SUPPLY CHAIN INTEGRATION AND OPERATIONAL PERFORMANCE OF PHARMACEUTICAL MANUFACTURERS IN NAIROBI

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A RESEARCH PROJECT PRESENTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTER OF SCIENCE IN PROCUREMENT AND SUPPLY CHAIN MANAGEMENT, SCHOOL OF BUSINESS, UNIVERSITY OF NAIROBI

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DECLARATION

I, the undersigned, declare that this is my original work and has not been presented to any institution or university other than the University of Nairobi for examination.

Signed: _____ Date: _16/11/2021_____

FELIX CHERUYOTD67/10764/2018

This research proposal has been submitted for examination on approval as the University

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DEDICATION

I wish to dedicate this research to my beloved mother, family, colleagues, friends and everyone else who contributed in every way possible to ensure this study was successful.

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ABREVIATIONS AND ACRONYMS

COMESA   Common Market for East and Central Africa

OP   Operational performance

RBVT   Resource Based View Theory

SC   Supply Chain

SCM   Supply Chain management

SCI   Supply chain integration

SI   Supplier Integration

MNC   Multinational Corporation

NQCL National Quality Control Laboratory

PPB Pharmacy and Poisons Board

 US   United States

ABSTRACT

The research was carried out on SCI and operational performance in pharmaceutical manufacturers in Nairobi. Establishing the extent of implementation of SCI in pharmaceutical manufacturers in Nairobi and ascertaining the effect of SCI on operational performance (OP) in pharmaceutical manufacturers in Nairobi were the two study objectives. The resource based view theory and Transactional cost economics theories guided this study. Descriptive research design was adopted and questionnaires were used as data collection tools distributed via email. Thirty-eight respondents made up the study population, which were all the pharmaceutical manufacturers firms in Nairobi. Multiple regression analysis and descriptive statistics was adopted in the data analysis. Moderately, SCI integration had been adopted in pharmaceutical manufacturers in Nairobi and besides a positive relationship between implementation of SCI and operational performance in pharmaceutical manufacturers in Nairobi was indicated in the results. Besides the findings further indicated that seventy-one percent of cost, seventy-two percent of quality and sixty-seven percent of timeliness as operational performance measures was affected by adoption of SCI function in their operations. The overall variables and the model adopted in the research was good since the p-value of 0.000 was hence statistically significant since it is below 5%. The demerits of this research were that the study was solely based in pharmaceutical manufacturers in Nairobi. There is need for a holistic study of all pharmaceutical manufacturers in Kenya. A wider research was to be done on SCI and SC performance as a whole and not only OP. There is need for future studies being carried out on the effect of SCI on OP in other sectors other than pharmaceutical manufacturers. To achieve better performance, future studies need to look at other variables other than those included in the study.

Key words: supply chain integration, operational performance, pharmaceutical manufacturers

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Over the years, there has been a tremendous increase in the need to adopt agile, fast, and service driven supply chain. Dynamics in the external environment, unpredictable demand forces and high competition has led to firms need to realign their supply chains and gain competitive advantage (Gimeze & Ventura, 2005) .There has been a high rise in demand for easy to understand and create synergies across supply chains due to the challenge to efficiently and effectively execute daily business activities by firms hence the need to adopt supply chain integration (SCI). Efficiency in carrying out their day-to-day activities is the key driving force to the implementation of supplier integration, which are key in facilitating the firm's ability to produce quality goods on-time (Hill,2007). According to (Sharma, 2019) high levels of a firm's SC performance is achieved by ensuring all the SC activities are integrated. Good strategic partnerships with suppliers and proper management of customer needs is key in achieving the required levels of performance (Mwanyota, 2004). To cut on costs and achieve greater levels of performance, there is need for integration of the SC activities (Morgan & Monczka, 2006).

The health sector is developed either by pharmaceutical firms, which are distributors, or in the manufacturing sector and the health ministry. They are local manufacturers or multinational firms who get their products from importation. However the pharmaceutical firms face a number of challenges like inadequate resources, poor quality of products (Min,2002).

This study will be guided by resource-based view (RBV)) and the transactional cost economics theory (TCE) developed by (Williamson,1981).The RBV was developed by Barney (1991). It

asserts that sustained competitive advantage and improved performance by a firm can be realized by use of resources that are not easy to imitate, are hard to find and have unique characteristics (Lacity & Hirschheim, 2000).

1.1.1. Supply Chain Integration

Supply chain integration (SCI) is the proper management of supply chain activities from the upstream to downstream which helps in creation of a cost effective and cost efficient supply chain (Chen, 2009). Enhancement of customer needs through coordination of various activities which help in the meeting of customer needs which is achieved through SI (Chen *et al*.,2009). Over the years many scholars have researched on the concept of supplier chain integration however no clear definition has been brought out on definition of SCI.

SCI entails coordination of suppliers and customer activities in conjunction with the firm to ensure that the supply chain activities are coordinated cost effectively in the SC. Collaborations between the firm, the suppliers, customers is what is termed as SCI which not only occurs internally, but also (Zhao, 2008). In SCI there is facilitation of easy information access by the firm through close working relationships with their customers on issues to do with their tastes and preferences, their orders, their location points among other aspects.

According to Cantor, Pan, and Blackhurt (2014), the internal and external coordination of activities and partners across the SC, which helps in free and fast flow of goods, and services across the SC is what is termed as SCI. By implementation of SCI the firm is in a position to achieve improved level of performance through improved levels of responsiveness to customer needs in the SC. (Flynn,2010). Through integration of all the activities in a SC, which helps a

firm achieve the required levels of performance, is one major goal of SCI. A study carried out by Childe (2015), ascertained that improved timeliness in delivery, quality of goods and responsiveness to varying customer needs all is achieved through SCI through lower waiting times and conformance to quality requirements by firms. (Schoenhrr & Swink, 2012).

1.1.2 Operational Performance

Operational performance (OP) entails a measure used to evaluate the rate at which a firm is in a position to satisfy customer expectations and requirements through ensuring that the products or services provided are of the right quality delivered at the right place and time at the right price which need to be in the required quantities (Lambert, 2009). Measurements got by evaluation of the level to which a firm is effective or not against a set standard is what is termed as OP (Zhang, 2015). In measuring OP firms evaluate the level to which they are responsible to their customers and all stakeholders under dimensions of how lean they are, their timeliness in delivery of goods, how productive they are among other aspects (Schoenherr *et al*, 2012).

