing and feedback with customers (mean 3.48)

Table 4.4 Respondents' perception on Customer integration practices

Description	Mean	Std. Deviation
EPSS keeps communication line open for customers on research and development activities	2.44	1.147
EPSS and its customers have transparent information about their inventory status.	2.74	1.071
EPSS and its customers share their plan with each other	3.74	1.036
EPSS and its customers share technical information with each other if required.	3.67	.871
EPSS has systematic way of constantly measure customer satisfaction.	2.78	.897
EPSS has networked linkage in information sharing and feedback with customers.	3.48	.854
Grand Mean	3.14	0.979

Source: Survey Data, 2022

4.1.2.4 Information integration

Results of the findings on Table 4.5 indicates that most of the respondents agree that (mean 3.84, 3.79, 3.77, 3.72, 3.68, 3.67) EPSS have positive practices on Information integration practices i.e enhanced the modes of communication, transparent information system about the operations, strong timely information exchange with major suppliers, staff members and customers through ICT network, Paperless communication system, networked ordering system with major suppliers and customers, Customers can collect their orders from warehouses without facing communication problems.

Table 4.5 Respondents' perception on Information integration practices

Description	Mean	Std. Deviation
EPSS have enhanced the modes of communication.	3.68	.924
EPSS have transparent information system about the operations.	3.67	.855
EPSS have strong timely information exchange with major suppliers, staff members and customers through ICT network.	3.72	.854
EPSS have Paperless communication system	3.77	.979
The organization have networked ordering system with major suppliers and customers	3.84	.847
Customers can collect their orders from warehouses without facing communication problems.	3.79	.929
Grand Mean	3.75	0.898

Source: Survey Data, 2022

4.1.2.5 External integration

Results of the findings on Table 4.6 indicates that EPSS have close collaboration with other members of the supply chain (mean 3.81) and EPSS share information about the flow of materials and information in demand forecasting with suppliers and customers (mean3.72). On the other hand some (mean 2.64 and mean2.64) responded that EPSS have coordination of

resources as well as information sharing plans in increasing quality of service and EPSS have coordination of resources as well as information sharing in inventory management.

Table 4.6 Respondents' perception on External integration practices

Description	Mean	Std. Deviation
EPSS have close collaboration with other members of the supply chain	3.81	.730
EPSS share information about the flow of materials and information in demand forecasting with suppliers and customers.	3.72	.872
EPSS have coordination of resources as well as information sharing plans in increasing quality of service.	2.64	1.016
EPSS have coordination of resources as well as information sharing in inventory management.	2.64	1.086
Grand Mean	3.20	0.926

Source: Survey Data, 2022

4.1.2.6 Measurement integration

Results of the findings on Table 4.7 indicates that the overall perception of respondents on measurement integration practices is perceived positively (mean 3.92, 3.98, 3.92, 3.92). EPSS ensures that the partners are aware of policies and rules concerning delivery of products. EPSS ensures that the partners are aware of policies and rules concerning quality issues. EPSS ensure that each part of the supply chain is accountable for meeting its own goals. EPSS ensures the delivery of products without any damage and in a timely manner.

Table 4.7 Respondents' perception on Measurement integration practices

Description	Mean	Std. Deviation
EPSS ensures that the partners are aware of policies and rules concerning delivery of products.	3.92	.825

EPSS ensures that the partners are aware of policies and rules concerning quality issues.	3.98	.748
EPSS ensure that each part of the supply chain is accountable for meeting its own goals.	3.92	.837
EPSS ensures the delivery of products without any damage and in a timely manner.	3.92	.798
Grand Mean	3.935	0.802

Source: Survey Data, 2022

4.1.4.1 Operational performance

Results of the findings on Table 4.8 indicates that the overall perception of respondents on the role of supply chain integration on operational performance is perceived positively.

