FACTORS INFLUENCING PERFORMANCE IN PHARMACEUTICAL SUPPLY CHAIN; A CASE OF MEDICAL STORES DEPARTMENT (MSD) IN DAR ES SALAAM REGION

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By

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CERTIFICATION

We, the undersigned, certify that we have read and hereby recommended for acceptance by the Mzumbe University, a dissertation entitled **Factors influencing Performance in Pharmaceutical Supply Chain; A Case Of Medical Stores Department (MSD) in Dar Es Salaam Region,** in partial/fulfillment of the requirements for award of Master Degree in Social Science in Procurement and Supply Chain Management (Msc. PSCM) of Mzumbe University (Morogoro Main Campus).

Signature

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Major Supervisor/Dr. Albogast Musabila

Signature

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Internal Examiner

Accepted for the Board of…….

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I, **Enock J. Fredrick**, declare that this dissertation report is my own original work and that it has not been presented and will not be presented to any other university for a similar or any other degree award.

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Date; _____

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DEDICATION

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LIST OF ABREVIATIONS AND ACRONYMS

BSC	-	Balanced Score Card
DF	-	Degree of Freedom
EDI	-	Electronic Data Interchange
ERP	-	Enterprise Resource Planning
FA	-	Factor Analysis
GHRM	-	Green Human Resource Management
GSCM	-	Green Supply Chain Management
HRM	-	Human Resource Management
ICT	-	Information Communication Technology
ISS	-	Information Support System
KBV	-	Knowledge Based View
KMO	-	Kaiser-Meyer-Olkin
KSAOs	-	Knowledge, Skills, Abilities and other characteristics
MIS	-	Management Information System
MRP	-	Material Requirement Planning
Msc. PSCM	-	Masters of Social Science in Procurement and Supply Chain Management
MSD	-	Medical Stores Department
PCA	-	Principal Component Analysis
PSC	-	Pharmaceutical Supply Chain
RBV	-	Resource Based View
RFID	-	Radio Frequency Identification
SCIS	-	Supply Chain Information System
SCM	-	Supply Chain Management
SCOR	-	Supply Chain Operations Reference
SCP	-	Supply Chain Performance
SPSS	-	Statistical Package for Social Science
TCT	-	Transaction Cost Theory
TPS	-	Transaction Processing System

ABSTRACT

The aim of this study was to determine factors influencing Performance in Pharmaceutical Supply Chain (PSC). A review of the literature showed that there is little empirical research studies conducted focusing on performance in PSC. This study aimed at filling the empirical gap and sheds light in Pharmaceutical supply chain in Tanzania. The study used exploratory design. The study was carried out in Dar es Salaam region Medical Stores Department (MSD-HQs) and a sample of 65 staffs was drawn from a targeted population of 220. Data was collected using questionnaire instrument and subjected to Statistical Package for Social Science (SPSS v.23) for running the quantitative analysis technique. The testing of hypotheses was involved several data analysis technique which included exploratory factor analysis (Kaiser-Meyer-Olkin Measure of Sampling Adequacy and Bartlett's Test of Sphericity), regression analysis (simple linear regression) and correlation analysis (Pearson correlation). The analyzed data was then presented in tables and figures for interpretation. The study found that Information, Competence, Technological infrastructure and Inventory control are direct related and they have close relationship with performance in Pharmaceutical Supply Chain (PSC). Among the four factors tested, it was found that Quality of information significantly influences Performance in PSC. This study has implication to various stakeholders and actors alongside pharmaceutical supply chain operations especially in Tanzania as well as the research community. The study recommends that actors alongside supply chain (manufacturers, suppliers, transport agencies, health facilities together with public and private beneficiaries.

Keywords: Performance Information, Competences, Technological infrastructure, Inventory Control and Pharmaceutical supply chain

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CHAPTER ONE

INTRODUCTION

1.0 Introduction

This chapter covers the background of the study, statement of the problem, objectives of the study, research hypothesis significance of the study and the organization of the study.

1.1 Background of the Study

Over the last several decades, supply chain trends have affected global market convergence and makes businesses to become truly global. Supply Chain means all inter-linked resources and activities needed to create and deliver products and services to customers (Mwangi & Kagiri, 2016). The concept of supply chain was first introduced in the early 1980's, and its focus was based on supply chain of raw materials (inbounds) and goods/finished products (out bounds) from point of origin to the point of consumption (Somashekhari et al., 2013).

Supply chain performance may be seen as an important indicator of how well supply chain strategy fulfills its objectives and goals (Rana et al. (2015). Researchers and practitioners have shown great attention in measuring the performance of supply chain. According to Aramyan et al. (2007) proposed four categories for supply chain performance; efficiency, flexibility, responsiveness and quality. These categories were also used as indicator in measuring performance in an Agri-food supply chain industry in India (Chopra et al., 2017).

In reference to same case of Vaidya and Hudnurkar (2013), conducted a research on criteria to be used in measuring SCP and propose an approach to evaluate the performance of supply chain under multiple criteria. They suggest 12 criteria as far as SCM in concerned; cost, customer service, productivity, asset measurement, quality, time, innovativeness, price, flexibility/adaptability, supplier profile, marketing measures and ability to collaborate/level of satisfaction. According to the study of Achuora et al. (2012), on performance of pharmaceutical products in Kenya, four criteria were used; financial capacity, transport outsourcing, third party relations and information technology.

Pharmaceutical supply chains are more complex because they require participation of different stakeholders such as manufacturers, distributors, wholesalers, customers, service providers and regulatory agencies. Due to these complexities, the pharmaceutical sector is not widely researched. Despite being one of the fastest growing sectors in Indian economy, PSC in Tanzania is not widely studied (Singh et al. 2016; Parmata et al., 2016; Mensah et al., 2015).

In hospital sector, decisions upon inventory levels are dictated based on the need to meet performance. Cost factor is among the critical criteria used by pharmaceutical companies in determining the amount of inventory to keep in a given period (Zepeda et al. 2016). According to research conducted by Mensah et al., (2015), he report that in hospital and healthcare sector inventory accumulation and obsolescence are several times higher than in retail/industrial based sector. The difference between hospital sector and retail/industrial sector is caused by unlike product based supply chains.

A study by Achuora et al. (2012), on factor affecting distribution performance for pharmaceutical products; found that information technology and financial capacity have the greatest influence in distribution performance. In pharmaceutical supply chains, the influence of technology has strongly evident in high clock-speed through the use of advances technologies in supporting supply chain operations (MacCarthy et al., 2016).

Pharmaceutical supply chains like MSD, plays a crucial role in welfare and economic growth of any country (Singh et al., 2016). Inventory management of an organization should ensure that asset, stocks and other supplies are kept at level that provide maximum return and service level at the possible minimum cost Salam et al. (2016). Inventory control and cycle time are the most significant metrics in measuring supply chain performance of an organization (Martin & Patterson, 2009).

Pharmaceutical supply chain is very complex in nature and extremely answerable to ensure that the right drugs and medical supplies reach the right person (medical facility) at the right time and in the right condition (Parmata et al., 2016).

1.2 Statement of the Problem

Pharmaceutical supply chain is very complex in nature, since pharmaceuticals are vital products due to the fact that their availability and accessibility are critical for government, companies and citizen. Then, it is crucial that drugs and pharmaceutical equipment has to be delivered at the right time to the right place in standard conditions. Improper distribution of drugs, not only affects companies' reputation, costumer's satisfaction and companies' profit, but also could disturb the healing processes of patients and affect total productivity of the nation (Yousefi & Alibabaei, 2015).

Information plays a virtual role in supply chain and hence allows company to gain competitive advantage (Yousefi & Alibabaei, 2015). Sharing and management of Information is necessary for coordination and collaboration among supply chain partners and hence it reduces supply chain risks (Abldullah & Rayamah, 2017). An information system (IS) has a significant role in managing and integrating data within the supply chain. Adequate information flow is one of the most important aspects in supply chain operations together with the entire performance (Yousefi & Alibabaei, 2015).

In reference to the study of Sangari et al. (2015) on the impact of knowledge management processes on supply chain performance, they found that knowledge management processes have a significant impact and influence towards Supply chain performance. Companies must identify critical competences that can drive performance of the organization (Meyer et al., 2015).

Technology has strongly evident in high clock-speed in pharmaceutical supply chain through the use of Information systems, Barcode system, RFID, manual and mechanical handling equipment's (MacCarthy et al., 2016). Technological tools lower coordination cost and improve transactional efficiency through the use of IS's (Kanda & Iravo, 2015). Inventory is an area of hospital supply chain management that particularly warrants close study, since inventory value for pharmaceutical supply chain is much higher compared to other chain due to lifesaving interest (Nyaga & Kihara, 2017).

But, many scholars and practitioners focus a great deal of attention toward economic and environmental sustainability in supply chains, less attention is paid to supply chain performance (Themisticleous et al., 2004), (Khan et al., 2015), (Anand & Grover, 2015) and (Mani et al., 2016). However, limited research is available in the area of performance in pharmaceutical supply chain (Singh et al., 2016). Since PSC is complex in nature and has a greatest effect on health and national matters, this research aims at shading a light and provides insights in PSC and to fill the gaps on the factors that are likely to influence performance in pharmaceutical supply chain.

1.3 Objectives of the Study

1.3.1 General Objective

The general objective of this study was to determine factors influencing performance in Pharmaceutical Supply Chain.

1.3.2 Specific Objectives

The study focused on achieving the following specific objectives:

i. To assess the effect of information on performance of pharmaceutical supply chain.
ii. To investigate the effect of employee's competences on performance of pharmaceutical supply chain.
iii. To examine the effect of technological infrastructure on performance of pharmaceutical supply chain.
iv. To determine the effect of inventory control on performance of pharmaceutical supply chain.

1.4 Research Questions

1.4.1 General Research Question

Which factors are likely to influence Performance in Pharmaceutical Supply Chain?

1.4.2 Specific Research Question

i. What are the effects of information on performance of pharmaceutical supply chain?
ii. What are the effects of employee's competences on performance of pharmaceutical supply chain?
iii. What are the effects of technological infrastructure on performance of pharmaceutical supply chain?
iv. What are the effects of inventory control on performance of pharmaceutical supply chain?

1.5 Significance of the Study

This research aims to advance the knowledge in supply chain performance specifically in Public sector organization. The theoretical and practical contributions of this research can be summarized in as follows.

After completion of this study, actors alongside different supply chains (individuals, organization and companies) will be able to understand critical factors that are likely to influence performance in Pharmaceutical Supply Chain (PSC). Moreover, the study may be used as an influence towards achieving market competitive of a company products and services. Also the recommendations of the study provide a meant to help supply chain actors to understand their role in improving performance in supply chain. However, the result of this study expects to contribute knowledge to the Medical Stores Department (MSD) organization in matters relating to performance as well as the Ministry of Health, Community Development, Gender, Elderly and Children (MoHCDGEC).

1.6 Limitation of the Study

The study is limited to one known organization (Medical Stores Department - MSD), it can be extended to other supply chain actors namely (Manufacturers, customers, retailers and Logistics companies). The scale of this study was developed only at the MSD – Head Quarter in Dar es Salam and it can be extended to other phases of the supply chain nodes (Country sides – Zonal sections) and improve the performance of Pharmaceutical SC.

1.7 Organization of the Study

The dissertation is organized into the following chapters; Chapter one provides the introduction, which consists of background to the problem, statement of the problem, objectives of the study, research questions, and significance of the study. Chapter two presents definition of key terms, the review of related literature in supply chain performance covering aspects such as theoretical framework, empirical part and conceptual framework. Chapter three describes the methodology employed in the study. This chapter includes research design, area of the study, sampling techniques, data collection methods and method of data analysis.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

The chapter consists of the following sections; theoretical base of the study, empirical literature review, supply chain performance models, current issues in supply chain management and conceptual framework.

2.1 Definition of Terms

This section covers definition of terms where by key terms that relate to the study concept will be defined.

2.1.1 Supply Chain

Supply chain means all inter-linked resources and activities needed to create and deliver products and services to customer (Mwangi & Kagiri, 2016).

2.1.2 Supply Chain Management (SCM)

SCM is a process of integrating /utilizing suppliers, manufacturers, warehouses and retailers, so that goods are produced and delivered at the right quantities and at the right time, while minimizing costs as well as satisfying customer requirement (Bahari et al., 2017).

2.1.3 Supply Chain Performance

Supply Chain Performance (SCP) refers to the systematic process of measuring the effectiveness and efficiency of Supply Chain operations (Anand & Grover, 2015). The term also refer to the extended supply chains activities in meeting end-customer requirements, including product availability, on-time delivery, and all necessary inventory and capacity in supply chain to deliver that performance in a responsive manner (Nurmandi & Kim, 2017).

2.1.4 Pharmaceutical Supply Chain (PSC)

Pharmaceutical Supply Chain (PSC) is the means by which prescribed medicines and medical equipments are distributed to health facilities and patients (Parmata et al., 2016). Drugs are manufactured at manufacturing promises, transported to Medical Stores Department (MSD) distributed to health facilities (hospitals, dispensary, health centers and pharmacies) and eventually provided to end user consumer.

2.2 Theories in Supply Chain

As a result of natural outcome, the evolution of a supply chain disciplines toward achieving and satisfying needs, different theories were developed and others were adopted from other disciplines (Carter et al., 2015). According to the research conducted by Hallodorsson (2007), he suggested that supply chain cannot rely upon one unified theory to explain inter-firm governance structure and management decisions and hence supply chain rely upon complementary theories**.**

Several studies have provided theoretical foundation for different area related to supply chain management (SCM), they dedicated theories that are direct linked and related to supply chain (Yan & Wang , 2008) (Manzouri & Rahman, 2013) and (Akyuz & Erkan, 2010). The theories were categories into three broad groups; Internal (inter-organizational), External and Relational category.

a) **Internal category** (Inter-organizational); emphasize on the internal processes and activities across organization. To fulfill customer orders and be able to manage its internal activities such as inventory control, production planning, overcoming problems and to reduce cost, then organization is suggested to rely on resource (Manzouri & Rahman, 2013) and (Carter et al., 2015).
b) **External category;** put an emphasis on the on the outdoor resources to manage supply chain. Organization are advised to use its supply chain partners capabilities to manage its activities, processes, solve its problems and gain higher performance (Lavassani et al., 2008) and (Manzouri & Rahman, 2013).
c) The **relational category** emphasizes the power of relationship among supply chain partners to manage their internal activities and supply chain as a whole mutual

relationship is suggested by these theories as if offer truth worth relationship among partners in order to share information, knowledge, goals and equipment (Carter et al., 2015) and (Manzouri & Rahman, 2013).

Apart from these categories, some theories put emphasis on combination on different categories (Carter et al., 2015) and (Manzouri & Rahman, 2013). The theories discussed below are based on Institutional as well as individual aspects in relation to supply chain. The following are relevant theories concerned and related to supply chain performance;

2.2.1 Resource Based View (RBV)

Resource Based View is grouped as a combination of categories, relational and external category. The theory suggests that each tier can earn competitive advantage by using valuable priceless and rare resource of its supply chain (Manzouri & Rahman, 2013). According to Sambasivan and Jacob (2008), Resource based theory allows the company to develop core competencies that can be used to design better supply chain practices that are likely to influences services performance.

According to Hallodorsson (2007), the theory is useful for describing the role of capabilities and strategic resources within the firm operations and supply chain network. Organization tangible and intangible resources are both critical in allowing the organization to implement a responsive supply chain strategy. A tangible resource includes; facilities, technological tools and equipment, while intangible a resource includes; process-skills set, inter-organizational relationships, knowledge management and structure and supply chain infrastructures employed (Roh et al., 2014).

RBV is used to identify the required competences needed to manage inter-organizational relationship between supply chain partners (Halldorsson et al., 2015).The theory suggests that a company to have sustainable competitive advantage it has to have a human resource pool which cannot be imitated or substituted by competitors/rivals (Okuku & Dr. Were , 2017). To ensure sustainable competitive advantage, Companies must assess their work place and ensure that they have the right people with the right knowledge and skills at the right place to retain the desired performance (Barney, 2011)

Resource based theory allow the company to develop core competencies that can be used to design better supply chain practices that are likely to influences services (Sambasivan & Jacob, 2008). In this study, theory support the independent variable (employees competences, Inventory and technological infrastructure) by confirming the importance of organization in viewing employee as important competitive resource and how it affect the performance of supply chain. The combination of different resources from different level of supply chain will be subjected to this theory.