According to Vogel (2011), quality of the final products produced or services provided, how flexible the operations are and the level to which firms are in a position to offer varying goods to different customers on time, cost of goods are the various measures put in place to evaluate the level of operational performance (Kurien & Qureshi, 2011). A number of measures have been brought across in the quest of ascertaining the best measure of operational performance. General performance indicators of the Operational performance in terms of time, quality, flexibility and cost are used to measure efficiency and effectiveness. (Arun & Ozdamar, 2005). To measure operational performance specifically in the pharmaceutical firms, this study is going to focus on: timeliness, cost and quality.

1.1.3 Pharmaceutical Manufacturers in Nairobi

Over the counter, pharmacist or distributors represent the manner that pharmaceutical products are channeled to the market. Pharmaceutical products according to Kenya Pharm Expo (2016), among countries in the Common Market for Eastern and Southern Africa (COMESA) region, are highly produced by Kenya compared to the other countries. Kenya is the leading supplier in the region with over 50% control of the market in terms of exports (Kenya Pharm Expo, 2016). 9000 represents the number of registered pharmaceutical firms in Kenya (Kenya National Bureau of Statistics (2012).

In the pharmaceutical industry, distributors, manufacturers and retailers represent the major three categories under which they are grouped which support a total of 4,557 health facilities countrywide (Kenya National Bureau of Statistics, 2012). A total of 30 licensed concerns which entail subsidiaries or joint ventures, local manufacturing companies and large Multi-National Corporations (MNCs) are major categories of pharmaceuticals with majority in Nairobi with over 2000 employees. These firms create employment which greatly contributes to the country's GDP (Daoda,2018). The Kenya Public Procurement and Disposal Act, 2005 is in charge of provision of guides that govern the workability of the public procurement. To adhere to quality standards, National Quality Control Laboratory (NQCL) governs quality inspections and adherence by the pharmaceutical manufacturers which is after tests are done on the pharmaceutical products by pharmacy and poisons board (PPB).

1.2 Research Problem

According to Cullen (2015), to attain the best level of OP, there is need for implementation of SCI since it helps in the minimization of costs involved in the operations and production of

goods in the firm hence high levels of efficiency are achieved (Robinson, 2014). Suppliers, customers, stakeholders among other players in the supply chain are key in the achievement of the required level of performance since the firm will be in a position to establish long lasting good working relationships with the customers. Despite all this firms experience a number of challenges in their quest of implementation of SCI in terms of inadequate resources, lack of top management support lack of trust among SC members among others (Kouvelis, Chambers & Wang, 2006).

There are a number of challenges faced in the quest of implementation of SCI in the pharmaceutical firms despite their desire to implement them. This is despite the fact that those firms with inadequate resources too face challenges in the implementation of SCI and this leads to low levels of strategic partnering between the SC members. This leads to losses to the firm in the long run and implementation of practices that are expensive (Glen, 2011).Lower levels of collaborations and partnerships are experienced whenever there is low levels of partnerships in pharmaceutical firms due to low levels of SCI implementation (Sang, 2010). Pharmaceutical firms need to review their performance against plan and more important evaluate the return on investment (ROI) (Faan, 2012).

A number of studies have been carried out on the concept of SCI Many researches have been done on the concept of SCI: Globally, Klassen (2016), looked at the role of green practices on the integration of the supply chain both upstream and downstream. As a result of the investigation it was discovered that SCI is adversely affected by green practices. The demerit of the research was that the context was in North America and not in the pharmaceutical firms.

Yang (2017) looked at the comparison between the SCI in China and US. The study's goal was to see if SCI strategies were adopted in the SC of the firm and there was close working relationship between the various stakeholders and suppliers in the SC by comparing the US and East Asian companies. In the methodology to be used in data collection, the research made use of journals which were sources of secondary data from 30 journals. A conclusion was drawn from the findings which indicated that proper implementation of SCI is a key factor to the achievement of higher levels of profitability in the firm due to faster decision making and . Besides China had to a greater extent implemented the SCI as compared to the other firms. The study's main flaws was it's exclusivity in terms of focus in the China and the East Asian markets.

Kull (2017), in his investigation on what role SCI plays in the integration of firms between China and USA together with the type of attitude the firm's management have to it in comparison between China and USA. The study's goals were to ascertain what role the top management has on the level of integration between SC partners. A multi-group structural equation modelling was adopted for the research methodology using a sample of 224 US firms and 227 China firms. According to the results, the attitudes displayed by the managers have a direct impact on the level of performance due to implementation of SCI. According to the results organization culture had greater impact on SCI in the US as compared to China.

Sharma (2019), investigated the 24 countries in Asia and Europe on the extent of SCI and the effect it has on performance in 12 firms in 24 countries across Africa, Asia, Europe and North America. The study's goal was to see to what extent various SCI integration was adopted in the 24 countries by comparing the internal, external and suppliers as the key stakeholders. The goal

of the research was to see if there are any links between SCI and performance in the 24 countries used as the study context online surveys were used in collection of primary data. The major flaw of this study is that it was emphasized in the Asian, Europe and North America a different context from the pharmaceutical firms in Nairobi.

Locally Kinya (2016) investigated SCI strategies and operational performance of the Kenyan treasury. The study's goal was to see to what extent SCI strategies were incorporated in the SCM of the national treasury. The study's goal was to establish what effect the in -corporation of SCI strategies has on SC performance of the national treasury. Incorporation of SCI as a strategy had a positive effect on performance as per the previous findings. However the study's main flaw is on the concept since it was based on SCI strategies.

Osman (2019) investigated what role SCI plays on performance of firms in terms of responsiveness of supermarkets in Mogadishu Somalia. The study goals were to see if there existed any links between SCI and performance. From the study results, SCI had led to higher levels of responsiveness to the customer needs by supermarkets in Mogadishu Somalia In analysis researchers used data from a sample of 28 firms. The major demerit of t6his study was that it was based on SCI and responsiveness alone and failed to look at the effect SCI has on overall performance.

In a view of the above studies carried out both locally and globally, it is evident Operational performance International Non-governmental organizations in Kenya. Hence this research will fill the existing gaps by answering the following research questions: To what extent supply chain integration been implemented in pharmaceutical manufacturing firms in Nairobi? What is the

effect of supply chain integration on operational performance of pharmaceutical manufacturing firms in Nairobi?