Table 4.8 Respondents' perception on the role of supply chain integration on operational performance

Description	Mean	Std. Deviation
Due to sharing of information about process, plan, schedule, duties, and tasks between departments increased the reliability of EPSS service.	3.99	.834
Due to sharing of information about process, plan, schedule, duties, and tasks between departments increased the responsiveness of EPSS service.	3.99	.807
Due to sharing of information about process, plan, schedule, duties, and tasks between departments increased the flexibility of EPSS service.	3.96	.791
EPSS has maintained Responsiveness due to sharing of information about process, plan, schedule, demand forecasting, long-term relationships and inventory status with its suppliers.	3.92	.847
EPSS has maintained reliability due to sharing of information about process, plan, schedule, demand forecasting, long-term relationships and inventory status with its suppliers.	3.81	.843
EPSS has maintained flexibility due to sharing of information about process, plan, schedule, demand forecasting, long-term relationships and inventory status with its suppliers.	4.04	2.261
Keeping communication line open for research and development activities, sharing inventory status, plan, technical information, measuring customer satisfaction and giving feedback to its customers	4.12	2.940

increased the reliability of EPSS services.		
Keeping communication line open for research and development activities, sharing inventory status, plan, technical information, measuring customer satisfaction and giving feedback to its customers increased the responsiveness of EPSS services.	3.92	.815
Keeping communication line open for research and development activities, sharing inventory status, plan, technical information, measuring customer satisfaction and giving feedback to its customers increased the flexibility of EPSS services.	4.00	.720
The use of enhanced the modes of communication with transparent and timely information, without any barrier helps to enhance its service reliability.	3.94	.811
The use of enhanced the modes of communication with transparent and timely information, without any barrier helps to enhance its service responsiveness.	4.05	.686
The use of enhanced the modes of communication with transparent and timely information, without any barrier helps to enhance its service flexibility.	4.04	.720
Close collaboration, sharing information about flow of materials and demand forecasting and inventory management with other members of the supply chain assists EPSS to enhance its service reliability.	3.99	.789
Close collaboration, sharing information about flow of materials and demand forecasting and inventory management with other members of the supply chain assists EPSS to enhance its service responsiveness.	3.96	.801
Close collaboration, sharing information about flow of materials and demand forecasting and inventory management with other members of the supply chain assists EPSS to enhance its service flexibility.	4.04	.783
Policies and rules concerning delivery of products without any damage and in a timely manner, meeting its own goals and quality issues assists EPSS to enhance its service reliability.	4.02	.741
Policies and rules concerning delivery of products without any damage and in a timely manner, meeting its own goals and quality issues assists EPSS to enhance its service responsiveness.	3.99	.774
Policies and rules concerning delivery of products without any damage and in a timely manner, meeting its own goals and quality issues assists EPSS to enhance its service flexibility.	4.04	.706
Grand Mean	3.99	0.982

Source: Survey Data, 2022

4.2 Inferential Statistics

Inferential statistics uses sample measurements of the subject and make generalization about the larger population. It comprises different test such as reliability test of data collection instrument, correlation analysis among variables and assumption of data test for their suitability or fitness to the intended regression analysis model namely normality, collinearity, linearity and homoscedasticity. Finally, the multi-regression analysis in terms of model summary, ANOVA test and determination of beta coefficients are conducted to address the objectives of this study.

4.2.1 Reliability Test

Reliability of the data collection instrument involves the consistency of the result obtained with the instrument. Cronbach's alpha was used to assess the internal consistency of variables in the research instrument. The scale represents as a number between 0 and 1 but the alpha value above 0.7 indicates good reliability of the measurement scale (Zikmund, 2010). For this study, thus, a Cronbach's alpha score of .70 or higher is considered adequate to determine reliability Based on this notion, the scale reliability was found to be within the acceptable range as all the variables' test scores were found to be above $\alpha = .70$. Thus, showing as indication of acceptability of the scale for further analysis, the reliability score of overall SCI and OP yielded $\alpha = .830$ and $\alpha = 0.794$ respectively. The overall scale reliability score is $\alpha = .799$ on average. It can be concluded that the measuring instrument is credible to conduct data analysis based on the collected data using the questionnaire.

Table 4.9 Reliability Test

	N	Cronbach's Alpha
Internal	5	.794
Supplier	5	.810
Customer	5	.802
Information	5	.789

External	4	.818
Measurement	4	.801
Overall SCI	28	.830
Internal	5	0.794
Total	33	

Source: Survey Data, 2022

4.2.2 Assumption Tests of Linear Regression Model

Linear regression is an analysis that assesses whether one or more predictive variables explain the dependent (criterion) variable. The regression assumptions are correlation (linear relationship), Multicollinearity, Homoscedasticity and Normality test.