2.2.2 Transaction Cost Theory (TCT)

According to Manzouri and Rahman (2013), Transaction cost theory is grouped under inter-organization category, TCT states the inter-organizational transactions, they are not only focused on transaction costs but also focused on total costs either in purchasing or selling the products. The theory was developed to facilitate an analysis of comparative cost adapting, planning and monitoring of task completion under alternative governance structures (Suleiman, 2015).

The theory support the independent variable (technological infrastructure and inventory) by confirming the importance of viewing costs as important aspect in an organization and how it can affect the performance of supply chain. The combination of different costs from different level of supply chain will be subjected to this theory.

2.2.3 Information Theory (Information Asymmetry signaling theory)

Information theory emphasizes that unequal information sharing among an organization and its customer makes inefficiency in doing organization activities. Information theory is grouped into relational category, the theory explain unequal information among supply chain actors and partners. The theory of information theory tries to cover a large part of supply chain as SCM consists of integration between Internal and External customers and suppliers (Manzouri & Rahman, 2013).

The theory supports the independent variable (Information and Technological infrastructure) by matching the importance of relationship among workers in an organization and how it affects the performance of supply chain.

2.2.4 Human Capital Theory (HCT)

Human capital refers to knowledge and skills (physical and intellectual) that an individual possess. Using this theory, organizations are able to understand and improve the knowledge, skills and capabilities of individual in work places through; recruitment, training and job enrichment. The theory argues that workers with higher skills should receive higher compensations than others because they are more productive (Okuku & Dr. Were , 2017). The theory supports the independent variable (employee's competences) by matching the importance of human capital in an organization and how it affects the performance of supply chain.

2.3 Theoretical Review

Supply Chain Performance is simply defined as get the right purchase to the right place at the lowest cost (Rana et al., 2015). Supply chain performance (SCP) is the overall efficiency and effectiveness of organization operations (Gunasekaran et al., 2001). SCP has been seen as a critical issue for companies in sustaining competitive advantages in a market (Vlachos, 2014).

Over the last several decades, Supply chain trends have affected Global market convergence and makes Businesses to become truly global. The rationale of global market convergence lies partially in the irreversible growth of global mass media including Radio, TV's, Newspaper and Internet. Companies within supply chain provide special attention on going global from economic perspective (Lu, 2011).

The Literature on Supply Chain Management suggest that integration among supply chain participants leads to improved business performance in terms of quality, delivery, flexibility and operation costs (Rana et al., 2015). According to Yousefi and Alibabaei (2015), a well-managed Supply Chain is considered as an important competitive advantage, but in recent years the increase in the importance of Information technology on supply chain has influence performance of many companies globally.

According to the research finding conducted by Khan et al., (2015), they found that, buyer-supplier partnership and information integration are important instruments for

supply chain practice, since they have significant effect in performance of the supply chain of an organization.

2.3.1 The role of Information on SCP

Information concerned with data, facts and knowledge. Information is considered as the most important and valuable instrument in today's competitive age (Paul et al., 2017). Previous definition of supply chain merely concerned with procurement, production and distribution but recent definitions of supply chain are based on three main flows namely; Information flow, Material flow, and Fund flow. Effective management of information flow has a positively impact on supply chain (Yousefi & Alibabaei, 2015). Seven SCM practices that can be used in a SC network: Supplier strategic partnership, customer relations, information sharing, information quality, and postponement, agree vision and goals and risk and reward system (Sundram, Chandran, & Bhatti, 2016). In this study the researcher adopted 2 SCM practices namely Information sharing and Information quality.

2.3.1.1 Information quality

The most common risk associated with information flow on supply chain is Bullwhip effect where information is distorted among supply chain actors that can lead to customer dissatisfaction and high stock and transportation cost (Yousefi & Alibabaei, 2015). Quality of information is defined as accuracy, adequacy, timeliness and credibility of information exchanged (Li et al., 2006).

The research attempt to adopt five indicators namely accuracy, timeliness, adequacy, credibility and reliability to study the effect of information quality on performance of supply chain. These indicators were adopted from the study of Carr in 2016, on the relationship of information technology, Organization Corporation and Supply Chain Performance (SCP).

2.3.1.2 Information sharing

Information sharing is defined as the extent to which critical and proprietary information is communicated to one's supply chain partner (Li et al., 2006). Information sharing is the extent to which information is communicated effectively among supply chain members

(Mentzer, et al., 2001). Supply chain integrates key business processes of an organization that ensure value creation for customers and other stakeholders (Yousefi & Alibabaei, 2015). Inter-organizational information sharing involves two or more organizations from different tiers of the supply chains (Kembro et al., 2017).

According to Kembro et al. (2017), Information sharing can be categorized based on the intended decision time horizon:

Strategic level: organizations share annual demand and promotion plans as well as marketing strategies to enable planning of future purchases and growth within the alliance among supply chain partners.

Tactical level: involves monthly and quarterly forecasts and plans to help supply chain partners to reserve adequate capacities for production and logistics

Operational level: companies share sales and order information to facilitate customer orders, reduce information distortion, and lower stock levels.

Several academic authors discuss benefits associated with information sharing alongside supply chain. The following are common benefits which were highlighted; improved production planning, improve and increase customer service, lower inventory costs, improved allocation and utilization of logistics resources and reduce lead-times through supply chain (Kebro et al., 2017), (Projogo & Othager, 2012) (Hill et al., 2012) and (Khan et al., 2015).

Companies are expected to intensify their efforts in establishing relationship with supply chain networks and share information to enhance and improve supply chain performance (Kebro et al., 2017). Buyer-supplier partnership and information integration has been seen as important tools in achieving supply chain performance in manufacturing firms in China (Khan et al., 2015). According to the study conducted by Vanpoucke et al. (2017), on the impact of supply chain integration through Information technology, the study has reveal the synergy that exists in the function of information exchange, information technology can affect positively operational performance of a given supply chain.

Information sharing/exchange itself cannot create enough operational benefits and hence integration of information and operational practices under a given supply chain will lead to operational benefits and hence sustain performance (Vanpoucke et al., 2017). According to the study conducted by Okuku and Were (2017) on employee's involvement on the performance of Companies in Nairobi, Kenya, they found that there is significant relationship between information sharing among employee and the entire performance of an organization.

Nowadays companies are expected to use extreme efforts to establish relationship and share information across supply chain networks in order to enhance quality of product and service levels strengthen their cost and sustainability performance (Kebro et al., 2015).

2.3.1.3 Information system

Information systems, integrates intra and inter organizational levels and allow the company to become significant and efficient in its operations (Yousefi & Alibabaei, 2015). According to Themistocleous (2004), Supply Chain Information System (SCIS) provide intra & inter communication between suppliers, customer, staffs and other supply chain actors in and out of an organization.

According to Kebro et al. (2015), technology utilization refer to the various means for sharing, receiving and understanding, and making sense of the transmitted information. Information technologies that can be used by organizations include email, fax, and video conferencing (Carr, 2016). According to the research findings done by Yousefi and Alibabaei (2015), Information system in supply chain can be divided into four layers as follows;

1. Transaction Level

Transaction level is the heart of SCIS which is used to initiate and records individual logistics activities data including order entry, inventory assignment, order selection, shipping, pricing and invoicing and customer inquiry. Transaction Processing System (TPS) is used under transaction level; it consists of five broad categories namely; Order Management, Order Processing, Preparation and Distribution, Transportation and shipping, and Procurement (Yousefi & Alibabaei, 2015). According to (Yousefi &

Alibabaei, 2015), the most technologies and tools used under this layer include Electronic Data Interchange (EDI), Electronic Fund Transfer (EFT), Radio Frequency Identification (RFID), Barcode, and Extensible Markup Language (XML). The use of RFID is increasingly used in pharmaceutical and healthcare system for the purpose of tracking both medical supplies and patients in hospitals.

2. Management Control Level

This level focuses on measuring the performance, reporting, providing feedback and identifying exceptions. Management Information System (MIS) helps to identify and solve inventory problems which are critical to SC (Yousefi & Alibabaei, 2015).

3. Decision Analysis Level

Under this level information are used to analyze decision relating of supply chain. The most common technologies and tools used under this layer include Decision Support System (DSS), Enterprise Resource Planning (ERP) and Decision Analysis System (DAS) (Yousefi & Alibabaei, 2015).

4. Strategic Planning Level

Under this level information is developed and refines the strategies used in supply chain using Information Support System (ISS). Executive Information System (EIS) is the common system used under this level/layer. EIS has brought the information of SCIS to the executive Managers and allows executives to see the critical information at a glance (Yousefi & Alibabaei, 2015).

DeLone and McLean Model attempt to address dimension of information system in term of six dimensions: system quality, information quality, system use, user satisfaction, individual and organizational impact (Almutairi & Subramanian, 2005). Information quality, system quality, and service quality have positive impacts on user satisfaction and hence result to performance (Wei et al., 2017).

As a result of understanding information system, the researcher opts to make a use of DeLone and McLean model to study the variable of Information system. Six dimension of information system were used to understand the system; system quality, information quality, system use, user satisfaction, individual impact, and organizational impact.

2.3.2 Individual competences on SCP

In 1995, Thompson defined competences as individual attribute needed to perform a given work/task. Employee or an individual become competent through a combination of education, training and best work practice (Meyer et al., 2015). Continuous training of medical supply chain employee is crucial for effective adoption and implementation of new technologies in SC discipline (Kanda & Iravo, 2015).

McClelland defined individual competences as basic personal characteristics that are determining factors for acting successful in a job or situation. The content and form of individual competences are designed and created through linking organization structure, strategy, objective, culture and resources. Competences cover things like standards, value and views of life (Bergenhenegouwen et al., 1996).

Competence model also known as individual KSAOs; it attempt to describe the combination of knowledge, skills, abilities and other characteristics that an individual/employee need to possess for effective performance in work places (Meyer et al., 2015). Employees should be motivated, committed, and satisfied with their work so as to influence the performance of an organization (Okuku & Dr. Were , 2017).

2.3.2.1 Knowledge

Knowledge has been seen as a valuable organizational asset (intangible resource) that is used as a base for continuous development and a tool for reaching sustainable competitive advantage (Sangari et al., 2015)**.** According to the research study conducted by Sangari et al. (2015) on the impact of knowledge management processes on supply chain performance, they found that knowledge management processes have a significant impact and influence towards Supply chain performance.

Resource Based View theory (RBV) is as a strategic tool widely used by organization in understanding the competitive position and advantage in a market place. The theory tries to understand both tangible and intangible resources/assets of an organization in achieving the desired performance targets (Sangari et al., 2015)**.** RBV was used to identify the competences needed to manage inter-organizational relationship between supply chain partners (Halldorsson et al., 2015).

Knowledge Based View (KBV) is an extension of RBV theory, it explain knowledge and skills needed for a particular job. KBV has a great potential in influencing supply chain performance by providing sustainable intangible strategic resources to the organization (Sangari et al., 2015)**.** According to Kagunyi and Dr. Were (2017), effective knowledge management involves creation of new knowledge and skills, and uses them to improve existing body of knowledge for decision making and affects the whole organizational performance.

Superior knowledge resource is important in order to enhance performance of supply chain. Kagunyi and Dr. Were (2017), conducted a study on the effect of knowledge management on organizational performance in Kenya, they found that organization performance is strongly influenced by attribute toward changes in knowledge through; creation of new knowledge, knowledge sharing, storage of knowledge and knowledge use and reuse. To achieve the desired performance, organization has to put in place; policies, structure and responsive culture of knowledge management (Meyer et al., 2015).

2.3.2.2 Skills

In today's competitive world SC managers alongside staffs from different angles of supply chain networks are responsible for more complex functionalities with a broad coverage, hence skills plays a vital part in performance of supply chain operations (Shou & Wang, 2017)**.** Shou and Wang identify five dimensions of supply chain manager competences; generic skills, functional skills, SCM expertise, SCM qualifications and leadership, industry-specific and senior managerial skills.

2.3.2.3 Work practices

Training is basically used to improve employee capability of doing work and accepting new skills. Continuous training programs about lean tools and practices are required to foster an appropriate culture in the organization (Sangwa & Sangwan, 2018).

2.3.3 The role of technological infrastructure on SCP

In global supply chains, companies are advised to employ advanced technologies relevant to their operations. Technological investments in terms of machines, equipment, work methods, information system are potential for organization to gain enormous economies of scale. Information system is vital for matching buyer and supplier information of supply chain activities (Prasad & Sounderpandian, 2003).

2.3.3.1 System software

Technology can affect positively collaboration of task, data mining and storage and hence improve knowledge and skills of workers and work relations. By employing advanced technology, organizations are promised to enjoy potential economic advantageous by enabling information sharing and by joining workers electronically through Information sharing systems (Ombok & Were , 2017). EDI systems, RFID and Barcode system have enable firms in pharmaceutical industry to be more proactive in the management of inventory and hence influence the overall performance of an organization (Kanda & Iravo, 2015). According to Jonsson and Gunnarsson (2005), Internet offer potential economic advantages in supply chain operations through interlinking value chain delivery system, it also reduce cost and improve information gathering and operationalization of transaction electronically.

2.3.3.2 Handling equipments

Technological tools lower coordination cost, and improve transactional efficiency through increased information sharing resulting in improved SCP (Kanda & Iravo, 2015). In pharmaceutical supply chains, the influence of technology has strongly evident in high clock-speed through the use of advances technologies in supporting supply chain operations (MacCarthy et al., 2016).

In reference to the study of Lin (2007), on supply chain performance (SCP) and adoption of new technologies for logistics services in Taiwan, they present a list of technologies that are likely to influence SCP; data acquisition technologies, information technologies, warehouse technologies and transport technologies. They found that adoption of new logistic technologies has positive impact on supply chain performance. Modern organizational landscape includes hardware, networking and bandwidth, through the use of material handling equipment; organization is likely to acquire the following benefits; improve efficiency, cut down costs, maximize space utilization, minimize accidents in workplace and improve customer service (Islam et al., 2015).

2.3.4 The role of Inventory control on SCP

Inventory represents the biggest numbers in an organization balance sheet (Barwa, 2015). Inventory control is a close control over the flow of goods or materials into inventory and preventing loss by ensuring that adequate inventory levels are maintained. For a company to maximize service level in retail industry, it must maintain minimum inventory level (Yusuf, 2003). Demand variability has been found as the most significant influence on the level of inventory to keep. Inventory management of an organization should ensure that asset, stocks and other supplies are kept at level that provide maximum return and service level at the possible minimum cost (Salam et al., 2016).

Control is a process by which events are made to conform to a plan (Yusuf, 2003). According to the study conducted by Martin and Patteson (2009) on measuring company performance and supply chain, they found that inventory control and cycle time are the most significant metrics in measuring supply chain performance of an organization. Inventory control and cycle time are the most significant metrics in measuring supply chain performance of an organization (Martin & Patterson, 2009).

Study conducted by Singh et al. (2016), on addressing strategic issues in pharmaceutical supply chain by linking resource, process and performance. They proposed a list of pharmaceutical supply chain processes; Inventory management, Outsource logistic activities, Reverse logistics, Lean manufacturing, Quality management and Green supply chain management.

The most common metrics used by practitioners in measuring supply chain performance include; quality, delivery, cost, price and flexibility (Loice et al., 2017).

The primary concern of management on control of inventory is to retain stock at appropriate levels, safeguard of assets, ensuring that stocks are properly used by organization and proper stock accounting (Yusuf, 2003).

2.3.4.1 Stock level

Yusuf (2003) classifies critical levels for each item in the store; maximum levels, minimum level, re-order level and re-order quantity. Inventory level has direct effect on firm average sales, replenishment cycle, service level, lead time and helps to minimize transportation cost (Salam et al., 2016). According to Yusuf (2003), control over inventory is improved through; stock level, overall reduction of stock to hold, cooperation, forecasting, staff involvement, low cost of operation, material management

2.3.4.2 Inventory control system

According to Yusuf (2003), inventory control system improve performance of supply chain through reduction or elimination of pilferage, elimination of the delivery and avoidance in holding slow moving items. Base stock system and reorder point level are common models used in management and control of inventory in retailer industry (Salam et al., 2016).