1.3 Research objectives

i. To establish the extent to which supply chain integration has been implemented by pharmaceutical manufacturers in Nairobi

ii. To establish the relationship between supply chain integration and operational performance of pharmaceutical manufacturers in Nairobi.

1.4 Value of the Study

The pharmaceutical firm's stakeholders will find this research of benefit. The various stakeholders and all the staff in the supply chain will understand the benefits of adopting outsourcing strategies to the supply chain performance. By understanding what impact SCI has on OP, this will be instrumental in future plans by management. In the long run they will be in position to meet their short- and long-term goals hence customer satisfaction.

Other organizations will also benefit from the study based on the fact that they will use these study findings to ascertain the impact of SCI on OP. They will also ascertain what challenges that are likely to be experienced in adopting SCI.

Researchers with intent in carrying out a study on SCI will find this study beneficial to them based on the fact that they will be in a position to build their literature review from the results of this study. Policy makers will come up with various policies that will govern Pharmaceutical firms in aspects to do with SCI. This will guide them in their operations to help them achieve improved OP.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

In this chapter, we will examine the composition and the conceptual framework behind SCI and its impact on the OP in pharmaceutical firms. We will approach this through theoretical review, and using existing literature.

2.2 Theoretical Framework

The theoretical framework underlines the various concepts and philosophies that form the basis of this research. Though heavily dependent on principles and theories, we also appreciate various findings that were identified as relevant. This study however is majorly guided by two theories: the resource dependency theory and transaction cost economics theory.

2.2. Transaction Cost Economics Theory (TCE)

The theory puts forward the idea that production economics are what determine transactions. In other words, the idea behind this theory is that firms are economic factors which make use of the most efficient mechanism for transactions (Williamson, 1981). This theory analyses outsourcing from a financial perspective making a comparison between outsourcing services and in house services (Lacity & Hirschheim, 1995). This theory allows us to determine and evaluate the success or failure of outsourcing on the basis of economic returns. Basically, TCE provides a basis for reliable decision-making with regards to what to outsource, and what not to as well as the preparations required. Here, the evaluation of outsourcing decisions is driven by the associated transactional costs and/or savings. These are in turn dependent on the frequency of contracting as well as the environmental and relationship uncertainties.

We believe that TCE is key in the decision-making process of whether to implement various strategies by the firm or not as it allows for an evaluation of the costs as well as the financial implications of decisions. The theory is therefore relevant to our study as it comprises a vital aspect of the decision-making process more so the cost implications on implementation of SCI.

2.2.2 Resource Based View Theory

Introduced in 1991 by Barney, the Resource based view theory (RBVT) dictates that a firm's sustained competitive advantage is an outcome of the capabilities and resources held and within the control of the firm that are unique to it (Lynch, Keller & Ozment, 2000). The RBV emphasizes the idea that the success or failure of an organization is determined not only by the firm's internal environment, but by its external environment as well (Barney, 1991; Thompson, 2001). With reference to Barney (1991), for an organization to improve its performance, it must be able to identify and utilize resources that are of high value, are scarce or rare to find, and also that are not easy to imitate or substitute. Simply put, it is the application of competitive advantage.

According to this theory, an organization's profitability is determined by rent-producing resources. In other words, a firm should focus on ensuring that the resources under its control are scarce and that getting substitutes for them is a challenge. As a result of this, a firm's performance is determined by firm-specific resources and capabilities which leads to the uneven distribution of resources within an industry (Warnier, Weppe, & Lecocq, 2013). By controlling a scarce and very valuable resource, an organization has a strength that it can use to take advantage of existing opportunities within its operating environment, and reduce the effects of the threats and weaknesses that may also exist either internally or externally (Barney,1991). For a firm to

achieve a sustainable competitive advantage, it is important for it to have unique resources and capabilities for a foreseeable future (Lynch, 2000).

This theory is relevant as it attempts to give insight into ideas behind how firms strategize themselves and take on various decisions such as outsourcing, all in calculated attempts to overcome dependencies in terms of resource acquisition in the view of improving organizational performance. Most organizations are not independent and as such often need to come up with strategies that will allow them to focus on their core business. Now, this gives breathe to the idea of outsourcing in order to facilitate improved performance and a dedication to meet the market demand and hence customer satisfaction by carrying out activities in a more cost-efficient manner.

2.3. Supply Chain Integration

External dimensions, internal dimensions and functional dimensions are the various ways we can categorize SCI. Internal integration that coordinates flow of goods physically from the upstream to downstream of a SC external integration that integrates with manufacturing, distribution and purchasing (Morash & Clinton, 2008). It is discussed in details below:

Supplier integration helps proper use of not only strategic capabilities but also strategic capabilities which make up parties that are part of the wider SC (Wiengarten, Humpreys, Gimenez & Mclvor, 2016). Trust is key in the execution of agreements between the various shareholders and members of the wider SC to achieve the required output of the SC in the long run. This is fully attained by close working relationships between the SC partners and the larger SC as a whole. This is achieved through spreading of risks through various partners in the

process of coming up with new products in the firm hence the overall production costs are minimized (Dubey, 2015).

Customer integration entails a firm's ability to produce quality goods and services by ensuring that the customers are involved at every step of the production process to achieve the required levels of performance (Chervonnaya 2003). By implementation of CI, firms are in a position to achieve the required levels of performance through a coordinated problem solving between partners, fast feedback due to contact with the customers. Goods reach customers on-time at the right place due to the implementation of CI which ensures customers are involved in all the processes from the specifications development. Higher levels of differentiation of goods and services is achieved whenever firms involve customers in their operations (Prajogo & Olhager, 2012).

Internal integration entails the interaction between various functions in a firm with consistent communication and cooperation that directs them into one single unit. It facilitates linkages of information between the various departments or functions of an organization into a single unit that operates as one (Liu, 2016). By so doing the firm is in a position to easily extract key operational information using computerized systems. It helps in timely dissemination of information throughout the supply chain and hence facilitate collaboration between the firm and the various stakeholders in the external environment. This facilitates firm's ability to bring together functions that used to work independently in a firm. Internal integration forms the first step in a firm's quest to integrate it's functions as it helps in the alignment of the firm's internal operations (Yang, 2014). It helps facilitate reduction in costs and improvement in the level of efficiency and effectiveness to adequately respond to customer requirements.