4.2.2.1 Correlation Analysis

This study employs correlation analysis, which investigates the strength of the relationships between the studied variables. Pearson correlation analysis was used to provide evidence of convergent validity. Pearson correlation coefficients reveal magnitude and direction of relationships (either negative or positive) and the intensity of the relationship (-1.0 + 1.0). Correlations are perhaps the most basic and most useful measure of association between two or more variables (Marczyk, Dematteo and Festinger, 2005). To interpret the direction and strengths of relationships between variables, the guidelines suggested by Field (2005) were followed. His classification of the correlation coefficient (r) refers 0.1– 0.29 is weak; 0.3 – 0.49 is moderate; and ≥ 0.5 is strong.

Table 4.10 Relationships between Supply chain integration and operational performance

Correlations							
	Internal	Supplier	Customer	Information	External	Measurement	op
Internal	1	.403**	.315**	.691**	.285**	.645**	.498**
Supplier	.403**	1	.564**	.355**	.432**	.397**	.498**
Customer	.315**	.564**	1	.408**	.699**	.300**	.498**

Information	.691**	.355**	.408**	1	.331**	.641**	.498**
External	.285**	.432**	.699**	.331**	1	.266**	.498**
Measurement	.645**	.397**	.300**	.641**	.266**	1	.498**
Op	.498**	.327**	.298**	.580**	.174**	.621**	1
**. Correlation is significant at the 0.01 level (2-tailed).							

Source: Survey Data, 2022

Table 4.10 above shows the relation between the six Supply chain integration practices and operational performance. The results of the correlation test revealed that, except external integration, the other, the other four supply chain integration practices had positive and significant relation with overall operational performance. Specifically, information and measurement integration had relatively strongest positive relation ($r = .691$ and $r = .645^{**}$) respectively. Supplier and customer had moderate relation ($r = .403$ and $r = .315$). External integration had weak relation. In summary, except external integration, the relationship between other SCI practices and overall operational performance had significant and positive relations.

4.2.2.2 Multicollinearity

Multicollinearity is an assumption that there is no highly related predictor variables. Having such problem or violation of the assumption may lead the prediction of the linear regression model inconsistent output. Thus, before running the linear regression (Ordinary Least Square Method), it is advisable check for the problem of multicollinearity issues high correlation between some of the independent variables. The study checks this with the variance Inflation Factor (VIF) which calculates the influence of correlation among the independent variables on the precision of regression estimates. The VIF should not exceed 10. If the Tolerance ($1/VIF$) value is less than 0.1 it also indicates that there is possibility of multi-Collinearity, but if it is greater than 0.1 it means that there is no multicollinearity problem with in the model (Hair, 2004). In this study, the collinearity statistics analysis of VIF shows that value ranges from 2.451 to 1.650 and tolerance value ranging with 2.451 to 1.650 indicated that there was no collinearity problem. This could be taken as a confirmation that there were no multi-collinearity problems to proceed for regression analysis.

Table 4.11 Collinearity Assumption Test

Coefficients^a								
		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.285	.186		6.914	.000		
	Internal	.023	.056	.023	.403	.687	.439	2.276
	Supplier	.053	.055	.047	.958	.339	.606	1.650
	Customer	.128	.059	.128	2.151	.032	.408	2.451
	Information	.256	.053	.283	4.872	.000	.426	2.348
	External	-.142	.053	-.144	-2.701	.007	.505	1.978
	Measurement	.390	.052	.406	7.529	.000	.495	2.020
a. Dependent Variable: OP								

Source: Survey Data, 2022

4.2.2.3 Homoscedasticity

There should be homoscedasticity before running multiple regression analysis, this means that the residuals (the differences between the values of the observed and predicted dependent variable) are normally distributed, and that the residuals have constant variance (Burns & Burns 2008). If the assumption of homoscedasticity is violated (i.e. there is heteroscedasticity).