2.4 Supply Chain Performance (SCP)

SCP is defined as a systematic process of measuring the effectiveness and efficiency of supply chain operations (Sundram et al., 2016). Supply chain performance refers to the evaluation of supply chain management, and includes both tangible and intangible factors. Tangible factor may include cost while intangible factor may include capacity utilization (Chang et al., 2013). Supply chain performance may be seen as an important indicator of how well supply chain strategy fulfills its objectives and goals (Rana et al., 2015).

For a company to be successful and take a competitive edge in the market it must have a strategic fit. Strategic fit is the state where by competitive strategies of a firm aligns with the supply chain strategies (Sambasivan & Jacob, 2008). PRTM was the first universal

performance measures that were generated by Pittiglio, Rabin, Todd and McGrant to measure performance of supply chain. Globalization and technological effects has lead the growing need for both supply chain actors and environmental concern and measurement criteria's in supply chain has been subjected to the light (Gopal & Thakkar, 2012).

According to the study conducted by Carr (2016), on the relationship among information technology, organizational cooperation and supply chain performance. The results reveal that quality; cost and delivery are the most common outcome of supply chain performance. SCOR model can be useful in understanding and managing the interaction between suppliers, customers and distributors in terms of planning, sourcing, making and delivery of products McLaughlin et., al. (2003). Performance constructs include cost, quality, responsiveness, flexibility, delivery, inventory, process involvement, innovation and sale. While, most popular supply chain performance metrics include cost, reliability, quality and responsiveness (Zhang, 2012). Sangwa and Sangwan (2018) in performance study identify key performance indicators (KPI's) in supply chain; Customer service, customer retention rate, annual customer complaints, responsiveness, customer involvement, on time delivery and service quality (Sangwa & Sangwan, 2018)

2.4.1 Quality

The pharmaceutical supply chain plays a major role in development of a society in terms of life saving interest (Parmata et al., 2016). Quality is the key aspect when it comes to supply of medical requirements (both equipment and drugs). Supplier quality is determined by the ability of supplier to deliver the required amount of products at a given period of time (Carr, 2016).

Quality is one of the main components of performance that it measured SC performance. Company has to offer quality product that create maximum value to the customer (Gawankar et al., 2017). Aspects of information quality include; timeliness, accuracy, adequacy and credibility (Sundram et al., 2016). In 1988, Garvin proposed eight dimensions of quality; conformance, reliability, features, performance, service ability, aesthetics and perceived quality (Gawankar et al., 2017).

Pharmaceutical supply chain is very complex in nature and extremely answerable to ensure that the right drugs and medical supplies reach the right person (medical facility) at the right time and in the right condition (Parmata et al., 2016). And hence, quality of service provided in supply of drugs and medical supplies plays a very important part in effecting performance. The researcher attempt to adopt SERVQUAL model to study and understand the significant of service quality in pharmaceutical supply chain.

2.4.2 Efficiency

Collaboration among supply chain actors has been seen as potential factor in maximizing efficiency of a firm performance Gawankar et al. (2017). According to Gawankar et al. (2017) defined efficiency as a measure of success and determinant factor of the ability and position of the company to profit (e.g. operating cost and inventory turnover). Cost was used as key performance indicator in measuring performance in supply chain in China (Ip, Chan, & Lam, 2011).

Cost as a performance dimension in supply chain is measured by percentage cost of poor quality, in-house cost, material cost, processing cost, inventory cost and labor cost (Sangwa & Sangwan, 2018). Transaction cost theory provide theoretical basis for understanding and explaining the inter-organizational relationship and how companies attempt to achieve level of performance throughout the entire supply chain (Carr, 2016).

2.4.3 Responsiveness to customer

Responsiveness refers to the organization speed in respond to customer request (Gawankar et al., 2017). In global supply chain and networks, supply chain managers works with supplier to find ways to improve and maintain delivery time. Lead time is said to decrease by establishing sound cooperative relationship between supply chain actors (Carr, 2016). The performance of supply chain must ultimately be measured by responsiveness to customer (Gawankar et al., 2017).

2.5 Models used in measuring performance in supply chain

Several models have been developed and used in supply chain studies; however few of them attempt to measure performance of supply chain. Models such as Supply Chain

Operation Reference Model (SCOR) model, Balance Score Card (BSC) model, Service Quality Model (SERVIQUAL) and KSAO's. According to Vlachos (2014), proposed two models that are likely to be used in measuring performance in supply chain. The models include Supply Chain Operations Reference (SCOR) and Balanced Score Card (BSC).

2.5.1 Balance Scorecard Model (BSC)

BSC model was developed by Kaplan and Norton in early 1990s as a performance measurement system which integrate indicators derived from strategy of an organization (Bigliard & Bottani, 2014). BSC is used as a strategic management tool in measuring performance of Supply Chain since it considers both financial and non-financial aspects (Amirkhani et al., 2016). In order to evaluate and measure performance of an organization, managers need to identify number of balanced indicators to be used (Vlachos, 2014).

Organization and companies use BSC model as a tool to identify measure and translate the company's mission and strategies into a comprehensive set of performance metrics (Boscia & McAfee, 2008). The original model suggests four perspectives namely; financial perspectives, customer perspective, internal process perspective and learning and growth perspective (Bigliard & Bottani, 2014). According to Amirkhani et al., (2016), proposed four balance indicators which were used to measure performance of the organization; Financial, Customer, Internal process (process and growth) and Innovation.

BSC model cover the following balances; short term vs. long term, internal vs. external focus, different levels in an organization, four views of BSC (learning and growth, internal processes, customer, financials) and multiple perspectives of stakeholders (Akyuz & Erkan, 2010).

2.5.2 Supply Chain Operation Reference Model (SCOR)

SCOR model was developed in 1996 as part of Supply Chain Council (SCC) product (Supply Chain Council, 2012). SCOR is a framework and management tool which helps organization make dramatic and rapid improvements in supply chain operations and processes (Kocaoglu et al., 2013). SCOR links business processes, performance metrics, practices and people skills into a unified structure with the aim of satisfying customer's demands (Bigliard & Bottani, 2014).

SCOR model is described into five management processes namely plan, source, make/produce, deliver and return; into three management levels namely top level, configuration level, process element level and implementation level (Kocaoglu et al., 2013) and (Bigliard & Bottani, 2014). The model has been proposed as a useful tool in measuring performance of supply chain (Bigliard & Bottani, 2014). The lowest levels of SCOR model can be used to generate indicators that can be used to measure performance of supply chain (Supply Chain Council, 2012).

Table 2.2 SCOR Model performance attributes (indicators)

Performance attributenm	Metrics
Reliability	means the ability to perform supply chain tasks as expected - *Perfect order fulfillment and fill rate*
Responsiveness	Refers to the speed at which tasks are performed. - *Order fulfillment cycle time (lead-time)*
Agility	The ability to respond quickly to external influences and market changes. - *Flexibility & adaptability*
Cost	refer to the total cost of operating the supply chain processes - *Total cost to serve (COGS)*
Assets management	the ability to efficiently utilize assets (inventories) - *Cash cycle time & return on fixed assets*

Source; Supply Chain Council, (2012)

2.6 Current issues influencing performance in supply chains

2.6.1 Outsource Practices

Developments of many supply chains worldwide are caused and influenced by outsource activities as strategic component of companies (Gunasekaran & Irani, 2010). Outsource offer potential benefits and opportunity for the company to turn fixed costs into variable costs and allow company to achieve economies of scale and scope (Azzi et al., 2013).

With the emerging application of Internet and Information Communication technology (ICT), companies are forced to shift their operations from traditional way to virtual e-business, e-procurement and e-supply chain philosophy (Gunasekaran & Irani, 2010).

2.6.2 E-Procurement

E-Procurement is automated systems that enhance efficiency in planning, budgeting, procurement and management in National and County governments (Mwita & Mwaighacho, 2017). E-procurement uses Internet and ICT to improve the effectiveness

and efficiency of supply chain (Rotich & Okello, 2015). E-procurement is particularly important due to the fact that procurement is one of the most critical functions of the supply chain (Quesada et al., 2010).

E-procurement is considered to be one of the major reforms in public procurement and Supply chain in general (Mwita & Mwaighacho, 2017). According to research conducted by Rotich and Okello (2015), on the analysis of e-procurement and performance; the results reveal that e-procurement has positive and direct relation towards supply chain performance in county governments in Kenya. E-procurement is associated with reduced transaction cost, improved process efficiency, increased contract compliance, reduced cycle times and tied up inventory capital and improved operational.

According to PPRA (2017), the current ICT infrastructure of Tanzania allows the Government to carry out governance activities, including the use of e-procurement system for procurement activities. E-procurement solutions leads to improved satisfaction of customer demands, improved contract compliance, enhanced supply chain capacity, reduce inventory costs and improved inventory management (Rotich & Okello, 2015)

2.6.3 Radio Frequency Identification (RFID)

Radio Frequency Identification (RFID) is identification technology that uses radio frequency waves to identify objects data and transmit information from a tag to a reader device (Muller-Seitz et al., 2009). Tags, readers and middleware comprise of RFID system. Generally RFID provide advantage to an organization from order management, warehouse and assets management, and transport management which offer abilities in identification of products and communication of real time information of products (Vlachos, 2014).

Recently, RFID take much attention in Pharmaceutical industry as the one among the fastest growing industries in packaging. RFID is used in Pharmaceutical Industry for monitoring their pharmaceuticals for both at supply chain levels as well as at home premises and warehouse. RFID has the capability of capturing data and relaying data, is used by the industry as a source of improving quality, reduce cost and most important to improve patient safety (Howard, 2009).

RFID offers many benefits for the Pharmaceutical Industry into their supply chain, benefits such as: proper stocking of drugs, efficient supply chain that save money and time but also improve patient safety. Another biggest benefit that RFID offer to pharmaceutical industry is it helps to solve and combat counterfeiting practices/acts (Howard, 2009). RFID technology is also used under SCM discipline in shipping, tracking, counting and checkout of objects and assets of an organization. RFID technology is said to provide timely and accurate data for managing information flows in supply chain, which, in turn leads to improved supply chain performance (Vlachos, 2014).

2.6.4 Human relations and environmental concerns

Supply chain consists of multiple organizations which are connected, combined, coordinated and structured to form a certain network. Due to these SC networks human relation and behaviors become more complex and organization has to highlight them (Jabbour & De Jabbour, 2016). Human resource management (HRM) concepts and practices can support the implementation of supply chain operations (Ellinger & Ellinger, 2014). HRM can indeed have a positive impact and influence on supply chain performance and management. According to Zhu et al (2016), Green supply chain management (GSCM) integrates environmental concerns into supply chains and has widely implemented by companies to improve supply chain performance. Green supply chain can bring environmental benefits through reduction of waste production and avoiding the use of hazardous substances Schrettle et al., (2014). Governments together with supply chain actors have gained increasing attention to promote environmental management practices among supply chain actors (Vurro & Perrini , 2009).

2.7 Empirical Review

In China, Ip et al. (2011) conducted a study on modeling supply chain performance and stability in Hong Kong. The study aim at proposing an integrated approach modeling and measuring supply chain performance uses system dynamics. The study targeted semi-conductor equipment manufacturing companies in China. The study found that efficiency and effectiveness with six indicators (employee fulfillment, product reliability, on-time delivery, customer fulfillment, profit growth and working efficiency) were the most preferred factors in measuring performance in supply chain.

Parmata et al. (2016), conducted a study on "Measuring Service Quality in Pharmaceutical Supply Chain – distributors perspective". The purpose of the study was to contribute knowledge to the service market literature by developing SERVQUAL scale for measuring distributor service quality of pharmaceutical supply chain. The study employed survey design as a research design. A questionnaire instrument was designed as per service quality measurement scale and distributed over three major cities of the Indian Pharmaceutical Market. The study used exploratory factor analysis in order to identify strong loading factors of service quality followed by confirmatory factor analysis.

The study developed a valid scale with for dimensions (responsiveness, reliability, communication and assurance) to study their effect on Parasuraman's SERVQUAL scale for measuring distributor perceived service quality of the Pharmaceutical supply chain. The study found that distributor perceived service quality has an effect on satisfaction and performance on PSC (Parmata et al., 2016).

Achuora et al. (2012), conducted a study on factors affecting distribution performance for pharmaceutical products in Kenya Public Sector. The study aimed at examining the effect of information technology, financial capacity, transport outsourcing and third part relations. The study employed survey design as a research design. Questionnaire and interview instrument were used to collect data from 145 samples of respondents collected from public institutions in Kenya. The collected data was then analyzed using descriptive and correlation analysis techniques for examining the relationship between variables of interest. The study found that information technology and financial capacity posses greatest influence on distribution performance of pharmaceutical products in Kenya public sector.

A study by Mandal (2016) on the influence of dynamic capabilities on Hospital-supplier collaboration and hospital supply chain. The purpose of the study was to explore the influence and effect of hospital visibility for sensing, coordinating, learning and integrating supplier collaboration. The study sought to explore the effect of technological orientation on hospital SC. A survey design was used as research design; the study employed email to send questionnaires and collect data from 192 responses and the data was analyzed using structural equation modeling.

The study found that there is positive influence on learning, integrating and supplier collaboration on Hospital supply chain performance.

Sangari et al. (2014), conducted a study on the impact of Knowledge management processes on SCP. The study aimed at examining the relationship between knowledge management and SCP. Knowledge management was developed under six processes grounds; knowledge creation, knowledge capture, knowledge organization, knowledge dissemination and knowledge application while SCP was evaluated using Supply Chain Operation References (SCOR) process elements; Plan, Source, Make and Deliver. A structural equation model was employed using a sample 78 respondents from Iranian Manufacturers in Mechanical and engineering industry. The study found that Knowledge management processes have a positive relationship and significant impact on SCP.

A study by Barwa (2015), on "Inventory control as an effective decision-making model and implementations for company's growth", the purpose of the study was to analyze factors involved in inventory control decision process and its implementation for company's growth. The study used secondary data to enrich the literature on Inventory control for company's growth and performance in global competitive market. The study proposed popular methods that can be used to control inventory; minimum stock level, stock review, Just-in-time, Economic Order Quantity (EOQ), Re-order level, Batch control, FIFI & LIFO. The study recommends the above mention methods to be used in an organization in order to accelerate growth and performance of company's operations.

In Tanzania, a study conducted by Njau (2018), on evaluating factors affecting Performance of Procurement Management Unit (PMU) in Tabora LGA's. The study adopted cross-sectional survey as research design and positivist paradigm. The study targeted a total population of 39 elements (staffs) and draws a sample size of 30 to represent the entire population in the study. Questionnaire as a data collection instrument was used to collect data from the sample selected. Quantitative data analysis technique was applied to analyze the data and then a study finding was presented in form of tables and percentages. The study found that Performance of PMU functions are influenced and affected by staff competences (skills and knowledge), the study also found that the effect of Information Communication Technology (ICT) though the use of information system provide a room for performance in PMU functions and operations.