2.4 Supply Chain Integration and Operational Performance

According to Frohlich and Westbrook (2001), Supply chain integration can be defined based on the direction it takes based on whether it is moved to the upstream or the downstream of the SC. Firms that highly integrate their activities attain a better competitive advantage as compared to their competitors in the same market. This is attained through an increased level of information visibility and seamless information sharing between the various partners which has a long-term effect of reduction in the overall SC costs(Rosenzewig,2003). SCI as partnership-based coordination links a firm with not only its customers but also with its suppliers and any other partners to help curb on the risks that may occur and cut on costs. It helps in integrating functions, processes and functions (Narasimhan & Kim, 2002).

Implementation of forward and backward integration helps firms increase their scope of operation and minimize risks and the level of overreliance on external aid. According to (Narasimhan et al.,2002), firms are in a position to better their decision-making power over key resources and competitiveness in the market by adoption of SCI. Material, information and cash flows is also improved due to implementation of SCI. It ensures that there is adequate commitment to cost minimization and quality improvement that also facilitates low distortion of plans, schedules and regular delivery of orders (Yusuf, 2004). Firms are in better position to achieve competitiveness and lower costs of operation due to implementation of SCI. According to Swink (2007), a firm's quest to attain competitive advantage is achieved through implementation of SCI.

2.5 Empirical Literature Review

A number of studies have been carried out on the concept of SCI Many researches have been done on the concept of SCI: Globally, Klassen (2016), looked at the role of green practices on the integration of the supply chain both upstream and downstream. As a result of the investigation it was discovered that SCI is adversely affected by green practices. The demerit of the research was that the context was in North America and not in the pharmaceutical firms.

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that it was based on SCI and responsiveness alone and failed to look at the effect SCI has on overall performance.

2.6 Conceptual Framework

The independent variable is the SCI, which entails supplier integration, internal integration and customer integration. The dependent variable is operational performance, which will be measured by use of cost, timeliness and quality. This is as shown in the diagram below:

Independent Variable   **Dependent Variable**

Supply Chain Integration   **Operational performance**

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┌──────────────────────┐
│      Supplier        │ ──────────▶
│    integration       │
└──────────────────────┘
                                          ┌──────────────────────────────┐
┌──────────────────────┐                  │  Operational Performance     │
│      Internal        │ ──────────▶      │        - Quality -           │
│    integration       │                  │          Cost -              │
└──────────────────────┘         ────────▶│         timelines            │
                                          │                              │
┌──────────────────────┐                  │                              │
│ Customer integration │ ──────────▶      └──────────────────────────────┘
└──────────────────────┘
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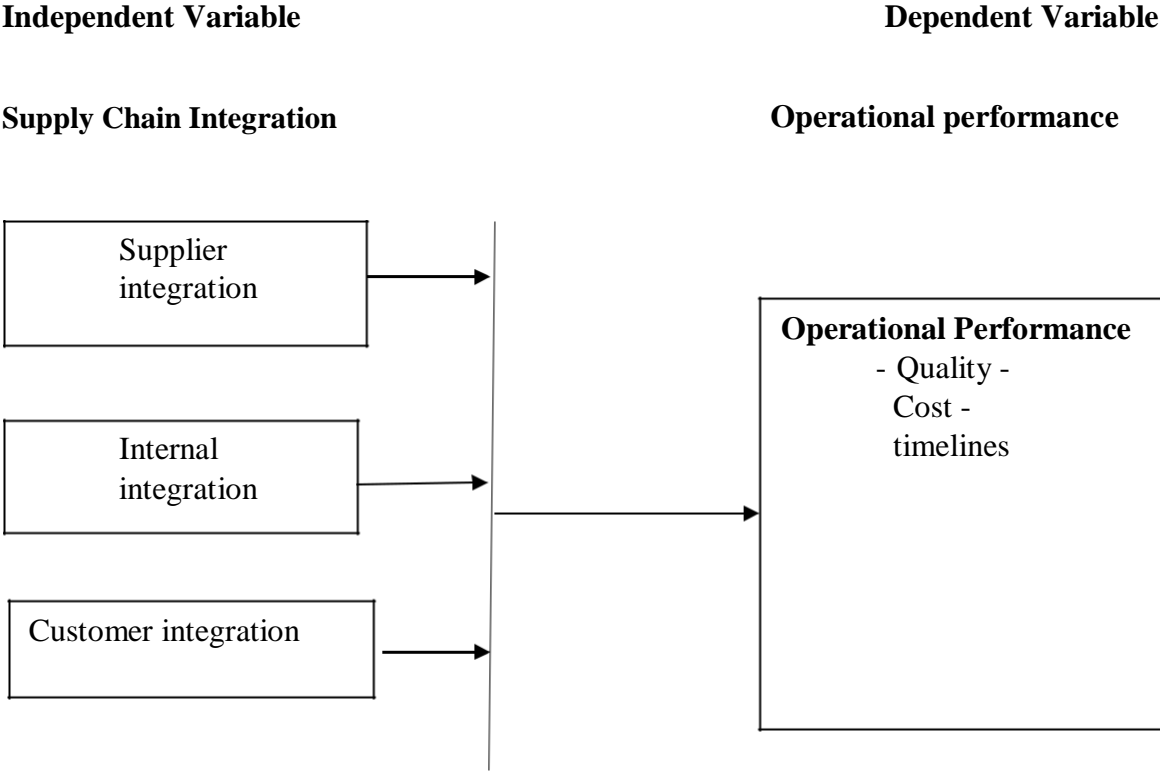
CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This part starts with the research design that was used, population of the study, methods of data collection, and data analysis.

3.2 Research Design

Descriptive research design was adopted which facilitates data collection which can be sought through observing, describing, analysis and reporting the as indicated by the population (Cooper and Schindler, 2006). Mugenda & Mugenda (2003), ascertains that descriptive research design is one that helps describes features of a population.

3.3 Population of the Study

The study population was comprised of 38 pharmaceutical firms. According to the NGO's coordination board, there are 38 pharmaceutical firms in Nairobi (appendix II). A census was carried out on all the 38 firms, since the population size is relatively small (Kenya's Association of manufacturers, 2019).

3.4 Data Collection

Self-administered questionnaires that were distributed to the respondents through use of email were used as the data collection tool. SC managers, procurement officers, procurement managers, logistics managers or the equivalent of the various pharmaceutical firms in Nairobi were the respondents of the study. The questionnaire was structured into three sections. Section A had background information, Section B had information on the first objective based on the

extent to which outsourcing strategies have been implemented, and section C had questions on the effect of SCI on OP of pharmaceutical firms in Nairobi.