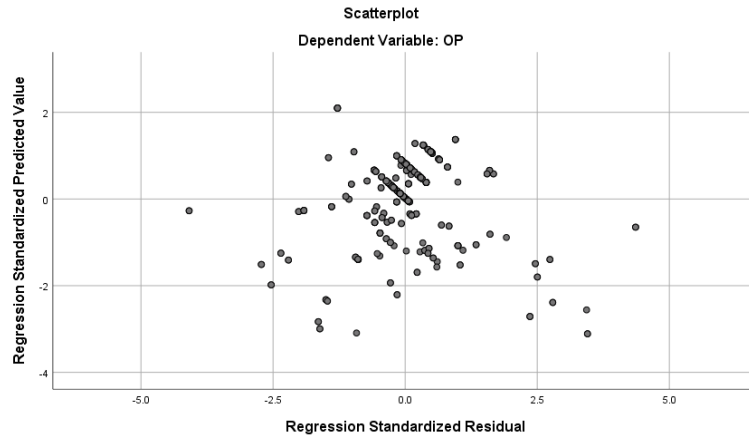


Figure 2: Homoscedasticity

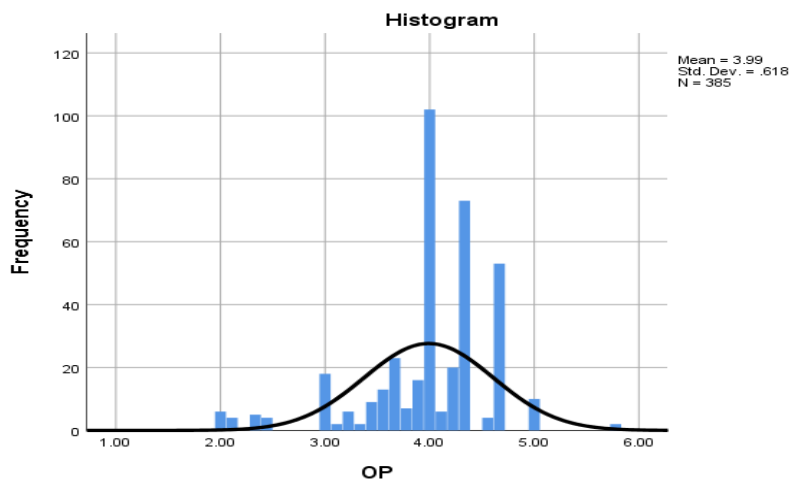
The graph has demonstrated homoscedasticity of the study. Using the plots of ZRESID against ZPRED, the researcher tried to check the graph looks like a random array of dots evenly dispersed around zero because the testing for Homoscedasticity is an assumption in regression analysis that the residual value of the dependent variable have equally distributed.. In figure 2, it shows that each of the the six Supply chain integration practices against the expected value (straight line). The figure shows that the distribution of the points throughout the plot. And, these patterns are indicatives of a situation in which the assumption of linearity and homoscedasticity have been met.

4.2.2.4 Normality

For the sample size above 50 is usually sufficient to ignore the assumption regarding normal distribution (Weinberg and Abramowitz, 2008). Since samples size of the study exceeds by far the suggested number hence it assumes normality by default. For further confirmation, Kolmogorov-Smirnov test has been carried out. It compares the scores in the sample to a normally distributed set of scores with the same mean standard deviation. If the test is nonsignificant ($p > 0.05$) it tells us that the distribution of the sample is not significantly different form a normal distribution (i.e. it is probably normal). If, however, the test is significant ($P < 0.05$) then the distribution in question is significantly different from a normal distribution (i.e. it is non-normal). In the case, as presented in Appendix III, value of each variable is almost zero and less than 0.05 and the distribution are slightly different from normal distribution as presented in the appendix table.

Table 4.12. Normality Test

	N	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Std. Error
Internal	385	-1.538	.124	2.792	.248
Supplier	385	.135	.124	1.328	.248
Customer	385	.135	.124	2.155	.248
Information	385	-1.177	.124	1.027	.248
External	385	.048	.124	.578	.248
Measurement	385	-1.172	.124	1.255	.248
Valid N (listwise)	385				

**Figure 3: Normality Test**

4.2.2 Multiple Linear Regression Analysis

Regression model was applied to test how far the SCI had impact on the operational performance. Coefficient of determination (R^2) is the measure of proportion of the variance of dependent variable about its mean that is explained by the independent or predictor variables. Higher value of R^2 represents greater explanatory power of the regression equation. Multiple

regression analysis in this study was used to model the value of impact on the operational performance based on its linear relationship to two or more predictors (Internal, Supplier, Customer, Information, External, Measurement). This means, the overall operational performance. In order to indicate the impact that each predictor had on the construct variable, the unstandardized coefficients are checked.