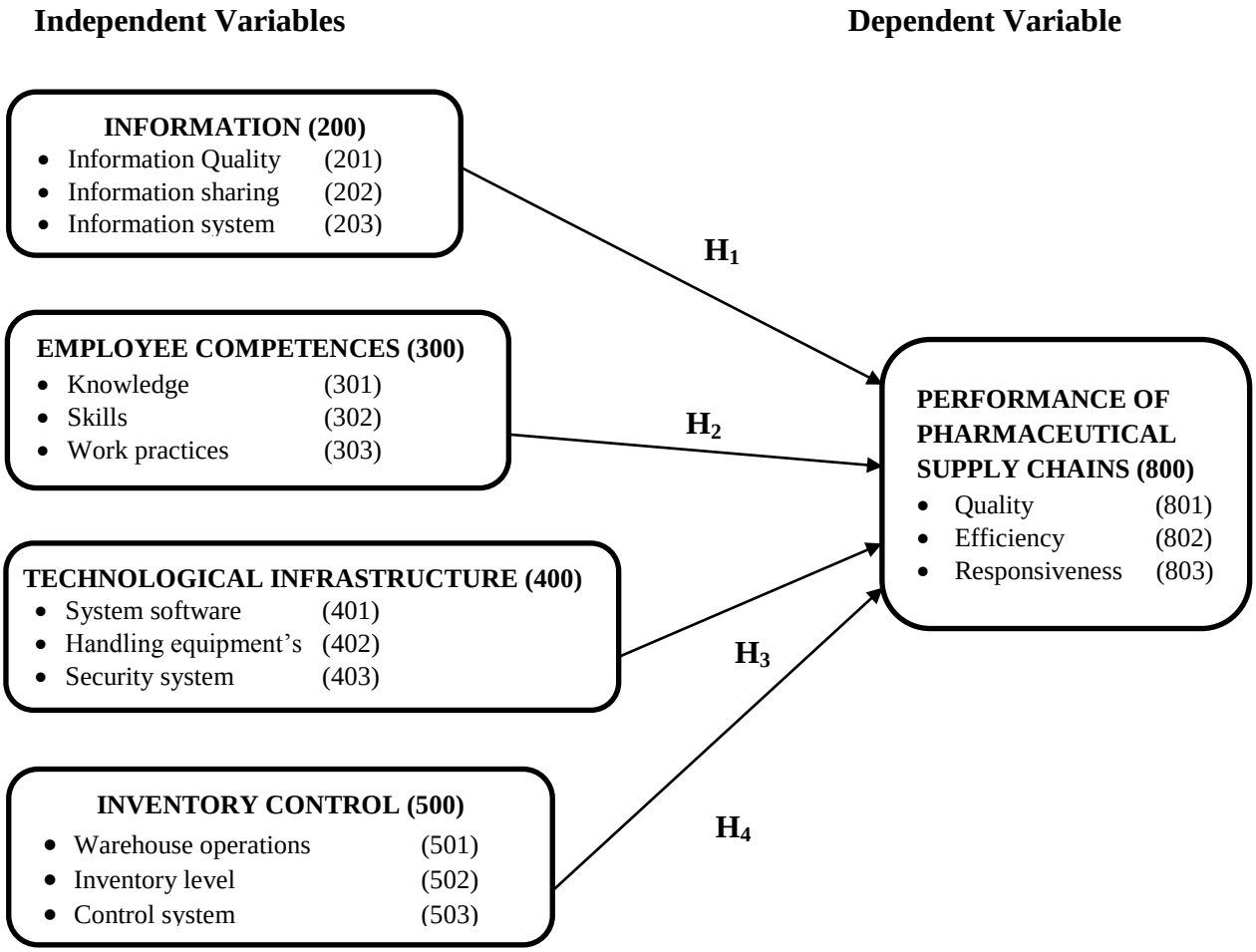
Matto (2018), conduct a research on "Assessment on factors affecting Performance of Procurement functions in LGA's in Arusha City Council. From documentary review, the study introduces three factors affecting performance; Staff competences, Procurement procedure and Ethical issues, and performance were measured by efficiency and effectiveness attributes and indicators. The study adopted deductive approach as research approach and positivist paradigm. The targeted population was 65 elements (staffs) and a sample size of 22 was drawn to represent the entire population in the study. The study used interview and questionnaire instruments in data collection process. A quantitative data analysis technique was used to analyze the collected data and then present in form of charts, frequency tables and percentage. The study found that procurement staffs with relevance skills and experience can perform effectively and efficiently.

A study by Sundram et al. (2016), on "Supply chain practices and performance: the indirect effects of supply chain integration in Malaysian electronic Sector". The study aimed at examining the relationship between SC practices and SCP. A survey design was employed to collect data from 156 electronic firms in Malaysia. The study found that supply chain integration has mediated the relationship between SCM practices and SCP. The study recommends that, practitioners alongside supply chain should link SCM practices and SC integration to improve SCP. The study also recommends seven SCM practices that can be used in a SC network: Supplier strategic partnership, customer relations, information sharing, information quality, and postponement, agree vision and goals and risk and reward system.

2.8 Conceptual Framework

This section presents factors that can influence supply chain performance from which the analysis of the study will be made. Dependent variable of the study is performance of pharmaceutical supply chain, which is influenced by Independent variables; Information, Employee Competences, Technological infrastructure and Inventory control.

Figure 2.1 Conceptual Framework



Source; Researcher (2018)

2.9 Research Hypotheses

H_1: Information is likely to have a positive relation with Performance in Pharmaceutical Supply Chain.

H_2: Employee's competences are likely to have a positive relation with Performance in Pharmaceutical Supply Chain.

H_3: Technological infrastructures are likely to have a positive relation with Performance in Pharmaceutical Supply Chain.

H_4: Inventory control is likely to have a positive relation with Performance in Pharmaceutical Supply Chain.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This chapter is divided into the following sections; research design, area of the study, population, sample size, sampling procedures together with data collection methods and data analysis techniques.

3.1 Research Design

Research design comprise of methods and procedures employed by a researcher in conducting scientific research. It may be understood as a science of studying how research is done scientifically (Kothari, 2004). The study used exploratory technique to explore factors influencing Performance in Pharmaceutical Supply Chain (PSC). The researcher confirms this study to be a case designed study and therefore employed exploratory design in order to find underlying relationship between factors and performance attributes. Exploratory design is stated as technique used to explore causal relationship between variables while descriptive design aims at describing the phenomena (Kothari, 2004).

3.2 The Study Area

The study was conducted at the Medicals Stores Department (MSD) organization in Dar es Salaam region. The rationale of selecting MSD is because is the only public Organization dealing with medical supplies in Tanzania.

3.3 The Target Population

According to Kothari (2004), Population constitutes all items in any field of inquiry. The study targeted MSD staffs located in different departments and sections that are directly linked with pharmaceutical supply chain located in Dar es Salaam region. Unit of analysis for this study was the staffs and officers in Medical Store Department (MSD Head Quarters).

3.4 Sample of the Study

Sampling is the statistical practice concerned with the selection of elements, observations or individuals intended to yield some knowledge about a population of concern. A researcher used 30% (65) of the total target population (220 staffs) as a sample for this study. A 30% of a total population is said to be the minimum acceptable for sample size computation in a given study (Mugenda & Mugenda, 2008).

In reference to the study of Turkyilmaz et al. (2015), on assessment of TQM practices as a part of Supply Chain Management in the Healthcare Institutions in Turkey country. They used 50 samples in studying the TQM practices in supply chain. However, Mugenda and Mugenda in (2008) recommend that a sample size has to be large enough in order to reproduce salient characteristics of the entire population to an acceptable level and also to avoid sampling errors. Sample size refers to the number of items to be selected from the universe to constitute a sample (Kothari, 2004). The researcher used a total of 65 samples from total targeted population of 220 elements. The figure 3.1 below shows the distribution of samples

Table 3.1 Study Sample Size

Departments/Section	Target population	Percentage	Sample size
ICT department	20	30%	6
Finance department	20	30%	6
Demand and planning	24	30%	7
Procurement department	24	30%	7
Clearing and Forwarding	20	30%	6
Sales department	24	30%	7
Human resource	24	30%	7
Warehouse section	24	30%	7
Quality assurance	20	30%	6
Distribution section	20	30%	6
TOTAL	**220**		**65**

Source; Researcher (2018)

3.5 Sampling Technique

The researcher used both probability method and non-probability methods in selecting the sample. Sample of the study was drawn using random sampling technique, stratified sampling and purposive sampling technique in MSD Head quarter office. The researcher

used random sampling technique alongside with stratified sampling to get a number of staffs from various departments to be used to deliver the required information. Under judgmental/purposive sampling technique, the researcher selected respondents/elements which he believes are experienced, knowledgeable and skilled enough to deliver the require information (Kothari, 2004).

3.6 Data Collection

Data collection is process of gathering specific information aimed at providing or refuting some facts about a certain phenomena. Different authors have divided data into two main categories; Primary data are directed collected from the field, while Secondary data category, data are obtained from various sources like Published books, Journal Articles, Published papers, magazines and different sources (Kothari, 2004) and (Mugenda & Mugenda, 2008). The researcher used questionnaire instrument in gathering/collecting the required data. List of coded questions item was developed based in variable nature (conceptual framework). The intended respondents were required to read, understand and fill/write the question items based on likert scale.

3.7 Data Reliability and Data Validity

Reliability is simply explained as the consistency of measurement used in research (Mugenda & Mugenda , 2008). According to Kothari (2008), reliability can be categorized into three forms; *Test-retest reliability*, *Alternate-form reliability* and *internal consistency reliability*. The researcher will make use of internal consistence to check the reliability of measurement. Internal consistency is applied to groups of items that are thought to measure different aspects of the same concept.

Validity is the extent to which a set of measured items actually reflects the theoretical base and latent constructs (Parmata et al., 2016). Validity reflects the relationship between the concepts and the indicators used to measure the concepts (Musabila, 2012). There are several different forms of validity such as *face validity*, *construct validity*, *content validity*, *convergent validity* and *discriminant validity* (Hair et al., 2010). The researcher makes a use of face validity and content validity.

Data validity is merely concerned with the accuracy of the measurement, it denote to what extent the instrument is measuring what it is supposed to measure (Kothari, 2004).Validity is measured into four ways; face validity, content validity, criterion validity, construct validity and convergent validity. The researcher will make use of content validity where content validity covers a range of meanings.

3.8 Measurement of scale

Measurement of scale is group into four categories; they include nominal, ordinal, interval and ratio scale (Kothari, 2004). The researcher used four categories basing on the type and nature of variable to be tested as indicated in the conceptual framework. Nominal scale is simply a system of assigning number or symbols to events in order to label them (Kothari, 2004). The researcher used nominal scale in assigning codes to different variables for the purpose of identifying them.

Ordinal scale is the smallest measurement scale that places events in order format (Mugenda & Mugenda, 2008). It implies a statement of; 'greater than' & 'less than'. Interval scale is another category of measurement of scale whereby variables are grouped in terms of some defined rule that has been established as a base for making units equal (Kothari, 2004).

Under interval scale T-test measurement is more likely to be used in testing the statistical significance of the variable. While, Ratio scale is used in measuring physical dimensions such as height, weight, distance, etc (Mugenda & Mugenda, 2008). All statistical techniques are usable in ratio scale.

3.9 Data Analysis

Quantitative methods of data analysis were used in analyzing the data for this study. Data classifications were done on the basis of common characteristic with the help of Statistical Package for Scientific Studies (SPSS – V.23). According to the nature of objectives, the researcher used factor analysis - Kaiser-Meyer Oklin in measuring the sampling adequacy, Barlett's Test of Sphericity (Chi-square test) and Significance. The researcher used of regression analysis techniques (Bivariate) and Correlations analysis technique (Pearson Correlation) in testing the hypothesis (Pallant, 2010).

CHAPTER FOUR

DATA ANALYSIS AND PRESENTATION OF FINDINGS

4.0 Introduction

This chapter deals with data analysis techniques and presentation of findings. Through the use of advanced Statistical Package for Social Science (SPSS) version 23, the questions items were filled in SPSS data template using specified codes and names. Data were analyzed using the following techniques; descriptive analysis, factor analysis, regression techniques and correlation technique.

4.1 Response Rate

The study was based in pharmaceutical supply chain, a case of Medical Stores Department (MSD) in DSM – Headquarters offices. From the targeted population of 220 respondents, the researcher draws a sample of 65 respondents from a 30% rule to represent the entire population. The researcher distributed 65 questionnaires to the respondents and they were filled in and returned for analysis. The researcher personally administered questionnaires and waited for respondents to fill it and picked the questionnaires once fully filled. The response rate demonstrates a willingness of the respondents to participate in the study (Kiage, 2013).

4.2 The respondents characteristics

In this section, the characteristics of respondents were fully analyzed. The characteristics observed include; Gender, Age, Education level, Experience, Department/Section and Experience. With the help of Statistical Package for Social Science (SPSS – v.23), Frequency distribution was used to organize data, to give meaning to the response rates and facilitate insight.

4.2.1 Respondents Gender

The result from respondent's gender is indicated in Table 4.2 below, showing that 30 (46.2%) of the respondents are female and 35 (53.8%) are male. There is a slight difference between female and male; this implies that operations and tasks alongside pharmaceutical supply chain can be performed by any practitioners' provided that individual can deliver the intended expectations although male are many compared to female.

Table 4.1 Gender

		Frequency	Percent
Valid	Female	30	46.2
	Male	35	53.8
	Total	65	100.0

Source: Field data (2018)

4.2.2 Respondents Age

Table 4.2 presents the results of respondent's age composition according to their category. The finding shows that among all the respondents only 2 (3.1%) were aged below 25 years, 13 (20%) were aged between 25 to 30 years, 21 (32.3%) were aged between 31 to 35 years, 18 (27.7%) were aged between 36 to 40 years and 11 (16.9%) were aged above 40 years. Therefore, most of the respondents observed by the study were the age of 31 to 35 years with contribution of 21 respondents and 36 to 40 years with the total contribution of 18 respondents. This implies that majority of workforce in pharmaceutical supply chain in MSD are aged between 30 – 40 Years, hence they can deliver the intended service in effective and efficiency manner due to adult age effect.

Table 4.2 Ages

		Frequency	Percent
Valid	Below 25 Years	2	3.1
	25 - 30 Years	13	20.0
	31 - 35 Years	21	32.3
	36 - 40 Years	18	27.7
	Above 40 Years	11	16.9
	Total	65	100.0

Source: Field data (2018)

4.2.3 Education Qualification

The study shows the education level composition of the respondent. Table 4.3 below presents the results. The finding in table below shows that most of the respondents have Bachelor degrees with a contribution of 37 out of 65 respondents equivalents to 56.9%, followed by Masters with the contribution of 15 (23.1%) and Diploma level has contributed 11 (16.9%), Phd level with the least contribution of 2 (3.1%). This implies that the desired and acceptable level of education on Pharmaceutical supply chain is Bachelor degree as most of the respondents has proved. This indicates the fact that, MSD in the field of Pharmaceutical Supply Chain has a strong base of qualified staffs.

Table 4.3 Education level

		Frequency	Percent
Valid	Diploma level	11	16.9
	Bachelor degree level	37	56.9
	Master's level	15	23.1
	PhD holder	2	3.1
	Total	65	100.0

Source: Field data (2018)

4.2.4 Respondents Department

The respondents profile in the Table 4.4 below, indicate that there is equal distribution of respondents in their department. Never the less each of the department or section has absolute relative contribution to the total sample of the study. ICT, Finance, Clearing and Forwarding, Quality assurance and Distribution Departments has the same contribution of 6(9.2%) while Demand and planning, Procurement, Sales, Warehouse and Human Resource Department has the same contribution of (10.8%) of the sample study.

This implies that each Department/Section has its own importance in influencing the performance of Pharmaceutical supply chain.

Table 4.4 Distribution of Respondents in Position

		Frequency	Percent
Valid	ICT department	6	9.2
	Finance department	6	9.2
	Demand and planning	7	10.8
	Procurement department	7	10.8
	Clearing and Forwarding	6	9.2
	Sales department	7	10.8
	Human resource	7	10.8
	Warehouse section	7	10.8
	Quality assurance	6	9.2
	Distribution section	6	9.2
	Total	65	100.0

Source: Field data (2018)

4.2.5 Working experience

Table 4.5 shows that most of the respondents have working experience of 1 – 5 years with a contribution of 22 out of 65 equivalent to 33.8%, followed by 6 – 10 years with a contribution of 17 (26.2%). Respondents with experience of 1 – 12 months have contribution of 14 (21.5%) and for 11 – 15 years working experience has a contributed a total of 7 (10.8%) while the least of respondents with experience above 15 years were 5 (7.7%) out of 65 respondents.This implies the fact that the respondents with experience of more than one to five year have better knowledge in regards with the pharmaceutical supply chain and hence have ability to perform well in supply chain activities and operations.

Table 4.5 Respondents by working experiences

		Frequency	Percent
Valid	15+ years	6	9.2
	11 - 15 years	7	10.8
	6 - 10 years	16	24.6
	1 - 5 years	23	35.4
	1 - 12 months	13	20.0
	Total	65	100.0

Source: Field data (2018)

4.3 Data Analysis for Variables

As presented in Chapter I, the main objective of this study was to determine factors influencing performance of pharmaceutical supply chain. The researcher adopted staged analysis methodology in studying and providing answers to the general research objectives stated in Chapter I. Data analysis test where carried out using Statistical Social (SPSS V.23). The main data analysis methods employed by the researcher include the following; factor analysis, correlation and regression techniques.