3.5 Data Analysis

Data from the respondents was checked for completeness, edited and then coded. Data obtained from objective one was analyzed using descriptive statistics. Data from the second objective on effect of SCI on SC performance in pharmaceutical firms in Nairobi was analyzed using regression analysis. The regression equation:

$Y_1 = \beta 0 + \beta 1X_1 + \beta 2X_2 + \beta 3X_3 + €$

$Y_2 = \beta 0 + \beta 1X_1 + \beta 2X_2 + \beta 3X_{34} + €$

$Y_3 = \beta 0 + \beta 1X_1 + \beta 2X_2 + \beta 3X_3 + €$ Where:

Y= Operational performance

Y_1=Timeliness, Y_2= cost, Y_3= quality

X1= Customer integration

X 2= Internal integration

X3= Supplier integration

X5= €=error term

β_{ij} =Regression Coefficients

Table 3.1: Summary of Data Collection and Analysis methods

Objective	Section	Analysis of Data
General Information	Section A	Descriptive Statistics
Implementation of SCI in pharmaceutical manufacturers in Kenya	Section B	Descriptive Statistics
Effect of SCI on SCP in pharmaceutical manufacturers in Kenya	Section C	Regression analysis

Source: Researcher (2021)

CHAPTER FOUR: RESULTS, FINDINGS AND INTERPRATATIONS

4.1 Introduction

This section presents the analysis of data sought from the field on the study objectives and interpretation. This section represents findings on the data sought on supply chain integration and operational performance of pharmaceutical manufacturers in Nairobi. Ascertaining to what extent supply chain integration had been implemented the extent to which Supply chain integration has been implemented in pharmaceutical manufacturers in Nairobi, to determine the effect of supply chain integration on operational performance of pharmaceutical manufacturers in Nairobi. The study target population was the procurement officers, supply chain managers or their equivalent in the procurement department.

4.1.1. Response Rate

In this study, 38 questionnaires were distributed out of which 27 were fully filled and hence usable for the study. This translates to 71% response rate and according to (Mugenda & Mugenda, 2003) a response rate of above 70% is considered very good and adequate for comprehensive data analysis.

4.2 Demographic Information

The study intended to have knowledge of the basic background information of the respondents working at the pharmaceutical manufacturers in Nairobi. The study gathered data on various aspects of respondents in various pharmaceutical manufacturers in Nairobi in order to evaluate how the supply chain integration has been implemented in pharmaceutical manufacturers in Nairobi and how it affects operational performance. The results are as shown below:

4.2.1 Gender

Based on gender the responses are as indicated below:

Table 4.2.1 Gender

Gender	Frequency	Percent
Male	13	49
Female	14	51
Total	27	100.0

Source: Research Data (2020)

From the findings in the table 4.1 above 49 % were male while 51% were female hence there was no gender bias in the study. This is an indication that there is gender balance in pharmaceutical manufacturers in Nairobi and this is in-line with the requirements of the government on equality in provision of employment.

4.2.2 Education

Based on education the responses are as indicated below:

Table 4.2.2 Education

Education	Frequency	Percent
Diploma	5	19
Undergraduate	19	70
Masters	6	11
Total	27	100.0

Source: Research Data (2021)

The results indicate; 19 % had Certificate and Diploma level of education, 70% had undergraduate level of education while 11% of the respondents had a master's degree level of education. Hence the respondents had adequate relevant education background and were in a position to provide information sought by the researcher on SCI.

4.2.3 Experience

Based on experience the responses are as indicated below;

Table 4.2.3 Experience

Experience	Frequency	Percent
Under 2 years	2	7
2-5 years	10	37
6-10 years	13	48
over 10 years	2	7
Total	27	100.0

Source: Research Data (2020)

The findings indicated that 6% had less than two years' experience, 32% had 2-5years working experience while 53% had experience of between 6-10 years' experience and finally 9% had an experience of over 10 years. This indicates that all the respondents had adequate experience and had a detailed understanding of the study sought by the researchers.

4.3 Extend of implementation of Supply Chain Integration

In order to ascertain the extent of implementation of SCI, descriptive statistics was carried out and the results are ;

4.3.1.Customer Integration

The results are as shown below:

Customer Integration	Mean	Std. Deviation
Our competitive strategies are based on customer needs	4.1481	.60152
We have frequently measured customer satisfaction levels to track any changes	3.9630	.64935
We interact with our customers on various internet enabled platforms	3.9630	.75862
We interact with our customers on various internet enabled platforms	3.6296	.79169
We share information with our customers services being offered at the institution	3.5185	.57981
We invite our customers to participate in the design of new products and services	3.4074	.79707
Average	**3.73**	**.79054**

Source: (Author,2021)

From the results indicated above it was ascertained that to a moderate extent Customer integration has been implemented in pharmaceutical manufacturers in Nairobi as indicated by mean values of three and above. Besides these results, indicate that pharmaceutical

manufacturers in Nairobi involves their customers in decisions about products. They involve customers in new product developments and in the end achieve customer satisfaction.

4.3.2 Internal Integration

The results of the extent to which internal integration has been implemented are as shown below:

Internal Integration	Mean	Std. Deviation
All employees are allowed to access all information they may require in execution of tasks	3.8889	.69798
The activities in various departments are coordinated centrally	3.8148	.55726
We utilize IT tools in facilitating information accessibility	3.7037	.66880
Information from different departments are interconnected into one	3.5926	.69389
Department plans and objectives are set jointly	3.5185	.50918
There is regular interaction between employees through meetings	3.3704	.88353
Average	**3.62**	**.66864**

Source: (Author, 2021)

The findings indicate that to a moderate extent internal integration as a supply chain integration concept has been implemented in pharmaceutical manufacturers firms as indicated by mean values greater than 3.0 this shows that there is close working relationship between various departments that make up the pharmaceutical manufacturers in Nairobi. They coordinate all the

decisions, workflow, ideas, and information on various products to make sure that the quality of products manufactured is good and helps meet customer needs.

4.3.3 Supplier Integration

The results on supplier integration are as indicated below:

Supplier integration	Mean	Std. Deviation
Information on sales forecast is shared with suppliers	3.8889	1.01274
We share procurement plans with our suppliers	3.8889	.57735
Product development is carried out using inputs from the suppliers	3.8519	.81824
Product design and manufacturing data is detailed in the SI	3.7778	.80064
Our firm's purpose is as per supplier's aims	3.7037	.72403
We have strategic suppliers for various products and services	3.5926	.93064
Average	**3.71**	**.88250 .**

Source: (Author, 2021)

From the results above, supplier integration has been implemented in pharmaceutical manufacturers to a moderate extent as indicated by three and above mean values. This implies that pharmaceutical manufacturers involve suppliers in product design and development, align their goals to those of suppliers, exchange information with the suppliers and this will lead to improved general performance of the firm.