Table 4.13 Model Summaryb

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.675 ^a	.456	.447	.45919
a. Predictors: (Constant), Measurement, External, Supplier, Information, Internal, Customer				

The model summary on Table 4.11, above indicated that, the value of R (.675^a) this indicates the relations of the six independent variables with the dependent one affecting approximately 45.6% (R^2) of the variance of operational performance. However, the remaining percent (54.4%) was explained by other variables not included in this study.

ANOVA test, Table 4.14, is significant at $p < 0.001$. Therefore, 45.6% of variance (R^2) SCI is statistically significant and the model appropriately measured the dependent variables – OP. Therefore, the regression model predicts overall operational performance and has been significantly explained by the six independent variables of SCI.

Table 4.14: ANOVA

ANOVA^a						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	66.831	6	11.138	52.825	.000 ^b
	Residual	79.704	378	.211		
	Total	146.535	384			
a. Dependent Variable: OP						
b. Predictors: (Constant), Measurement, External, Supplier, Information, Internal, Customer						

Finally, the analysis of the multiple regression models represents the output for the beta coefficients of each SCI. The regression equation for this research is presented below.

$$CPL = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + e$$

Where, OP = operational performance, II = internal integration, EI = external integration, CI = customer integration, SI = supplier integration, INI=information integration and MI = measurement integration. β_0 = Constant, β_1 to β_4 = beta coefficients, and e = error terms. Based on multiple linear regression analysis on Table 4.13, substituting the results in the model yields, excluding internal integration and supplier integration variable as it was found to be statistically insignificant at $p < .10$:

$$OP = 1.285 + .128CI + .256INI + .142EI + .390MI$$

The regression analysis revealed that, except internal and supplier integration, each supply chain integration have positive and significant effect on overall operational performance. Measurement integration ($\beta = .390$) has relatively the highest effect. Information integration (.256) and external integration (.142) have medium effect but customer integration (.128) have relatively lower contribution to the prediction model. This predicted change in the customer patronage for every unit change in that specific predictor variable. This means, a unit change in Measurement integration, for instance, is accounted for .390 units change in operational performance. The results, Table 4.13, implies that all the six Supply chain integration practices

had statistically significant influences on overall customer loyalty at 95% confidence level ($p < 0.05$), indicating that, for the organization, these factors are important in assessing overall their operational performance.

Table 4.15 Estimated Regression Coefficients

Coefficients^a							
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Hypotheses
		B	Std. Error	Beta			
1	(Constant)	1.285	.186		6.914	.000	
	Internal	.023	.056	.023	.403	.687	H1-Refused
	Supplier	.053	.055	.047	.958	.339	H1-Refused
	Customer	.128	.059	.128	2.151	.032	H1-Supported
	Information	.256	.053	.283	4.872	.000	H1-Supported
	External	-.142	.053	-.144	-2.701	.007	H1-Supported
	Measurement	.390	.052	.406	7.529	.000	H1-Supported
a. Dependent Variable: OP							

4.3 Discussion

This part elaborates the findings of the results of the study. The aim of this study is to assess the effect of supply chain integration on operational performance of EPSS. The discussion focuses on the major findings of Internal, Supplier, Customer, Information, External and Measurement integration and their relationship with overall operational performance of EPSS.

The first specific objective was to investigate the effect of information integration, supplier integration, measurement integration, internal integration external integration and customer

integration on the operational performance of EPSS. The results indicate that the effect of customer integration is positive and significant on operational performance ($\beta = .128$).

The result answers how supply chain integration affects the operational performance of EPSS, and found that supply chain integration affects the operational performance had positive and significant effect on operational performance.

Referring the second specific objective, to assess the SCI practices of EPSS, it was found that supply chain integration practices had positive and significant effect on operational performance.

Finally, the third objective was to evaluate how SCI is being practiced at EPSS. The results of this study revealed that that supply chain integration practices had positive and significant effect on operational performance.

These findings support other literature that argues the supply chain management integration have a role on the performances of the organization. When the results of this study compared with those of previous research on supply chain integration, the supplier integration, customer integration and internal integration findings that indicate as there are no significant impact in improving a firm's performance is consistent with the findings of *Uwamahoro, 2018*, *Devaraj, S., L. Krajewski and J.C. Wei (2007)*, and *Chirchir and Richu, 2013* respectively.

The measurement integration result has significant result for the performance of the organization, this finding is aligned with the study made by *Klemencic, 2006*.