The hypotheses were grouped into four blocks, as indicated below;

H_1: Information is likely to have a positive relation with performance in Pharmaceutical Supply Chain.

H_2: Employee's competences are likely to have a positive relation with performance in Pharmaceutical Supply Chain.

H_3: Technological infrastructures are likely to be positively relation with performance in Pharmaceutical Supply Chain.

H_4: Inventory control is likely to have a positive relation with performance in Pharmaceutical Supply Chain.

Using a likert scale of 5 points, the researcher opts to use "*strongly disagree*" as one (1) point while "*strongly agree*" as five (5) point scale in studying the sample responses. The respondents were asked to select the most appropriate number (Likert scale; 1 - 5) that suit the level of agreement against the statement provided. In factor analysis technique, the extraction of data was carried out using Principal Component Analysis (PCA). The researcher adopted the Varimax as the rotation technique/method. The acceptable loading cut off point as suggested in previous studies is normally +0.500 (Hair et al., 2006; Musabila, 2012 & Pallent, 2010). But the researcher opts to use 0.600 as a cut-off point in determining the loading factors throughout this study.

4.3.1 Factor Analysis for Dependent Variable (Performance of PSC)

The dependent variables in this study were determinants of Performance in Pharmaceutical Supply Chain. As discussed in Chapter Two – Literature review, performance can be measured using three attributes namely; *quality*, *efficiency* and

responsiveness as indicated in appendix 1. To measure the dependent variable, the researcher adopts confirmatory factor analysis to test the validity of the attributes/variable items used in this study. The factor analysis was carried out in order to find out whether quality, efficiency and responsiveness are directly linked with performance.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) was used to verify suitability of data for factor analysis. Variable *802d, 802e, 803a, 803b, 803c, 803d and 803e* were dropped or removed due to poorly loading below the cut of point and hence omitted. After removing poor loading factors the result for KMO and Bartlett's Test was .766 which is highly acceptable value as shown in Table 4.6 below. Therefore factor analysis is appropriate since Significance value (Sig. value "p = .000).

Table 4.6 Kaiser-Meyer-Olkin and Bartlett's Test for Performance

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.766
Bartlett's Test of Sphericity	Approx. Chi-Square	304.042
	df	28
	Sig.	.000

Source: Field data (2018)

The finding in Table 4.7 below presents the rotated factor matrix which shows how the variables load in component 1 and 2 using Principal Component Analysis extraction method. The reliability was performed to determine the consistency of the findings and the results shows that the value of the Cronbach's Alpha are above 0.7 as presented in the Table 4.7 below

Table 4.7 Rotated Component Matrix[a] for Performance variable

	Component		Cronbach's Alpha	Computation
	1	2		
801d - Delivery time	.890			
801a - Quality provision	.872		.910	(801d + 801a + 801b + 801c + 801e) /5
801b - Demand information	.857			SCP_Quality
801c - Supplier product	.843			
801e - Distribution service	.825			
802b - Inventory cost		.915	.805	(802b + 802a + 802c) / 3
802a - Operational cost		.833		SCP_Efficiency
802c - Transport cost		.787		

Source: Field data (2018)

As for the recommended limits for the Cronbach's Alpha measure, it is argued that the Cronbach's Alpha is unacceptable when it is below 0.60, moderate when it is above 0.60, acceptable when it is above 0.70 and very good when it is above 0.80 (Hair et al., 2006; (Musabila, 2012).

4.3.2 Factor analysis for Independent Variable

The independent variables on this study were Information, Technological Infrastructure, Employees competences and Inventory Control as discussed and presented in Chapter One (Introduction) and Chapter Two (Literature review).

4.3.2.1 Impact of information on supply chain performance

The first independent variable was Information as supported by three sub-variables namely; Information Quality, Information Sharing and Information system as discussed and presented in Chapter One and Two. Using factor analysis method, the result of KMO and Bartlett's Teston measure of sampling adequacy was .730 which is considerable acceptable and Sig. value (p value = .000) which is significantly acceptable. As shown in Table 4.8 below Chi-square **= 228.250** and Degree of Freedom (df) was 21 are appropriate for further analysis.

Table 4.8 Kaiser-Meyer-Olkin and Bartlett's Test for Information

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.730
Bartlett's Test of Sphericity	Approx. Chi-Square	228.250
	df	21
	Sig.	.000

Source: Field data (2018)

The researcher uses .6 as a cut-off point in determining the loading factors. Using Principal Component Analysis as an extraction method and Rotation method, poor loaded factors were removed or dropped (201a, 202a, 202b, 202c, 202d, 202e, 203a and 203e) as indicated in Table 4.9 below; the Table also show the result of Cronbach's alpha which is above 0.700, hence coinciding with recommendation presented by Hair et al., (2006) and Musabila (2012). The value of 0.861 and 0.789 is very good fit for the study.

Table 4.9 Rotated Component Matrix[a] for Information variable

	Component 1	Component 2	Cronbach's Alpha	Computation
201e - Budget Information	.877			
201b - Accurate Information	.832		.861	(201e + 201b + 201c + 201d) /4 INFO_Quality
201c - Complete Information	.812			
201d - Sales Information	.800			
203b - System accuracy		.854		
203c - Ease of use		.810	.789	(203b + 203c + 203d) / 3 INFO_Sytem
203d - System interaction		.802		

Source: Field data (2018)

4.3.2.2 Employees' competence variable

The second independent variable of this study was Employees competences and was supported by three sub-variables (attributes) namely; Knowledge, Skills and Work practices. Factor analysis on Employees competences was undertaken to prepare data for further analysis method. After running factor analysis the result of Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) was .752 which is considerable acceptable value for further analysis. Chi-square = 177.367 and Degree of freedom "df" = 21 while the Significant level (p value) was .000 which is standard acceptable value as shown in Table 4.10 below.

Table 4.10 Kaiser-Meyer-Olkin and Bartlett's Test for Competence

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.752
Bartlett's Test of Sphericity	Approx. Chi-Square	177.367
	df	21
	Sig.	.000

Source: Research data (2018)

The research uses .6 as a cut-off point in determining the loading factors. Using Principal Component Analysis as an extraction method and Rotation method, poor loaded factors were dropped (301d, 302b, 302e, 303a, 303b, 303c, 303d and 303e) as indicated in Table 4.11.

Table 4.11 Rotated Component Matrix[a] for Competence variable

	Component 1	Component 2	Cronbach's Alpha	Computation
301a - Knowledge creation	.884			
301b - Knowledge sharing	.874		.864	(301a + 301b + 301e + 301c) /4
301e - Knowledge protection	.823			KNOWLEDGE
301c - Knowledge integration	.792			
302a - Computer skills		.862		
302d - Clearing skills		.819	.746	(302a + 302d + 302c) / 3
302c – Planning skills		.757		SKILLS

Source: Research data (2018)

Table 4.11 also show the result of Cronbach's alpha which is above 0.864 under Knowledge indicator and Skill with a Cronbach's Alpha value of 0.746. The results of Cronbach's alpha are acceptable as a good fit for this study hence coinciding with the study of Hair et al., (2010) and Musabila, (2012).

4.3.2.3 Technological Infrastructure Variable

The third independent variable of the study was Technological Infrastructure as supported by three sub-variables namely; System software (301), Handling equipment (302) and Security system (303) as discussed and presented in Chapter One and Two. Using factor analysis method, the result of KMO and Bartlett's Test on measure of sampling adequacy was .687 which is considerable acceptable and Sig. value (p value = .000) which is significantly acceptable. The result of Chi-square was 327.491 and Degree of Freedom (df) was 28, this implies that the data are appropriate for further analysis as shown in Table 4.12 below.

Table 4.12 Kaiser-Meyer-Olkin and Bartlett's Test for Technological

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.687
Bartlett's Test of Sphericity	Approx. Chi-Square	327.491
	df	28
	Sig.	.000

Source: Research data (2018)

The research uses 0.600 as a cut-off point in determining the close-loading factors. Using Principal Component Analysis as an extraction method and Rotation method, poor loaded

factors were dropped (401a, 402a, 403c, 403b, 403a, 403e & 403d) as indicated in Table 4.13 below.

Table 4.13 Rotated Component Matrix[a] for Technological infrastructure

	Component		Cronbach's Alpha	Computation
	1	2		
401e – Equipments	.918			
401b – Assurance	.894		.899	(401e + 401b + 401d + 401c) / 4
401d - Simplification	.847			System Software
401c - Timely operations	.845			
402c - Space utilization		.865		
402e – Efficiency		.849		(402c + 402e + 402d + 402b) / 4
402d – Accidents		.837	.868	Handling Equipments
402b - Cost cut down		.824		

Source: Research data (2018)

From the Table 4.13 above, variable code number 402 (Handling equipment) and 403 (Security system) are automatically fit for this study since the value of Cronbach's Alpha are above 0.700. Variable named 401 had a Cronbach's Alpha of 0.899 which is a sign of goof fitness for the study while variable named 402 had Cronbach's Alpha of 0.868 which also show a good sign of good fit for the study.

4.3.2.4 To determine the impact of Inventory Control on Pharmaceutical SC

Inventory Control variable was supported by three sub-variables namely; warehouse operations, inventory level and inventory control system as discussed and presented in Chapter One and Two. Factor analysis technique was applied to determine close loading factors and the result of KMO and Bartlett's Test on measure of sampling adequacy was .756 which is considerable acceptable and Sig. value (p value = .000) which is significantly acceptable. As shown in Table 4.14 below the results of KMO is acceptable for further statistical analysis.

Table 4.14 Kaiser-Meyer-Olkin and Bartlett's Test for Inventory Control

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.756
Bartlett's Test of Sphericity	Approx. Chi-Square	307.475
	df	15
	Sig.	.000

Source: Research data (2018)

The Chi-square = 307.475 and Degree of Freedom (df) was 15 are appropriate for further analysis. The research uses .6 as a cut-off point in determining the loading factors. Using Principal Component Analysis as an extraction method and Rotation method, poor loaded factors were dropped (501a, 501b, 501c, 502e, 503a, 503b, 503c, 503d & 503e) as indicated in Table 4.15

Table 4.15 Rotated Component Matrix[a] for Inventory control variable

	Component		Cronbach's Alpha	Computation
	1	2		
502c - Control methods	.945			
502d - Service level	.942		.948	(502c + 502d + 502b + 502a) / 4
502b – Ave replenishment cycle	.924			Inventory Level
502a - Average sales	.912			
501d – Reporting		.920	.825	(501d + 501e) / 2
501e - Protective incentives		.919		Warehouse Operations

Source: Research data (2018)

From the Table 4.15 above, the results shows that variable named 502 (Inventory Level) and 501 (Warehouse operations) are automatically fit for this study since the value of Cronbach's Alpha are above 0.700. Variable named 502 had a Cronbach's Alpha of 0.948 which a good sign of fitness for the study while variable named 501had Cronbach's Alpha of 0.825 which also show a good sign of good fit for the study.

4.4 Regression Analysis

After Factor analysis technique, the researcher adopts simple and multiple regression analysis to test the relationships among independent and dependent variables of the study. According to Pallant (2010), Multiple regression is a statistical technique used to predict scores on a dependent variables from scores of a number of independent variable The main purpose of adopting Regression analysis was to test and prove the hypotheses as was presented in chapter two (Literature review).

4.4.1 The effect of Information on Performance of PSC

The effect of Information was discussed into three supportive attributes namely; Information quality (201), Information sharing (202) and Information system (203). The researcher opts to use multiple regressions to test the relationship among Information attributes and performance of Pharmaceutical supply chain.

Using multiple regression analysis; the model summary describes the overall contribution of the predictors (INFO Quality and INFO System) to the dependent variable (Performance of Supply Chain) as shown in table 4.16

Table 4.16 Model Summary for Information and Performance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.929[a]	**.863**	.859	.35679

Source: Field data (2018)

Using the value of R^2, the results shows that Performance of Pharmaceutical Supply Chain is directly influenced by the by the Information Quality by 86.3% and adjusted R-Squad of (.859). Under this ground the fact the hypotheses as assumptions are positive relevant for further analytical concerns. The results in Table 4.17 below show the results that coinciding with the study of Yousefi and Abilabaei (2015) and Li and Nathan (2006) that information quality has the direct impact and influence towards the performance of Pharmaceutical supply chain. Although the researcher was not surprised to see the insignificant result of information sharing and performance as the results are coinciding with Wei and Tang (2017).

Table 4.17 Multiple regression analysis for Information and Performance

Model		Hypothesis	Un-standardized Coefficients		Standardized Coefficients	t	Sig.
			B	Std. Error	Beta		
1	(Constant)		.133	.182		.728	.469
	INFO Quality	H_{1a}	.947	.051	.928	18.572	**.000**
	INFO System	H_{1c}	.004	.051	.004	.080	.937

Source: Research Data (2018)

Table 4.17 above indicates the results that the Information Quality as the Independent variables. Information System has positive significant relationship with Performance of Pharmaceutical Supply Chain by Significant value of .000, while Information System shows insignificant relationship on Performance of Pharmaceutical Supply Chain. The results above are coinciding with the study of Carr (2016), McLaughlin et al., (2003) and Khan, Liang & Shahzad (2015).

Finally, Information Quality has shown significant relationship with Performance in Pharmaceutical Supply Chain (PSC) with a contribution on Beta value of (β = .928).

4.4.2 Critical competences needed in PSC

The researcher wants to identify critical competences that are directly linked and the impact on Performance in Pharmaceutical Supply Chain. Employees competences were categorized into three namely attributes; Knowledge (301), Skills (302) and Work Practices (303). The researcher uses multiple regressions to test the relationship among Competences attributes and Performance on Pharmaceutical supply chain. Using multiple regression analysis; the model summary describes the overall contribution of the predictors (Knowledge and Skills) to the dependent variable (Performance of Supply Chain) as shown in Table 4.18

Table 4.18 Model Summary for Competences and Performance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.987[a]	**.975**	.974	.15289

Source: Field data (2018)

The results in Table 4.18 above show that the value of R^2 is 97.2%, this implies that skills together with Knowledge are direct linked with performance of Pharmaceutical Supply Chain. Employee's competences such as skills criteria and knowledge aspects are likely to influence the performance in pharmaceutical supply chain.

Table 4.19 below indicates the results that the Knowledge as the Independent sub-variables has positive and significant relationship with Performance of Pharmaceutical Supply Chain by Significant value of .000, while Skills shows positive insignificant relationship on Performance of Pharmaceutical Supply Chain by a Signficant value of .952 which is typically above the acceptable value (p = .05).

Table 4.19 Multiple regression analysis for Competence and Performance

Model		Hypothesis	Un-standardized Coefficients		Standardized Coefficients	t	Sig.
			B	Std. Error	Beta		
1	(Constant)		-.022	.106		-.210	.834
	SKILLS	H_{2b}	.001	.019	.001	.060	.952
	KNOWLEDGE	H_{2a}	1.008	.021	.987	48.902	**.000**

Source: Field data (2018)

The Table 4.19 above shows direct relationship between Knowledge and Performance and hence the results are coinciding with the study of Meyer, Brunig & Nyhuis (2015). The study result also reflects with the presentation of Kanda (2015) that individual competences are key attribute toward performance of supply chain especially in Pharmaceutical sector. Finally, knowledge competences has shown significant relationship with Performance in Pharmaceutical Supply Chain (PSC) with a contribution on Beta value of ($\beta = .987$).

4.4.3 Effect of Technological Infrastructure on SCP

The effect of Technological Infrastructure was discussed into three supportive attributes namely; System Software (401), Handling Equipments (402) and Security system (403). The researcher opts to use multiple regressions to test the relationship among Technological infrastructure attributes and performance of Pharmaceutical supply chain.

Table 4.20 Model Summary for Technological and Performance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.986[a]	**.972**	.972	.15999

Source: Research Data (2018)

Using multiple regression analysis; the model summary describes the overall contribution of the predictors (System Software and Handling equipments) to the dependent variable (Performance of Supply Chain) as shown in Table 4.20 above. The result shows that the value of R^2 is 97.2%; this implies that System Software together with Handling Equipments is direct linked with performance of Pharmaceutical Supply Chain.