From the results above internal integration had been adopted the most as implicated by mean values of 3.73, followed by supplier integration which had been implemented moderately as indicated by mean value of 3.71 and finally customer integration which indicated a mean value of 3.63 .

4.4 Effect of Supply Chain Integration on Operational Performance

Establishing the effect of SCI implementation on operational performance in pharmaceutical manufacturers in Nairobi was the study's second purpose. The results are as indicated below:

4.4.1 Coefficients on Cost

Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	2.435	.808		3.012	.006
Supplier integration	.521	.109	.543	4.769	.000
Customer integration	.524	.104	.566	5.020	.000
Internal integration	.546	.096	.649	5.709	.000

a. Dependent Variable: Cost

b. Predictors: (Constant), II,CI, SI

$Y = 2.435 + 0.521X_1 + 0.524X_2 + 0.546X_3$

A positive relationship supplier integration and OP exists: (t=0.521, p=0.000). An implication that whenever supplier integration implementation is increased by one unit, the resulting effect is a related increase in the OP by 0.521. Besides supplier, integration had p=0.000 value hence it is statically significant since it is less than 0.05. Besides, Z value is 4.769, which is more than 1.96 hence significant.

From the results above, there exists a positive relationship customer integration and OP are (t=0.524, p=0.000). An implication that whenever customer integration implementation is increased by one unit, the resulting effect is a related increase in the OP by 0.524. Besides customer integration had p=0.000 value hence statically significant since it is less than 0.05. Besides, Z value is 5.020 which is more than 1.96 hence significant.

From the results shown above, there exists a positive relationship between SCI and OP (t=0.5709, p=0.000). An implication that whenever supplier integration implementation is increased by one unit, the resulting effect is a related increase in the OP by 0.5709. Besides supplier integration had p=0.000 hence it's statically significant since it is less than 0.05. Besides, Z value is 5.709 which is more than 1.96 hence significant.

4.4.2 Model Summary on Cost

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.849[a]	.721	.684	.44078

a. Dependent Variable: Cost

b. Predictors: (Constant), II,CI, SI

The findings indicated a correlation coefficient value of 0.849 and R value of 72%. R squared value is 72% meaning that 72% of the variations in operational performance is explained by the variation in the independent variables: customer integration, internal integration and supplier integration. Unexplained variations are 28% .This is due to variables not included in the model and also due to pure chance factors.

4.4.3 ANOVA on Cost

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	11.531	3	3.844	19.784	.000[b]
	Residual	4.469	23	.194		
	Total	16.000	26			

a. Dependent Variable: Cost

b. Predictors: (Constant), II,CI, SI

SCI indicated by customer integration, supplier integration and internal integration and contribute significantly to OP since the p-value =0.000 established in the findings is less than 0.005 hence statistically significant.

4.4.4 Coefficients and Quality

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	T	Sig.
(Constant)	2.134	.816		2.616	.015
Customer integration	.488	.113	.498	4.316	.000
Internal integration	.551	.100	.621	5.525	.000
Supplier integration	.489	.111	.510	4.405	.000

a. Dependent Variable: Timeliness

b. Predictors: (Constant), II,CI, SI

Y=2.134+0.488X1+0.551X2+0.489X3

From the results shown above, there exists a positive relationship between SCI and OP (t=0.5709, p=0.000). An implication that whenever supplier integration implementation is increased by one unit, the resulting effect is a related increase in the OP by 0.5709. Besides

supplier integration had p=0.000 hence it's statically significant since it is less than 0.05. Besides, Z value is 5.709 which is more than 1.96 hence significant.

From the results shown above, there exists a positive relationship between SCI and OP (t=0.488, p=0.000). An implication that whenever supplier integration implementation is increased by one unit, the resulting effect is a related increase in the OP by 0.488. Besides supplier integration had p=0.000 value an indication that it is statically significant since it is less than 0.05. Besides, Z value is 4.316 which is more than 1.96 hence significant.

From the results shown above, there exists a positive relationship between customer integration and OP (t=0.551, p=0.000). An implication that whenever customer integration implementation is increased by one unit, the resulting effect is a related increase in the OP by 0.551. Besides customer integration had p=0.000 value an indication that it is statically significant since it is less than 0.05. Besides, Z value is 5.020 which is more than 1.96 hence significant.

From the results shown above, there exists a positive relationship between internal integration and OP (t=0.489, p=0.000). An implication that whenever internal integration implementation is increased by one unit, the resulting effect is a related increase in the OP by 0.489. Besides internal integration had p=0.000 value an indication that it is statically significant since it is less than 0.05. Besides, Z value is 4.405 which is more than 1.96 hence significant.

4.4.5 Model Summary on Quality

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.844[a]	.712	.674	.44762

a. Dependent Variable: quality

b. Predictors: (Constant), II,CI, SI

R squared value is 71% meaning that 71% of the variations in OP is explained by the variation in the independent variables: customer integration, internal integration and supplier integration. Unexplained variations is 29% .This is due to variables not included in the model and also due to pure chance factors.

4.4.6 .ANOVA on Quality

ANOVA[a]

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	11.392	3	3.797	18.952	.000[b]
Residual	4.608	23	.200		
Total	16.000	26			

a. Dependent Variable: Quality

b. Predictors: (Constant), II,CI, SI

SCI indicated by customer integration, supplier integration and internal integration and contribute significantly to OP since the p-value =0.000 established in the findings is less than 0.005 hence statistically significant.

4.4.7 Coefficients on Timeliness

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	2.440	.896		2.724	.012
Supplier integration	.513	.118	.535	4.348	.000
Customer integration	.503	.112	.543	4.475	.000
Internal integration	.569	.115	.608	4.965	.000

a. Dependent Variable: Timeliness

b. Predictors: (Constant), II,CI, SI

Y=2.440+0.513X1+0.503X2+0.569X3

From the results shown above, there exists a positive relationship between supplier integration (t=0.513, p=0.000). An implication that whenever supplier integration implementation is increased by one unit, the resulting effect is a related increase in the OP by 0.513. Besides supplier integration had p=0.000 value an indication that it is statically significant since it is less than 0.05. Besides, Z value is 4.348 which is more than 1.96 hence significant.