Information integration are very significant for performance of the organization is contingent with the finding of the *Wong, Lai and Cheng, 2016*. External integration with intra-organization has produced the significant result which is consistent with the finding of the previous study (*Barroso, Gouveia and José, 2016*).

It can be concluded that SCI practices have significant and positive effect on operational performance of EPSS. Measurement integration, information integration, external integration and customer integration played significant role in enhancing operational performance of EPSS.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

In this chapter of the study, summary of the major findings, conclusion and recommendations of the study is presented.

5.1 Summary of major findings

The primary objective of this study was to demonstrate the effect of supply chain integration on operational performance of Ethiopian pharmaceutical supply service. To address the intended research objectives, six dimensions of SCI namely Internal, Supplier, Customer, Information, External and Measurement integration and their relationship with overall operational performance of EPSS. A sample size of 385 respondents was selected using convenience sampling technique. Based on the theoretical framework and objectives of the study, a questionnaire were provided in a 5-point Likert scale filled by the respondents. The gathered data was analyzed by descriptive and inferential analysis using descriptive and inferential statistics respectively. The major findings of the study are summarized and presented as below:

Demography

- The results of the demographic characteristics of the respondents shows that majority (63.2%) of the respondents were males, 45.3 % within the age range of 30-39 years, 59.3% with educational qualification of degree 35.2% 6-10 years.
- The results of the study variable internal integration shows that majority of the respondents agreed that internal meetings have organized among departments in adding value in quality (mean 3.94).
- The results of the study variable Supplier integration shows that majority of the respondents agreed that EPSS has long-term relationships with its suppliers (mean 4.00).
- The results of the study variable customer integration shows that majority of the respondents agreed that they share their plan with each other (mean 3.74).
- The results of the study variable information integration shows that majority of the respondents agreed EPSS have positive practices on Information integration practices which are enhanced the modes of communication, transparent information system about

the operations, strong timely information exchange with major suppliers, staff members and customers through ICT network, Paperless communication system, networked ordering system with major suppliers and customers, Customers can collect their orders from warehouses without facing communication problems.

- The results of the study variable external integration shows that majority of the respondents agreed indicates that EPSS have close collaboration with other members of the supply chain (mean3.81) and EPSS share information about the flow of materials and information in demand forecasting with suppliers and customers (mean3.72).
- The results of the study variable measurement integration shows that majority of the respondents agreed that the overall perception of respondents on measurement integration practices is perceived positively (mean 3.92, 3.98, 3.92, 3.92). EPSS ensures that the partners are aware of policies and rules concerning delivery of products. EPSS ensures that the partners are aware of policies and rules concerning quality issues. EPSS ensure that each part of the supply chain is accountable for meeting its own goals. EPSS ensures the delivery of products without any damage and in a timely manner.

In summary of the major findings, results of the study variables, except internal integration and Supplier integration, the other four variables of SCI had positive and statistically significant effect on operational performance of EPSS.

5.2. Conclusion

There is high extent of practices of supply chain integration by the organization since all of the dimensions have been fall in the great rate as per the survey scale instrument.

The internal integration and supplier integration has no effect on organizational performance. The other four variables of SCI: information integration, measurement integration, customer integration and external integration had positive and statistically significant effect on operational performance of EPSS.

The aim of the study was to demonstrate the effect of supply chain integration on operational performance of Ethiopian pharmaceutical supply Service (EPSS). Hence, supply chain integration is important in improving and increasing organizational performance Thus, organizations should evaluate periodically to investigate which SCI tool or a mixture of two or more tools improve their overall performances in the long run.

The overall assessment results of the structural model revealed that the model had satisfactory statistical power in predicting the research model. Generally, the study showed that the superior organizational performance can be attained through supply chain integration impact.

5.3 Recommendation

It was found to have positive and significant relationships between SCI and operational performance. Except internal integration and supplier integration, all the other four dimensions of SCI practices such as Customer, Information, External and Measurement integration are appropriate predictors to measure overall operational performance. If EPSS properly use these factors to the right target customers at the right place, in the right time, then they can easily increase the operational performance. In view of the findings and conclusions of this study, the following recommendations are made to the concerned managements.