Table 4.21 Multiple regression analysis for Technological and Performance

Model		Hypothesis	Un-standardized Coefficients		Standardized Coefficients	t	Sig.
			B	Std. Error	Beta		
1	(Constant)		.003	.086		-.038	.970
	System Software	H_{3a}	.972	.021	.983	46.126	**.000**
	Handling Equipment	H_{3b}	.019	.024	.017	.816	.418

Source: Research Data (2018)

Table 4.21 above indicates the results that the System software as the Independent variables has positive and significant relationship with Performance of Pharmaceutical Supply Chain by Significant value of .000, while handling equipment shows insignificant relationship on Performance of Pharmaceutical Supply Chain. The results above are coinciding with the study of Kanda and Iravo (2015) and Ombok and Dr. Were (2017). Finally, System software has shown significant relationship with Performance in Pharmaceutical Supply Chain (PSC) with a contribution on Beta value of ($\beta = .983$).

4.4.4 The Impact of Inventory Control on SCP

The effect of Inventory Control was discussed into three supportive attributes namely; Warehouse operations (501), Inventory level (502) and Inventory control system (503). The researcher opts to use multiple regressions to test the relationship among Inventory Control attributes and performance of Pharmaceutical supply chain.

Table 4.22 Model Summary for Inventory control and Performance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.840[a]	**.706**	.696	.51240

Source: Research Data (2018)

The model summary describes the overall contribution of the predictors (System Software and Handling equipments) to the dependent variable (Performance of Supply Chain) as shown in Table 4.22 above. The result shows that the value of R^2 is 70.6%, this implies that System Software together with Handling Equipments are direct linked with performance of Pharmaceutical Supply Chain. Finally Inventory level has shown significant relationship with Performance of PSC ($\beta = .834$).

Table 4.23 Multiple regression analysis for Inventory control and Performance

Model		Hypothesis	Un-standardized Coefficients		Standardized Coefficients		
			B	Std. Error	Beta	t	Sig.
1	(Constant)		.601	.258		2.332	.023
	Inventory level	H_{4b}	.748	.063	.834	11.879	**.000**
	Operations	H_{4a}	.017	.035	.035	.498	.620

Source: Research Data (2018)

Results indicates the fact that inventory level as independent variable has a positive and significant relationship on Performance in Pharmaceutical supply chain, while warehouse operations has shows insignificant relationship on Performance in Pharmaceutical supply chain. The results in Table 4.23 above are directly coinciding with the study of (Yousefi & Alibabaei, 2015) and (Salam et al., 2016).

4.5 Correlation Analysis

Correlation analysis is a technique used to describe the direction and strength of the linear relationship between two variables (Pallant, 2010). According to Hair et al., (2010), Correlation coefficient is a measure of linear relationship or association between two variables. Values of correlation coefficient always range between -1 and +1 (Musabila, 2012). A correlation coefficient of +1 value implies that variables are perfectly related in a positive linear sense while a correlation coefficient of -1 indicates that variables are perfectly related in a negative linear sense, and a correlation coefficient of 0 indicates that there is no linear relationship between the two variables (Ndeto et al., 2016).

4.5.1 Correlations between Information and SCP

First, the researcher wants to measure the association between performance and information variable. Using Bivariate correlation technique, the result in Table 4.24 show that, there is a close and strong positive relationship between performance quality and quality of information as shown by a Pearson correlation ($r = 0.929^{**}$) and a p-value of ($p = 0.000$). Information system has shown positive relationship with quality performance with a Pearson Correlation ($r = 0.318^{**)}$ and a p-value of ($p = 0.010$). This implies that Information quality and system has relative relationship with Pharmaceutical SC and hence can be used to accelerate performance in PSC.

Table 4.24 Correlations analysis between Information and SCP

		SCP Quality	SCP Efficiency	INFO Quality	INFO System
SCP Quality	Pearson Correlation	1			
	Sig. (2-tailed)				
	N	65			
SCP Efficiency	Pearson Correlation	.129	1		
	Sig. (2-tailed)	.305			
	N	65	65		
INFO Quality	Pearson Correlation	**.929****	.107	1	
	Sig. (2-tailed)	**.000**	.396		
	N	**65**	65	65	
INFO System	Pearson Correlation	**.318****	.139	**.338****	1
	Sig. (2-tailed)	**.010**	.271	**.006**	
	N	**65**	65	**65**	65

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

Source; Field data (2018)

In addition, Information quality has a positive relationship with Information system by a Pearson correlation (r = 0**.**338**) and p-value of (p = 0.006). This implies that quality of information together with advanced Information system has a positive relationship with Performance quality in pharmaceutical supply chain.

4.5.2 Correlations between Competences and Performance variable

Second, the researcher wants to understand the relationship or association between competences and performance. Results in Table 4.25 below show that, there is a positive relationship between Performance quality and Competence - knowledge of employees as shown by a Pearson correlation (r = 0.987**) and a p-value of (p = 0.000). This implies that there is a strong and close relationship between employee's knowledge inputs and performance quality output in Pharmaceutical supply chain. In addition, the model with significance level less than 0.05 is considered to be a good fit for the data and hence it is appropriate in predicting the influence of independent variable on dependent variable (Ndeto et al., 2016).

Unfortunately the researcher was surprised with negative relationship between skills and performance quality. A negative relationship by Pearson correlation (r= -0.068**) with no significant (p = 0.583) which is above the acceptable standard p-value; p = .050 (Hair et al., 2016).

Table 4.25 Correlation analysis between Competences and Performance

		SCP Quality	SCP Efficiency	Knowledge	Skills
SCP Quality	Pearson Correlation	1			
	Sig. (2-tailed)				
	N	65			
SCP Efficiency	Pearson Correlation	.129	1		
	Sig. (2-tailed)	.305			
	N	65	65		
Knowledge	Pearson Correlation	**.987****	.131	1	
	Sig. (2-tailed)	**.000**	.297		
	N	**65**	65	65	
Skills	Pearson Correlation	-.068	.143	-.070	1
	Sig. (2-tailed)	.593	.257	.581	
	N	65	65	65	65

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

Source; Field data (2018)

4.5.3 Correlations between Technological Infrastructure and Performance

Third, the researcher wants to understand the relationship between performance of pharmaceutical supply chain and technological infrastructure attributes (System software and Handling equipment). The researcher was not surprised to see close relationship between Performance quality and system software by a Pearson correlation ($r = 0.986^{**)}$ and p-value of ($p = 0.000$). This implies that system software installed along Pharmaceutical SC (Epicor 9) is likely to have a positive impact towards the performance quality.

The results in Table 4.26 below also show positive relationship between Handling equipment and Efficiency of Supply chain performance in pharmaceutical sector by a Pearson correlation ($r = 0.407^{**)}$ and Significant value ($p = .001$). This implies that handling equipments such as forklift, conveyor belt and stackers have ability in reducing cost of handling materials (drugs and medical equipments) in Pharmaceutical supply chain operations.

Table 4.26 Correlations analysis Technological Infrastructure and SCP

		SCP Quality	SCP Efficiency	System Software	Handling Equipment
SCP Quality	Pearson Correlation	1			
	Sig. (2-tailed)				
	N	65			
SCP Efficiency	Pearson Correlation	.129	1		
	Sig. (2-tailed)	.305			
	N	65	65		
System Software	Pearson Correlation	**.986****	.131	1	
	Sig. (2-tailed)	**.000**	.297		
	N	**65**	65	65	
Handling Equipment	Pearson Correlation	.165	**.407****	.150	1
	Sig. (2-tailed)	.189	**.001**	.233	
	N	65	**65**	65	65

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

Source; Field data (2018)

4.5.4 Correlations between Inventory control and SCP

Lastly, the researcher wants to determine the relationship between pharmaceutical supply chain performance and inventory control attributes (level of inventory and warehouse operations). The result summaries in Table 4.27 below show that there is a close relationship between Performance quality and Inventory level by a Pearson correlation (r = $0.846^{**)}$ and p-value of (p = 0.000) of 65 respondents. This implies that the decision upon the level of inventory to keep has a direct and positive relationship towards the performance quality of drugs and medical equipments. Hence a strategic decision should be suggested based on forces of demand of the market.

Table 4.27 below show that Inventory level has direct relation with Efficiency (cost aspects). The relationship is shown by a Pearson correlation (r = $0.253^{**)}$ and p-value of (p = 0.042) of 65 respondents and hence prove a small link of relationship between the stated variable items. The results do coincide with the study of Yusuf, (2003) and Salam et al., (2016); were they study found that cost has direct impact against the decision of inventory level to keep.

Table 4.27 Correlations analysis between Inventory Control and SCP

		SCP Quality	SCP Efficiency	Inventory Level	Warehouse Operations
SCP Quality	Pearson Correlation	1			
	Sig. (2-tailed)				
	N	65			
SCP Efficiency	Pearson Correlation	.129	1		
	Sig. (2-tailed)	.305			
	N	65	65		
Inventory Level	Pearson Correlation	**.846****	**.253***	1	
	Sig. (2-tailed)	**.000**	**.042**		
	N	**65**	**65**	65	
Warehouse Operations	Pearson Correlation	.161	.429**	.151	1
	Sig. (2-tailed)	.205	.000	.235	
	N	64	64	64	64

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Source; Field data (2018)

CHAPTER FIVE

DISCUSSION OF THE FINDINGS

5.0 Introduction

This chapter discusses the findings in previous chapter based on the specific objectives of the study by connecting theories, concepts and views from other academicians and researchers as discussed in Chapter two. The study was base on four specific objectives as stated and explained below.

5.1 To assess the impact of information on performance of PSC

The first specific objective of this study was to assess the impact of information on the performance of Pharmaceutical Supply Chain (PSC). Information variable was supported by three sub-variable named; *information quality* (201), *information sharing* (202) and *information system* (203). After running factor analysis for three attributes few items were dropped due to poor loading aspect.

Then, the results of Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) was .730 while Bartlett's Test of Sphericity under Chi-Square was 228.250 and degree of freedom of 21 and significance value of ($p = 0.000$) as indicated in Table 4.8 in Chapter four. The results shown on Table 4.26 indicate R^2 has a value of 86.3%, this implies that that Performance of PSC is directly influenced by the by the Information Quality.

The results shown on Table 4.27 are also coinciding with the study of Yousefi and Abilabaei (2015) and Li and Nathan (2006) that information quality has the direct impact and influence towards the performance of Pharmaceutical supply chain. Although the researcher was not surprised to see the insignificant result of information sharing and performance as the results are coinciding with Wei and Tang (2017).

Information System has positive significant relationship with Performance of Pharmaceutical Supply Chain by Significant value of ($p = 0.000$), the results are also coinciding with the study of Carr (2016), McLaughlin et al., (2003) and Khan, Liang & Shahzad (2015).

Table 4.26 show the value of R^2 by 86.3%, it implies that Performance of Pharmaceutical Supply Chain is directly influenced by the by the Information Quality. Table 4.27 indicates the results that the Information System has positive significant relationship with Performance of Pharmaceutical Supply Chain by Significant value of .000, while Information System shows insignificant relationship on Performance of Pharmaceutical Supply Chain. The results above are coinciding with the study of Carr (2016), McLaughlin et al., (2003) and Khan et al., (2015).

Under Correlation method using Bivariate correlation technique, performance quality has been found to have a positive relationship with Information system by a Pearson correlation of $.338^{**}$ and p-value of ($p = .006$) as shown in Table 4.24 in Chapter four of analysis. Table 4.24 also show positive relationship between performance quality and quality of information as shown by a Pearson correlation of 0.929 and a p-value of ($p = 0.000$). Information system has shown positive relationship with performance quality with a Pearson Correlation of 0.318 and a p-value of ($p = .010$).

This implies that quality of information together with advanced Information system has a positive relationship with Performance quality in pharmaceutical supply chain. The results are coinciding with the most of the literatures (Almutairi & Subramanian, 2005); (Baldi & Vannoni, 2017) & (Halldorsson et al., 2015). Hence the results are related with two theories; Resource based view and Information Asymmetry theory as discussed in Chapter two (Manzouri & Rahman, 2013); (Sambasivan & Jacob, 2008).

5.2 To identify critical competences needed by employees in supply chain

The second specific objective of this study was to identify critical competences needed by employees in influencing performance in PSC. Competence variable was supported by three attributes namely; *Knowledge* (301), *Skills* (302) and *Work practices* (303). After running factor analysis for three attributes few items were dropped due to poor loading aspect.

The result of Kaiser-Meyer-Olkin Measure of Sampling Adequacy after running factor analysis for loading factors were .752 as indicated in Table 4.20 which is appropriate for this study as suggested by Pallant (2010). Bartlett's Test of Sphericity were approx.

Chi-square of 177.367 and degree of freedom of 21 while the result shows that there was significant relationship with (p = 0.000). The P-value of 0.000 for the chi-square statistics implies good absolute model fit (Nunnally, 1978).

Table 4.21 show that variable name 301 were loaded properly in component 1 with a Cronbach's Alpha value of .864 while variable 302 also load properly in component 2 with a Cronbach's Alpha value of .746 which is above .700 as required (Pallant, 2010). The acceptable standard value for Cronbach's alpha is 0.5 and above (Hair et al., 2010).

After running factor analysis, the researcher conducted multiple regressions to test the relationship among Competences attributes and Performance on Pharmaceutical supply chain. Table 4.28 shows the Model summary describing the overall contribution of the predictors (Knowledge and Handling equipments) to the dependent variable (Performance of Pharmaceutical Supply Chain). The value of R^2 was 97.2%, this implies that skills together with Knowledge are direct linked with performance of Pharmaceutical Supply Chain.

Table 4.29 indicates that Knowledge has positive relationship with Performance of Pharmaceutical Supply Chain by Significant value of .000, while Skills shows positive insignificant relationship on Performance of Pharmaceutical Supply Chain by a significant value (p = .952). The results are coinciding with the study of Meyer, Brunig & Nyhuis (2015). The study result also reflects with the presentation of Kanda (2015) that individual competences are key attribute toward performance of supply chain especially in Pharmaceutical sector.

The researcher also conducted Correlation analysis using Pearson technique. Table 4.25 show that, there is a positive relationship between Performance quality and Competence - knowledge of employees as shown by a Pearson correlation of 0.987^{**} and a p-value of (p = 0.000). This implies that there is a strong and close relationship between employee's knowledge inputs and performance quality output in Pharmaceutical supply chain. In addition, the model with significance level less than 0.05 is considered to be a good fit for the data and hence it is appropriate in predicting the influence of independent variable on dependent variable (Ndeto et al., 2016).

5.3 To examine the effect of technological infrastructure on performance of PSC

The third specific objective of this study was to examine the effect of Technological infrastructure on Performance of Pharmaceutical Supply Chain. Technological infrastructure variable were coded as (400) and was supported by three attributes namely; *system software* (401), *Handling equipment* (402) and *Security system* (403). After running factor analysis for three attributes few items were dropped due to poor loading aspect.

The results of Kaiser-Meyer-Olkin and Bartlett's Test after dropping poor loading factor were indicated in Table 4.22 in Chapter Four. The table indicate that Kaiser-Meyer-Olkin Measure of Sampling Adequacy was .687 while Bartlett's Test of Sphericity with Approx. Chi-Square with a contribution of 327.491 and degree of freedom of 28. The table also reveal that the results were significant with (p = .000). The P-value of 0.000 for the chi-square statistics implies good absolute model fit (Nunnally, 1978).

Table 4.23 show that variable 401 and 402 are properly loaded in Component 1 and 2 with an evidence of Cronbach's Alpha of .899 and .868 which is above acceptable value of .700 (Pallant, 2010). According to Hair et al., (2010), the acceptable standard value for Cronbach's alpha is 0.5 and above.

The researcher conducted regression analysis to test relationship between Technological Infrastructure and Performance of PSC. Table 4.20 show the value of R^2 of .972, implying that System Software together with Handling Equipments are direct linked with performance of Pharmaceutical Supply Chain. Table 4.21 indicates the results that the System software has positive relationship with Performance PSC by Significant value (p = .000). The results above are coinciding with the study of Kanda and Iravo (2015) and Ombok and Were (2017).