From the results shown above, there exists a positive relationship between customer integration and OP (t=0.503, p=0.000). An implication that whenever supplier integration implementation is increased by one unit, the resulting effect is a related increase in the OP by 0.503. Besides customer integration had p=0.000 value an indication that it is statically significant since it is less than 0.05. Besides, Z value is 4.475 which is more than 1.96 hence significant.

From the results shown above, there exists a positive relationship between supplier integration and OP (t=0.569, p=0.000). An implication that whenever supplier integration implementation is increased by one unit, the resulting effect is a related increase in the OP by 0.569. Besides supplier integration had p=0.000 value an indication that it is statically significant since it is less than 0.05. Besides, Z value is 4.865 which is more than 1.96 hence significant

4.4.7 Model Summary on Timeliness

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.821[a]	.674	.632	.47614

a. Dependent Variable: Timeliness

b. Predictors: (Constant), II,CI, SI

The findings indicated an R squared value is 67% meaning that 67% of the variations in operational performance is explained by the variation in the independent variables: customer

integration, internal integration and supplier integration. Unexplained variations is 28% This is due to variables not included in the model and also due to pure chance factors.

4.4.8 ANOVA on Timeliness

ANOVA[a]

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	10.786	3	3.595	15.858	.000[b]
Residual	5.214	23	.227		
Total	16.000	26			

a. Dependent Variable: Timeliness

b. Predictors: (Constant), II,CI, SI

SCI indicated by customer integration, supplier integration and internal integration and contribute significantly to OP since the p-value =0.000 established in the findings is less than 0.005 hence statistically significant.

4.4.8 Discussion

The results indicated above are in-line with a study carried out by Odongo (2017) who researched on SCI and performance of public universities in Kenya. Osman (2019), Sharma (2019). Besides these findings are related to the resource-based theory based on the fact that the implementation of SCI helps firms avoid all instances of overreliance on external resources, service providers and other firms for survival. Through implementation of SCI firms are in a position to coordinate the supply chain processes from the suppliers to the final customers and achieve improved performance.

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter starts with the summary, conclusions, recommendations and ends with limitations of the study. The research purpose was to ascertain to what extent implementation of SCI in pharmaceutical manufacturers in Nairobi and the effect of SCI on OP of pharmaceutical manufacturers in Nairobi

5.2 Summary

This study was on SCI performance of pharmaceutical manufacturers in Nairobi. The first objective of the study was establishing to what extent of implementation of SCI in pharmaceutical manufacturers in Nairobi. The second objective was establishing the effect of SCI on operational performance in pharmaceutical manufacturers in Nairobi. Twenty- seven out of thirty-eight questionnaires distributed were used for analysis since they were fit for analysis. There was gender equality in pharmaceutical manufacturers firms in Nairobi based on almost equal number of men and female employees in the procurement department. Most of the respondents had degrees based on the education level indicating that they had adequate knowledge on the data sought by the respondents. Besides the data indicated that they had adequate experience hence were in a position to articulate issues and give out adequate data.

The study's first objective was to ascertain the extent of implementation of SCI in pharmaceutical manufacturers in Nairobi. The results ascertained that to a moderate extent they had implemented SCI from the mean values of three and above from descriptive statics. The

second objective was to ascertain the effect of SCI on operational performance of pharmaceutical manufacturers in Nairobi. The results indicated that there exists a positive relationship between SCI and operational performance as indicated by positive coefficient variables in the results of the regression analysis. Besides the results of multiple regression further indicated that seventy-two percent of cost, seventy–one percent of quality and sixty –seven percent of timeliness is affected by implementation of SCI in pharmaceutical manufacturers in Nairobi. The results further showed that the overall model was statistically significant based on p-values less than five percent in the analysis of variance results. This is an indication that adoption of SCI has a major role on the cost reduction of all the operations of a firm, helps improve timeliness in meeting customer needs and improves the quality of goods produced by manufacturers in the pharmaceutical manufacturers in Nairobi. Internal integration was the most implemented, followed by supplier integration and finally customer integration from the findings.

5.3 Conclusion

Supply chain integration is very key in supply chain management. In any organization, there is need for proper management of all activities of a supply chain from the upstream to the downstream of a supply chain. There is need for ensuring that there is supplier involvement in the in the design and product development to ensure that there is quality conformance during supply of the various products. There is need for incorporating customer needs in the production of goods to achieve customer satisfaction and long-term profitability. Besides there is need for inter-departmental sharing of information, resources, decisions among others to achieve improved general performance of the firm. Hence there is need to ensure that SCI as a whole is well implemented in a firm to achieve improved performance in the firm in the long run.

Based on the first objective, the results indicate that to a moderate-extent pharmaceutical manufacturers in Nairobi have adopted SCI. An indication that they coordinate their activities both in the upstream and downstream. These firms work hand in hand with their suppliers and customers to ensure that they meet the customer needs, ensure that there is timeliness in delivery of goods by the suppliers, to ensure that they are supplied with quality raw materials for production among others. Based on the second objective the results indicated that implementation of SCI leads to improved operational performance in pharmaceutical manufacturers in Nairobi. These findings ascertain that implementation of SCI in pharmaceutical manufacturers in Nairobi helps achieve customer satisfaction, helps in timely delivery of goods at the lowest costs, helps in improved quality conformance by the suppliers and timely decisions by the internal employees of the firm. This has the long-term effect of ensuring that the firm achieves improved quality of goods at a lower cost and improved overall brand image.

5.4 Recommendations for Policy and Practice

Based on the findings which indicate that implementation of SCI has a positive impact on operational performance, there is need for more resources be put on the concept of SCI to ensure that the level of operational performance improves to hundred percent, since at the moment SCI only affects seventy percent of the performance in pharmaceutical manufacturers in Nairobi. There is need for adopting use of trainings, to help employees better understand the concept of SCI. There is need for more top management commitment to the implementation of SCI so as to achieve better performance of the firms. The top management needs to assign more resources to the SCI implementation to achieve overall performance of the firm and minimize on costs. Based on the results it was ascertained that only sixty –seven to seventy -two percent of operational performance was affected by implementation of SCI. Further studies need to incorporate other

variables that were not included in this research to ascertain the impact that it has on performance. Besides the top management in collaboration with the heads of the supply chain department heads need to strategize on the ways that they will curb the various challenges that are faced in SCI implementation to achieve better performance.