- Customer integration has positive and strong effect on operational performance so EPSS should address the intended integration.
- Information integration has positive and strong effect on operational performance so EPSS should address the intended integration.
- External integration has positive and strong effect on operational performance so EPSS should address the intended integration.
- Measurement integration has positive and strong effect on operational performance so EPSS should address the intended integration.
- This study is limited in nature and discusses only the slight element of SCI even there are some other supply chain tools and technique which contribute to the overall operational performance.

The overall assessment results of the structural model revealed that the model had satisfactory statistical power in predicting the research model. Generally, the study showed that the superior organizational performance can be attained through supply chain integration impact.

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Appendix I – Survey Questionnaire

Appendix I: Questionnaire on operational performance of Ethiopian pharmaceutical supply service (EPSS).

This questionnaire is prepared to gather data on the effect of supply chain integration on operational performance of Ethiopian pharmaceutical supply service (EPSS). The study is for academic purpose only and thus not affects you in any case. So, your response is vital for successfulness of the study. Therefore, you are kindly asked to respond to each question very carefully. Your answers are completely confidential, it would not be disclose to any third parties.

General Instructions

- no need of writing your name
- Try to address all the questions
- please put (✓) on your level of agreement
- Contact Address

If you have any doubts, please contact me (Mobile: 0912174796 or e-mail: tseb40@gmail.com)

Thank you in advance!

PART I: DEMOGRAPHIC INFORMATION

1. Age ☐ 20-29 ☐ 30-39 ☐ 40-49 ☐ above 49

2. Sex ☐ Male ☐ Female

3. Educational Qualification

☐ Certificate ☐ Diploma ☐ Degree ☐ Masters ☐ PhD

4. Relation with EPSS

☐ Staff ☐ Supplier ☐ Customer ☐ Other specify _____

5. Years stayed with EPSS

☐ Under two Years ☐ 2-5 Years ☐ 6-10 Year ☐ above 10 years

PART II: SupplychainIntegrationPractices of EPSS

Please tick (✓) on the appropriate question number to indicate the extent to which you agree or disagree with each statement. Please rate your level of agreement where:

1. Strongly Disagree 2. Disagree 3. Neutral, 4. Agree 5.Strongly Agree

I. supply chain integration practices of EPSS						
A. Internal integration practices		1	2	3	4	5
i.	Departments in EPSS share information about new operationalprocesses to each other.					
ii.	Each departments recognize schedules of the organization.					
iii.	Departments share their plan to each other.					
iv.	Departments in EPSS have clear information about duties and tasks of each other.					
v.	Sharing of information about new product exists among each other.					
vi.	Internalmeetings have organized amongdepartments in adding value in quality					
B. Supplier integration practices						
i.	EPSS keeps communication line open for suppliers on research and development activities.					
ii.	EPSS and its suppliers havetransparent information about their inventory status.					
iii.	EPSS and its suppliers havetransparent information about their plans.					
iv.	EPSS and its suppliers havetransparent information about their schedules, innovations and operational systems.					
v.	EPSS has long-term relationships with its suppliers.					
vi.	EPSS shares demand forecastswith major suppliers.					
C. Customer integration practices						
i.	EPSS keeps communication line open for customers on research and development activities					
ii.	EPSS and its customers havetransparent information about their inventory status.					

iii.	EPSS and its customers share their plan with each other					
iv.	EPSS and its customers share technical information with each other if required.					
v.	EPSS has systematic way of constantly measure customer satisfaction.					
vi.	EPSS has networked linkage in information sharing and feedback with customers.					
D. Information integration practices						
i.	EPSS have enhanced the modes of communication.					
ii.	EPSS have transparent information system about the operations.					
iii.	EPSS have strong timely information exchange with major suppliers, staff members and customers through ICT network.					
iv.	EPSS have Paperless communication system					
v.	The organization have networked ordering system with major suppliers and customers					
vi.	Customers can collect their orders from warehouses without facing communication problems.					
E. External integration practices						
i.	EPSS have close collaboration with other members of the supply chain					
ii.	EPSS share information about the flow of materials and information in demand forecasting with suppliers and customers.					
iii.	EPSS have coordination of resources as well as information sharing plans in increasing quality of service.					
iv.	EPSS have coordination of resources as well as information sharing in inventory management.					
F. Measurement integration practices						
i.	EPSS ensures that the partners are aware of policies and rules concerning delivery of products.					
ii.	EPSS ensures that the partners are aware of policies and rules concerning quality issues.					
iii.	EPSS ensure that each part of the supply chain is accountable for meeting its own goals.					
iv.	EPSS ensures the delivery of products without any damage and in a timely manner.					