The researcher conducted correlation analysis to see the relationship usion Pearson correlation. The researcher was not surprised to see close relationship between Performance quality and system software by a Pearson correlation of **.986**** and p-value of (p = 0.000). This implies that system software installed along Pharmaceutical SC (Epicor 9) is likely to have a positive impact towards the performance quality.

The results above are coinciding with the studies discussed in previous chapters (Prasad & Sounderpandian, 2003); (Ombok & Were , 2017) & (Kanda & Iravo, 2015).

The results in Table 4.26 also show positive relationship between Handling equipment and Efficiency of Supply chain performance in pharmaceutical sector. This implies that handling equipments such as forklift, conveyor belt and stakers have ability in reducing cost of handling materials (drugs and medical equipments) in Pharmaceutical supply chain operations.

5.4 To determine the impact of inventory control on performance of PSC

The last specific objective of this study was to determine the impact of inventory control on Performance of Pharmaceutical Supply Chain (PSC). Inventory control variable were coded as (500) and was supported by three attributes namely; *warehouse operations* (501), *inventory level* (502) and *control system* (503). After running factor analysis for three attributes few items were dropped due to poor loading aspect.

The results of Kaiser-Meyer-Olkin and Bartlett's Test after dropping poor loading factor were indicated in Table 4.24 in Chapter Four. The table indicate that Kaiser-Meyer-Olkin Measure of Sampling Adequacy was .756 while Bartlett's Test of Sphericity with Approx. Chi-Square with a contribution of 327.475 and degree of freedom of 15. The table also reveal that the results were significant with (p = .000). The P-value of 0.000 for the chi-square statistics implies good absolute model fit (Nunnally, 1978).

Table 4.25 show that variable 401 and 402 are properly loaded in Component 1 and 2 as indicated in rotated Component Matrix with an evidence of Cronbach's Alpha of .948 and .825 which is above acceptable value of .700 (Pallant, 2010). According to Hair et al., (2010), the acceptable standard value for Cronbach's alpha is 0.5 and above.

The researcher conducted regression analysis to test relationship between Inventory Control and Performance of PSC. The researcher opts to use multiple regressions to test the relationship among Inventory Control attributes and performance of Pharmaceutical supply chain.

Table 4.22 describes the Model Summary and the result shows that the value of R^2 is 70.6%, this implies that inventory level together with warehouse operations are direct linked with performance of Pharmaceutical Supply Chain. The results are directly coinciding with the study of (Yousefi & Alibabaei, 2015) and (Salam et al., 2016).

Lastly, the researcher conducted correlation analysis to describe the strength and direction of relationship between two variable using Pearson correlation techniques as suggested by Pallant, (2010). The result summaries in Table 4.27 show that there is a close relationship between Performance quality and Inventory level by a Pearson correlation of **.**846** and p-value of (p = 0.000) of 65 respondents.

This implies that the decision upon the level of inventory to keep has a direct and positive relationship towards the performance quality of drugs and medical equipments. Hence a strategic decision should be suggested based on forces of demand of the market.

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.0 Introduction

This chapter discusses the recommendations, conclusions and suggests areas for further research. It commences with the conclusions, recommendations, finally the need for further research is given.

6.1 Conclusions

The study was aimed at determining the factors that influence performance in Pharmaceutical Supply Chain; A case of Medical Stores Department (MSD) in Dar es Salaam Head quarter. Four factors was adopted from various literatures and supported by theories and concepts as discussed in previous Chapters. After reading and reviewing various literatures, analyzing and discussing the findings, the study has tried to come up with the following conclusions as explain in below sections.

6.1.1 Impact of Information on PSC

Information variable was concluded that quality of information and information system are precise attributes that support the performance of PSC. It has been seen that quality of information is directly connected with information system and hence organization has to employ advanced system that support supply chain operation. For the case of MSD organization, modern computerized system has high degree to improve the performance of PSC and hence allow customers, Manufactures to share information in efficiency manner.

6.1.2 Competences in PSC

Individual or employees competences are critical instruments in supply chain operation, since manpower and effort are termed are potential attributes in performing supply chain operations. The study has revealed that Knowledge together with Skills is likely to have the direct impact on PSC.

6.1.3 Effect of Technological Infrastructure on PSC

Handling equipments are typical solution towards advanced supply chain operations. In Pharmaceutical supply chain, handling equipment plays a major role in supporting stores operations. The use of forklift, stalker, pallets and other associated instruments and equipment are likely to improve operations alongside Pharmaceutical supply chain and hence improve the performance.

6.1.4 Effect of Inventory Control on PSC

Inventory plays a major role in any organization; also in Pharmaceutical sector inventory take a large portion in terms of storage and supply drugs and pharmaceutical equipments. The study has found that appropriate inventory level and control system are direct related to the performance of PSC. Hence, MSD has to make appropriate inventory decision based on critical factors that will govern long-term basis.

Since, the Pharmaceutical sector and discipline is playing a very major role in Tanzania and any other country as it affects the health aspect of the people. The results concluded that Information - *information quality*, Employees competences - *knowledge*, Technological infrastructure - *system software* and Inventory control – *level of inventory* are critical attributes that support independent variable in influencing Performance in PSC.

6.2 Contribution of the Study

This study will give and provide new lights and insights to academicians and researchers in developing more concepts and model where little research has been done in Pharmaceutical SC. The researcher believes that this study will be helpful for practitioners in pharmaceutical supply chain to evaluate their performance and take critical corrective measures and actions to improve the entire performance of the SC.

6.3 Study Implications

The findings of the study provide implications to other institutes, agencies, supplier, manufacturers and transport companies alongside supply chain operations by providing knowledge base and professional contribution in improving performance especially in Pharmaceutical sector.

6.4 Study Recommendation

Based on research findings, the following are proposed recommendation that should be taken into consideration in order to ensure performance in PSC

To policy maker; policies have great impact on the performance of PSC in regional, zonal and country level. Policy makers should put more emphasis on enforcing policies that improve performance of PSC operations by addressing the benefits and weakness experienced in the supply chain of drugs and medical facilities.

To the practitioners; competences are valuable resources that posses advantageous position in today complex and competitive market. There is need for actors alongside PSC to have appropriate skills and knowledge that can possess efficiency and effectiveness in PSC operations

6.5 Area for Further Research

As the study revealed that four factors together with their attributes has a significant relationship on Performance of PSC. The researcher recommended that future research could concentrate on assessing the contribution of four discussed factor towards the growth or stability of Pharmaceutical Supply Chain in widely content.

REFERENCES

Abldullah , R., & Rayamah, M. N. (2017). Supply Chain Integration; Level of existence in Green Supply Chain Management Practices among Malaysia ISO 14001 Manufacturing Firm. *International Journal of Supply Chain Management. 6(2)*, 243-249.

Achuora, J. O., Arasa, R. M., Nzioki, W., Ochiri, G., & Muangangi, P. (2012). Factors Affecting Distribution Performance for Pharmaceutical Products in Kenya's Public Sector. *IMS Manthan, 7(2),* 55-62

Akyuz , G. A., & Erkan, T. E. (2010). Supply Chain Performance measurement; a literature review. *International Journal of Production Research. 48(17)*, 5137-5155.

Almutairi, H., & Subramanian, G. H. (2005). An Empirical Application of the Delone and Mclean Model in Kuwaiti Private Sector. *Journal of Computer Information Systems, 45(3)*, 113-122.

Amirkhani, A. H., Nazeryani, M. A., & Faraz, M. (2016). The Effect of Succession Planning on the Employees' Performance based on the Balance Score Card with Regard to the Mediating Role of Commitment. *Research Journal of Management Reviews. 2 (1)*, 42-51.

Anand, N., & Grover, N. (2015). Measuring retail supply chain performance; Theoretical model using key performance indicators (KPIs), Benchmarking. *An International Journal, 22(1)*, 135-166.

Azzi, A., Persona, A., Sgarbossa, F., & Bonin, M. (2013). Drug inventory management and distribution; outsourcing losistics to third-party providers. *Strategic Outsourcing: An International Journal, 6(1)*, 48-64.

Baldi, S., & Vannoni, D. (2017). The impact of centralization on pharmaceutical procurement prices; the role of institutional quality and corruption. *Regional Studies*, 51(3), 426-438.

Barasa, P. W., Simiyu, G. N., & Iravo, M. A. (2015). The impact of supply chain collaboration practice on the performance of steel manufacturing companies in Kenya. *European Journal of Logistics Purchasing and Supply Chain Management*, 3(2), 28-39.

Barney, J. B. (2011). Firm resources and sustainable competitive advantage. *Journal of Management, 17 (1)* , 99-120.

Barwa, T. M. (2015). Inventory Control as an Effective Decision-Making Model and Implementations for Company's Growth. *International Journal of Economics, Finance and Management Sciences* , 3(5): 465-472.

Bigliard, B., & Bottani, E. (2014). Supply chain performance measurement: a literature review and pilot study among Italian manufacturing companies. *International Journal of Engineering, Science and Technology, 6(3)*, 1-16.

Boscia, M. W., & McAfee, B. R. (2008). Using Balance Scorecard Approach: A Group Exercise. *Developments in Business Simulation and Experiential Learning. 35(1)*

Carr, A. S. (2016). Relationship among Information Technology, Organizational Cooperation and Supply Chain Performance. *Journal of Managerial Issues, 28(4),* 171-190.

Carter, C. R., Rogers, D. S., & Choi, Y. T. (2015). Toward the theory of the Supply Chain. *Journal of Supply Chain Management. 15(2)* .

Ellinger, A. E., & Ellinger, A. D. (2014). Leveraging Human Resource development expertise to improve supply chain manager's skills and competencies. *European Journal of Training and Development. 38(1\2)* , 118-135.

Gawankar, S. A., Kamble , S., & Raut, R. (2017). An investigation of the relationship between supply chain management practices (SCMP) on supply chain performance measurement (SCPM) of Indian retail chain using SEM. *Benchmarking: An International Journal, 24(1*), 257-295.

George, D., & Mallery, P. (2003). *SPSS for windows step by step: A simple guide and reference.* Boston: Allyn and Bacon.

Gopal, P. C., & Thakkar, J. (2012). A review on supply chain performance measures and metrics: 2001-2011. *International Journal of Productivity and Performance Management, 61(5),* 518-547.

Gunasekaran, A., & Irani, Z. (2010). Editorial: modelling and analysis of outsourcing decisions in global supply chains. *International Journal of Production Research, 48(2*), 301-304.

Hair, J. F., Black, W. C., & Anderson, R. E. (2010). *Multivariate Data Analysis.*

Halldorsson, A., Hsuan, J., & Kotzab, H. (2015). Complementary theories to supply chain management revisited - from borrowing theories to theorizing. *Supply Chain Management: An International Journal, 20(6),* 574-586.

Howard, J. D. (2009). *Implementation of RFID in the Pharmaceutical Industry.*

Ip, W. H., Chan, S. L., & Lam, C. Y. (2011). Modeling Supply Chain Performance and Stability. *Industrial Management & Data Systems,111(8),* 1332-1354.

Islam, M. Z., Jasimuddin, S. M., & Hassan, I. (2015). Organizational Culture, Structure, Technology Infrastructure and Knowledge Sharing; Empirical evidence from MNCs based in Malaysia. *VINE, 45(1),*67-88.

Jabbour, C. J., & De Jabbour, A. B. (2016). Green Human Resource Management and Green Supply Chain Management; Linking two emerging agendas. *Journal of Cleaner Production. 112*, 1824-1833.

Jamal, A., & Kamuzora, F. (2008). *Research Methods for Business and Social Studies.* Mzumbe: Mzumbe Book Project .

Kanda, M. K., & Iravo, M. A. (2015). Access Factors Affecting Supply Chain Efficiency of Medical Supplies in Public health centres in Kenya. A case study of Public health centres in Elgeyo Marakwet Count. *International Journal of Academic Research in Accounting, Finance and Management Sciences.5(2),* 32-41.

Keane, R. H., Herbohn, J., & Slaughter, G. (2010). Theoretical Backgrund of Supply Chain Management and Potential Supply Chain of North Queensland Timber Industry.

Kiage, J. O. (2013). Factors Affecting Procurement Performance: A Case of Ministry of Energy. *International Journal of Business and Commerce, 3(1),* 54-70.

Kocaoglu, B., Gulsun, B., & Tanyas, M. (2013). A SCOR based approach for measuring a benchmarkable supply chain performance. *Journal of Intelligent Manufacturing. 24(1*), 113-132.

Kothari, C. R. (2004). *Research methodology: Methods and Techniques 2nd edition.* New Delhi: Age International Publishers Limited.

Lavassani, K., Movehedi , B., & Kumar, V. (2008). *Evolution of supply chain theories; A comprehensive Literature Review.*

Li, S., Nathan, B. R., Nathan, T. R., & Rao, S. S. (2006). The impact of supply chain management practices on competitive advantage and organizational performance. *Internantional Journal of Management Science, (34*), 107-124.

Lin, C. Y. (2007). Supply Chain Performance and the adoption of new logistics technologies for logistics service provider on Taiwan. *Journal of Statistics and Management System.10(4*), 519-543.

Lu, D. (2011). *Fundamentals of Supply Chain Managemeny.* Ventus Publishing ApS.

MacCarthy, B. L., Blome, C., Olhanger, J., Srai, J. S., & Zhao, X. (2016). Supply Chain Evolution - theory, concepts and science. *International Journal of Operations and Production Management. 36(12*), 1696-1718.

Manzouri, M., & Rahman, M. N. (2013). Adaptation of theories of supply chain management to lean supply chain management. *International Journal of Logistics systems and Management, 14(1)* .

Martin, R. P., & Patterson, W. J. (2009). On measuring company performance within a supply chain. *International Journal of Production Research. 47(9)*, 2449-2460.

McLaughlin, J., Motwani, J., Madan, M. S., & Gunasekaran, A. (2003). Using Information Technology to improve downstream supply chain operations: a case study. *Business Process Management Journal, 9(1*), 69-80.

Mentzer, J. T., DeWitt, W., Keebler, J. S., Min, S., Nix, N. W., Smith, C. D., et al. (2001). Defining Supplychain Management. *Journal of Business Logistics, 22(2*), 1-25.

Mugenda, M. O., & Mugenda , A. G. (2008). *Research Methods: Quantitative and Qualitative Approches.* Nairobi, Kenya: Act Press.

Musabila, A. K. (2012). *The Determinants of ICT Adoption and Usage among SMEs: The Case of the Tourism Sector in Tanzania.* Amsterdam: VRIJE Universiteit, Academisch Proefschrift.

Mwangi, E. W., & Kagiri, A. (2016). Effects of e-Procurement on Procurement performance in hospitality industry in Kenya; Case of Sarova chain of hotels. *International Academy Journal of Procurement and Supply Chain Management.* 2(2), 1-19.

Mwita, P., & Mwaighacho, S. (2017). Efect of E-procurement on Procuremnt Performance in Kenya Port Authority. *Imperial Journal of Interdisciplinary Research* , 3(5).

Ndeto, C. K., Dr Amuhaya, M. I., & Prof. Sakwa, M. (2016). The effect of Material Acquision Procedures on Inventory Management Performance in Government Ministries in Kenya. *International Journal of Sciences Management and Entrepreneurship, 3 (2),* 120 - 142.

Nunnally, J. C. (1978). *Psychometric Theory, 2nd Edition.* New York, NY: McGraw Hill.

Nurmandi, A., & Kim, S. (2017). Making e-procurement work in a decentralized procurement system. *International Journal of Public Sector Management*, 28(3),198-220.

Nyaga, J. N., & Kihara, D. (2017). Factors Influencing Implementation of Procurement Plans in Public Hospitals in Kenya: A Case of Kenyatta National Hospital. *The Strategic Journal of Business & Change Management. 4(26)*, 445 - 460.

Okuku, B. A., & Dr. Were , S. (2017). Employee involvement on performance of Insurance companies in Kenya; a case of CIC Insurance Group. *International Journal of Social Sciences Management and Entrepreneurship. 4 (2)*, 41-58.

Ombok, J. M., & Were , S. (2017). Effect of Information Technology on Human Resource Management in the Banking Industry in Kenya; A case of KCB Bank Kenya Limited. *International Journal of Social Sciences Management and Entrepreneurship, 4 (2)* , 199-135.