5.5 Limitations of the Study

This study solely looked in pharmaceutical manufacturers in Nairobi as the context of the study. This is a major limitation of this study since the results cannot be applicable in other firms other than pharmaceutical firms in Kenya or any other sectors of the economy. The study was on SCI function and this is a limitation based on the fact that there was need for a holistic view of supply chain as a whole and not only SCI. The study failed to look at benefits and challenges faced from implementation of SCI. The study only looked at pharmaceutical manufacturers in Nairobi and not in Kenya as a whole.

5.6 Suggestions for Further Research

The study was based on SCI and operational performance in pharmaceutical manufacturers in Nairobi. There is need for a holistic view of the impact that supply chain management practices on supply chain management. Future research needs to establish the relationship of SCI and organizational performance as a whole. From the results, only sixty-seven to seventy-two percent operational performance was affected by SCI an indication that the other percentage represented unexplained variables. Further studies need to ascertain what these unexplained variables are to achieve full operational performance. In addition, there is need or research in other firms, sectors other than pharmaceutical manufacturers in Nairobi. There is need for further research on

benefits of SCI and challenges faced in the implementation of SCI in pharmaceutical manufacturers in Nairobi.

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APPENDICES

Appendix I: Research Questionnaire

This questionnaire seeks to collect data on the supply chain integration and operation performance for pharmaceutical manufacturers in Nairobi. Kindly fill in the questionnaire. Any information availed will be treated with utmost confidentiality and shall be used for academic purposes only. Your identity shall not be revealed.

SECTION A: GENERAL INFORMATION

1. Gender

Male   [ ]   Female   [ ]

2. Age Bracket in years

   20-25 [ ]   26-30   [   ]

   31-35 [ ]   36-40   [   ]

   41 -50   [ ]   51 and Above [ ]

3. Highest level of education

Secondary   [ ]   Diploma [ ] Degree   [ ]   Masters [ ]   PHD [ ]

4. How long have you been in this position?

   Less than 1 year   [ ]   1 - 5 years   [ ]

   6 – 10 years   [ ]   Above 10 years   [ ]

SECTION B: EXTENT OF IMPLEMENTATION OF SUPPLY CHAIN INTERGRATION IN PHARMACEUTICAL MANUFACTURERS IN NAIROBI.(Tick where appropriately)

To what extent has the following supplier integration been implemented in your firm ? Kindly indicate where: Where 1= No at all, 2=small extent, 3=moderate extent, 4=large extent and 5=very large extent:

Supplier Integration Variables	1	2	3	4
Information on sales forecast is shared with suppliers				
We share procurement plans with our suppliers				
Supplier's input regarding products attributes are considered during product development				
Suppliers are provided with details of product design and manufacturing data				
Our firm's objectives are aligned to those of our suppliers				
We have strategic suppliers for various				

products and services				
We regularly interact with our suppliers in mutual information exchanges regarding operating activities				

To what extent has the following internal integration been implemented in your firm? Kindly indicate where: Where 1= No at all, 2=small extent, 3=moderate extent, 4=large extent and 5=very large extent:

Internal Integration Variables	1	2	3	4
All employees are allowed to access all information they may require in execution of tasks				
We utilize IT tools in facilitating information accessibility				
Information from different departments are interconnected into one				
Department plans and objectives are set jointly				
There is regular interaction between employees through meetings				

The activities in various departments are coordinated centrally				

To what extent has the following Customer integration been implemented in your firm? Kindly indicate where: Where 1= No at all, 2=small extent, 3=moderate extent, 4=large extent and 5=very large extent:

External Integration Variables	1	2	3	4
Our competitive strategies are based on customer needs				
We have frequently measure customer satisfaction levels to track any changes				
We interact with our customers on various internet enabled platforms				
We interact with our customers on various internet enabled platforms				
We share information with our customers services being offered at the institution				
We invite our customers to participate in the design of new products and services				

SECTION C: EFFECT OF SUPPLY CHAIN INTEGRATION ON OPERATIONAL PERFORMANCE IN PHARMACEUTICAL MANUFACTURERS IN NAIROBI. (Tick where appropriately)

To what extent does supplier integration improved the following measures of performance - Where 1= Strongly Disagree, 2= Disagree, 3= Neutral, 4 = Agree and 5 = Strongly Agree

Supply chain integration Variables	1	2	3	4	5
Supplier integration					
Leads to cost reduction					
Improves quality of goods					
Improves timeliness of operations					
Internal integration					
Leads to cost reduction					
Improves quality of goods					
Improves timeliness of operations					
Customer Integration					
Leads to cost reduction					
Improves quality of goods					
Improves timeliness of operations					

APPENDIX II: LIST OF MANUFACTURING PHARMACEUTICAL FIRMS

1. African Cotton Industries Limited.

2. Alpha Medical Manufacturers.

3. Aventis Pasteur SA East Africa.

4. Bayer East Africa Limited.

6. Biodeal Laboratories Limited.

7. Infusion Kenya Ltd.

8. Cosmos Limited.

9. Dawa Pharmaceuticals Limited.

10. Didy Pharmaceutical 11. Diversey Lever.

12. Eli-Lilly (Suisse) SA.

13. Elys Chemical Industries Ltd.

14. Gesto Pharmaceuticals Limited.

15. Glaxo SmithKline.

16. High Chem East Africa Ltd.

17. Ivee Aqua EPZ Limited.

18. KAM Pharmacy Limited.

19. Laboratory & Allied Limited.

20. Mac's Pharmaceutical Ltd.

21. Manhar Brothers (Kenya) Ltd.

22. Medivet Products Limited.

23. Novartis Rhone Poulenic Ltd.

24. Novelty Manufacturers Ltd.

25. Pfizer Corp (Agency).

26. Pharm Access Africa Limited.

27. Pharmaceutical Manufacturing Co (K) Ltd.

28. Pharmaceutical Products Limited.

29. Phillips Pharmaceuticals Limited.

30. Regal Pharmaceutical Ltd.

31. Revital Healthcare (EPZ) K.

32. Universal Pharmaceutical Limited.

33. Sphinx Pharmaceuticals Ltd.

34. E.P.Dis Kenya Ltd.

35. Jaskam and Company Ltd.

36. Laboratory and Allied.

37. Nairobi Enterprises Ltd.

38. Norbrook Kenya Ltd.

Source, KAM, (2020).