II. The role of supply chain integration operational performance						
A. The role of Internal integration on operational performance		1	2	3	4	5
i.	Due to sharing of information about process, plan, schedule and duties and tasks between departments increased the reliability of EPSS service.					
ii.	Due to sharing of information about process, plan, schedule and duties and tasks between departments increased the responsiveness of EPSS service.					
iii.	Due to sharing of information about process, plan, schedule and duties and tasks between departments increased the flexibility of EPSS service.					
B. The role of Supplier integration on operational performance						
iv.	EPSS has maintained Responsiveness due to sharing of information about process, plan, schedule, demand forecasting, long-term relationships and inventory status with its suppliers.					
v.	EPSS has maintained reliability due to sharing of information about process, plan, schedule, demand forecasting, long-term relationships and inventory status with its suppliers.					
vi.	EPSS has maintained flexibility due to sharing of information about process, plan, schedule, demand forecasting, long-term relationships and inventory status with its suppliers.					

C. The role of Customer integration on operational performance					
vii.	Keeping communication line open for research and development activities, sharing inventory status, plan, technical information, measuring customer satisfaction and giving feedback to its customers increased the reliability of EPSS services.				
viii.	Keeping communication line open for research and development activities, sharing inventory status, plan, technical information, measuring customer satisfaction and giving feedback to its customers increased the responsiveness of EPSS services.				
ix.	Keeping communication line open for research and development activities, sharing inventory status, plan, technical information, measuring customer satisfaction and giving feedback to its customers increased the flexibility of EPSS services.				
D. The role of Information integration on operational performance					
x.	The use of enhanced the modes of communication with transparent and timely information, without any barrier helps to enhance its service reliability.				
xi.	The use of enhanced the modes of communication with transparent and timely information, without any barrier helps to enhance its service responsiveness.				
xii.	The use of enhanced the modes of communication with transparent and timely information, without any barrier helps to enhance its service flexibility.				

E. The role of External integration on operational performance					
xiii.	Close collaboration, sharing information about flow of materials and demand forecasting and inventory management with other members of the supply chain assists EPSS to enhance its service reliability.				
xiv.	Close collaboration, sharing information about flow of materials and demand forecasting and inventory management with other members of the supply chain assists EPSS to enhance its service responsiveness.				
xv.	Close collaboration, sharing information about flow of materials and demand forecasting and inventory management with other members of the supply chain assists EPSS to enhance its service flexibility.				
F. The role of Measurement integration on operational performance					
xvi.	Policies and rules concerning delivery of products without any damage and in a timely manner, meeting its own goals and quality issues assists EPSS to enhance its service reliability.				
xvii.	Policies and rules concerning delivery of products without any damage and in a timely manner, meeting its own goals and quality issues assists EPSS to enhance its service responsiveness.				
xviii.	Policies and rules concerning delivery of products without any damage and in a timely manner, meeting its own goals and quality issues assists EPSS to enhance its service flexibility.				

Research Question

1. How supply chain integration is being practiced in EPSS (in terms of supplier integration, information integration, internal integration, external integration, measurement integration and customer integration)?

2. What is the role of supply chain integration operational performance of EPSS (in terms of responsiveness, reliability, flexibility)?

Thank you

Appendix II

Table 1. Multicollinearity Test

Coefficients ^a							
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.285	.186	6.914	.000		
	Internal	.023	.056	.023	.687	.439	2.276
	Supplier	.053	.055	.047	.958	.606	1.650
	Customer	.128	.059	.128	.032	.408	2.451
	Information	.256	.053	.283	.000	.426	2.348
	External	-.142	.053	-.144	.007	.505	1.978
	Measurement	.390	.052	.406	.000	.495	2.020
a. Dependent Variable: OP							

Table 2. Normality Test

	N	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Std. Error
Internal	385	-1.538	.124	2.792	.248
Supplier	385	.135	.124	1.328	.248
Customer	385	.135	.124	2.155	.248
Information	385	-1.177	.124	1.027	.248
External	385	.048	.124	.578	.248
Measurement	385	-1.172	.124	1.255	.248
Valid N (listwise)	385				