Pallant, J. (2010). *SPSS SURVIVAL MANUAL: A step by steo guide to data analysis using SPSS, 4th edition.* Maidenhead - Berkshire, England: McGraw - Hill Education.

Parmata, U. M., Sankara, R. B., & Rajashekhar, B. (2016). Measuring service quality in pharmaceutical supply chain – distributor's perspective. *International Journal of Pharmaceutical and Healthcare Marketing,10(3),* 258-284.

Prajogo, D., & Olhager, J. (2012). Supply chain integration and performance: The effects of longterm relationship, information technology and sharing and logistics integration. *International Journal of Production Economics. 135* , 514-522.

Prasad, S., & Sounderpandian, J. (2003). Factor influencing global supply chain efficiency; Implication for information system. *An International Journal of Supply Chain Management, 18(3),* 241-250.

Rana, S., Osman, A., Bahari, A. B., & Solaiman, M. (2015). Determinant of Supply Chain Performance; A Strategic point of View. *International Journal of Supply Chain Management*, 4(3), 94-102.

Rotich, K. G., & Okello, B. (2015). Analysis of use of e-Procurement on performance of the procurement functions of county governements in Kenya. *International Journal of Economics, Commerce and Management*, 3(6).

Salam , A., Panahifar, F., & Byrne, P. (2016). Retail supply chain service levels; the role of inventory storage. *Journal of Enterprise Information Management. Vol. 29, No. 6* , pp. 887-902.

Sambasivan, M., & Jacob, G. (2008). An Empirical Study on the Impact of Supply Chain Practices on Competitive Position of MNEs in Malaysia. *International Journal of Economics and Management. 2(2)* , 369-394.

Sangari, M. S., Hosnavi, R., & Zahedi, M. R. (2015). Impact of Knowledge Management Processes on Supply Chain Performance. *International Journal of Logistics Management. 26(3*), 603-626.

Sangwa, N. R., & Sangwan, K. S. (2018). Development of an integrated performance measurement framework for lean organizations. *Journal of Manufacturing Technology Management, 29(1)*, 41-84.

Saunders, M., Lewis, P., & Thornhill, A. (2009). *Research methods for business stududents 5th edition.* Prentice Hall: Pearson Education Limited.

Schrettle, S., Hinz, A., Scherrer, R., & Friedli, T. (2014). Turning sustainability into action: explaining firms' sustainability efforts and their impact on firm performance. *International Journal of Production Economics. 127,* 73-84.

Shou, Y., & Wang, W. (2017). Multidimensional competences of supply chain managers: an empirical study. *Enterprise Information Systems, 11(1),* 58-74.

Singh, R. K., Kumar, R., & Kumar, R. (2016). Strategic issues in pharmaceutical supply chain; a review. *International Journal of Pharmaceutical and Healthcare Marketing. 10(3)* .

Sinha, A., & Kotzab, H. (2012). *Supply Chain Management: A Managerial Approach.* New Delhi: McGraw-Hill Offices.

Somashekhari, I., Raju, J., & Patif, H. (2013). Reducing Bullwhip effect in fresh food vegetables Supply Chain Management; A strategic approach for inclusive Growth. *International Journal of Supply Chain Management*, 2(3).

Sounders, M., Lewis, P., & Thornhill, A. (2009). *Research methods for business students 5th edition* . Prentice Hall: Pearson Education Limited.

Suleiman, M. (2015). Adoption of E-Procurement and Value Addition; Tanzania context. *European Journal of Business and Management*, 7(14).

Supply Chain Council. (2012). *Supply Chain Operations Reference Model. Revision 11.0.* United States of America: SCOR®. ISBN 0-615-20259-4.

Themistocleous, M., Irani, Z., & Love, P. E. (2004). Evaluating the intergration of supply chain information systems: A case study. *European Journal of Operational Research 159* , 393-405.

Vachon, S., & Klassen, R. D. (2008). Environmental Management and Manufacturing Performance; the role of collaboratiion in the Supply Chain. *International Journal of Production Economics. 111. (2)* , 299-315.

Vaidya, O., & Hudnurkar, M. (2013). Multi-creteria supply chain performance evaluation; An Indian chemical industry case study. *International Journal of Productivity and Performance Management*,293-316.

Vlachos, I. P. (2014). A hierarchical model of the impact of RFID practices on retail supply chain performance. *Expert Systems with Applications, 41 (1)* , 5-15.

Vurro, C., & Perrini , F. (2009). Shaping sustainable value chains: network determinants of supply chain governance modes. *Journal of Business Ethics. 90*, 607-621.

Wei, K.-M., Tang, Y.-T., Kao, Y.-C., Tseng, L.-C., & Hung, H. (2017). Using an updated Delone and McLean model to assess the success of implementing the ward cleaning logistics system in a medical center. *Journal of Statistics and Management Systems, 20(5),* 965–976.

Yan, B., & Wang , L. (2008). Supply chain management and clusters: a case study on Guangdong automobile clusters. *International Seminar on Business and Information Management, IEEE. 1* , 364-367.

Yousefi, N., & Alibabaei, A. (2015). Information flow in Phamaceutical Supply Chain. *Iranian Journal of Phamaceutical Research* , 14(4), 1299-1303.

Yusuf, A. M. (2003). *Inventoty Control and Economic Order Quantity in National Electricity Power Authority (NEPA).* St Clements University.

Zepeda, D. E., Nyaga, G. H., & Young, G. J. (2016). Supply chain risk and management and hospital inventory: Effect of system affiliation. *Journal of Operation Management. 44*, 30-47.

Zhang, X. (2012). *The Role of ICT in Supply Chains.* University of Groningen.

APPENDICES

APPENDIX I

QUESTIONNAIRE **No.; ……..**

Dear respondents,

I, **Enock Fredrick**, a student from Mzumbe University (Morogoro main campus) pursuing Masters of Social Science in Procurement and Supply Chain Management pursuing a research on Pharmaceutical Supply Chain. I kindly request you to respond to my questions which will help me to write a Research Report which is part of my study at the University.

The purpose of this study is to determine factors influencing performance in Pharmaceutical Supply Chain; Your cooperation on responding the questions shall be valued and appreciated.

PART A; BACKGROUND INFORMATION (100)

For each question below please indicate the appropriate **LETTER** to the box that which best describes your answer on the organization.

---

101. What is your gender?(respondent gender)

a. Female
b. Male

102. Which of the following categories best describes your age?

a. Below 25 Years
b. 25 – 30 Years
c. 31 – 35 Years
d. 36 – 40 Years
e. Above 40 Years

103. What is your highest Education Qualification?

a. Primary level
b. Secondary level
c. Certificate level
d. Diploma level
e. Bachelor degree level
f. Masters level
g. PhD holder

104. Which field/department or section do you belong? (respondent position)

a. ICT department
b. Finance department
c. Demand and Planning
d. Procurement department
e. Clearing and Forwarding
f. Sales department
g. Human resource
h. Warehouse section
i. Quality assurance
j. Distribution section

105. How long have you been working with MSD? (Job Experience)

a. 15 + Years
b. 11 – 15 Years
c. 6 – 10 Years
d. 1 – 5 Years
e. 1 – 12 Months

PART II; INFORMATION (200)

For each statement below please **circle** the appropriate **number** that best describes level of agreement or disagreement on the organization.

[Likertscale; Strongly Disagree (1), Disagree (2), Neutral (3), Agree (4), Strongly Agree (5)**]**

	Impact of Information on Supply Chain Performance (SCP)	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
201.	**Information quality**					
201(a)	Our organization exchange timely information with trading partners such as Local Purchase Order (LPO) and delivery note.	**1**	**2**	**3**	**4**	**5**
201(b)	Our organization exchange accurate information with trading partners such as order management.	**1**	**2**	**3**	**4**	**5**
201(c)	Our organization exchange complete demand and planning information with trading partners.	**1**	**2**	**3**	**4**	**5**
201(d)	Our organization exchange adequate sales management information with trading partners.	**1**	**2**	**3**	**4**	**5**
201(e)	Our organization exchange reliable operational budget information with trading partners.	**1**	**2**	**3**	**4**	**5**
202.	**Information sharing**					
202(a)	Our organization openly shares information with suppliers and customers.	**1**	**2**	**3**	**4**	**5**
202(b)	Our suppliers and customers openly share information with us.	**1**	**2**	**3**	**4**	**5**
202(c)	The information shared by participants (suppliers, manufacturers an customers) in our supply chain is available on a real-time basis.	**1**	**2**	**3**	**4**	**5**
202(d)	Our organization is able to respond to customer needs by sharing information with supplier.	**1**	**2**	**3**	**4**	**5**
202(e)	Information distortion is minimized throughout our supply chain.	**1**	**2**	**3**	**4**	**5**
203.	**Information system**					
203(a)	As a part of our supply chain efforts we have worked to develop an information system that is compatible with the systems of our suppliers and customers.	**1**	**2**	**3**	**4**	**5**
203(b)	Using information system, errors are highly to be minimized and improve accuracy of operation	**1**	**2**	**3**	**4**	**5**
203(c)	The current Information system is ease of use and has consistency in documentation	**1**	**2**	**3**	**4**	**5**
203(d)	Information system increases the level of cooperation/interaction between functional areas	**1**	**2**	**3**	**4**	**5**
203(e)	Information system enhances effectiveness of supply chain operations	**1**	**2**	**3**	**4**	**5**

PART III; EMPLOYEES COMPETENCES (300)

For each statement below please **circle** the appropriate **number** that best describes level of agreement or disagreement on the organization.

[Likertscale; Strongly Disagree (1), Disagree (2), Neutral (3), Agree (4), Strongly Agree (5)**]**

300.	Impact of Employees Competences on Supply Chain Performance (SCP)	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
301.	**Knowledge**					
301(a)	My organization has mechanisms for creating and acquiring knowledge from different sources such as employees, customer and business partners.	**1**	**2**	**3**	**4**	**5**
301(b)	My organization has regular meetings, training sessions and conference for knowledge sharing and transfer.	**1**	**2**	**3**	**4**	**5**
301(c)	My organization has mechanism for filtering, cross-listing and integrating different sources and types of knowledge.	**1**	**2**	**3**	**4**	**5**
301(d)	My organization rewards employees for new idea and knowledge.	**1**	**2**	**3**	**4**	**5**
301(e)	My organization has mechanism to protect knowledge from inappropriate or illegal use inside and outside of the organization	**1**	**2**	**3**	**4**	**5**
302.	**Skills**					
302(a)	Most of the MSD staffs are familiar with the use of computerized system i.e. EPICOR 9 system	**1**	**2**	**3**	**4**	**5**
302(b)	Our employees have adequate procurement skills	**1**	**2**	**3**	**4**	**5**
302(c)	Our employees have appropriate supply management skills	**1**	**2**	**3**	**4**	**5**
302(d)	My organization value employees skills needed in supply chain operations	**1**	**2**	**3**	**4**	**5**
302(e)	MSD staffs are frequently subjected to training appropriate to their field	**1**	**2**	**3**	**4**	**5**
303.	**Work practices**					
303(a)	our organization ensure that employee get necessary incentives in order to motivate them	**1**	**2**	**3**	**4**	**5**
303(b)	Our organization assign duties and responsibility in workplace	**1**	**2**	**3**	**4**	**5**
303(c)	Our organization provide safety measures and equipment's in workplaces	**1**	**2**	**3**	**4**	**5**
303(d)	Our organization provide adequate security measures in workplaces	**1**	**2**	**3**	**4**	**5**
303(e)	Our organization provide conducive environment to ensure employees are satisfied in workplaces	**1**	**2**	**3**	**4**	**5**

PART IV; TECHNOLOGICAL INFRASTRUCTURE (400)

For each statement below please **circle** the appropriate **number** that best describes level of agreement or disagreement on the organization.

[Likertscale; Strongly Disagree (1), Disagree (2), Neutral (3), Agree (4), Strongly Agree (5)**]**

400.	Impact of Technology Infrastructure on Supply Chain Performance (SCP)	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
401.	**System software**					
401(a)	Our organization provide capacity building on the use of system software	**1**	**2**	**3**	**4**	**5**
401(b)	System software provides assurance in supply chain operations.	**1**	**2**	**3**	**4**	**5**
401(c)	With the help of system software operations are performed in respective time.	**1**	**2**	**3**	**4**	**5**
401(d)	Technological tools (barcode reader, RFID) has simplified supply chain operations in the organization and service quality	**1**	**2**	**3**	**4**	**5**
401(e)	System software such as Epicor of the supply chain process (Epicor 9)	**1**	**2**	**3**	**4**	**5**
402.	**Handling equipment**					
402(a)	MSD staffs have adequate knowledge on the use of technical equipment and machines	**1**	**2**	**3**	**4**	**5**
402(b)	Handling equipment's allow our organization to cut down indirect labor cost	**1**	**2**	**3**	**4**	**5**
402(c)	Our organization maximizes space utilization using material handling equipment such as forklift and pallets.	**1**	**2**	**3**	**4**	**5**
402(d)	Accidents are likely to be minimized using material handling equipment's	**1**	**2**	**3**	**4**	**5**
402(e)	Handling equipment such as conveyor belt improve efficiency in warehouse operations	**1**	**2**	**3**	**4**	**5**
403.	**Security system**					
403(a)	Our organization has sufficient security system in warehouse zone	**1**	**2**	**3**	**4**	**5**
403(b)	Our organization has employed advanced security system such as CCTV cameras to regulate and control store movements	**1**	**2**	**3**	**4**	**5**
403(c)	Warehouse products, drugs and medicines are direct controlled by	**1**	**2**	**3**	**4**	**5**
403(d)	Control room provide assurance in terms of timely reporting on theft issues	**1**	**2**	**3**	**4**	**5**
403(e)	Our organization has enter in contractual relationship with security company and hence improve assurance of service	**1**	**2**	**3**	**4**	**5**

PART V; INVENTORY CONTROL (500)

For each statement below please **circle** the appropriate **number** that best describes level of agreement or disagreement on the organization.

[Likertscale; Strongly Disagree (1), Disagree (2), Neutral (3), Agree (4), Strongly Agree (5)**]**

500.	Impact of Inventory management on Supply Chain Performance (SCP)	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
501.	**Warehouse operations**					
501(a)	Receiving and issuing are done under respective documents	**1**	**2**	**3**	**4**	**5**
501(b)	MSD staffs understand and perform inventory activities in effective manner.	**1**	**2**	**3**	**4**	**5**
501(c)	Inventories (stock) are located to their respective places under a certain criteria. i.e. (classification method in location process)	**1**	**2**	**3**	**4**	**5**
501(d)	Damage, scrap and waste are well identified and reported.	**1**	**2**	**3**	**4**	**5**
501(e)	MSD provide protective initiatives to ensure the safety of his staff	**1**	**2**	**3**	**4**	**5**
502.	**Inventory level**					
502(a)	As a result of inventory level control, Our organization has increased its average sales	**1**	**2**	**3**	**4**	**5**
502(b)	Our organizations have improved its average replenishment cycle through making appropriate decision such as lead time management.	**1**	**2**	**3**	**4**	**5**
502(c)	Taking appropriate Inventory control methods has help to increase overall service level.	**1**	**2**	**3**	**4**	**5**
502(d)	Through demand and planning decisions, our organization has the ability to maintain and sustainable inventory level and needs.	**1**	**2**	**3**	**4**	**5**
502(e)	Our organization has minimized logistics costs due to proper planning of inventory level.	**1**	**2**	**3**	**4**	**5**
503.	**Inventory control system**					
503(a)	Our organization has improved accuracy rate using inventory control methods such as batch control and stock review.	**1**	**2**	**3**	**4**	**5**
503(b)	Warehouse system such as epicor, enhances efficiency of the supply chain process	**1**	**2**	**3**	**4**	**5**
503(c).	The current inventory control system is ease of use and has consistency in documentation	**1**	**2**	**3**	**4**	**5**
503(d)	Inventory control system increases the level of cooperation/interaction between functional areas	**1**	**2**	**3**	**4**	**5**
503(e)	The current inventory system enhances effectiveness of the supply chain process	**1**	**2**	**3**	**4**	**5**

PART VI; SUPPLY CHAIN PERFORMANCE (800)

For each statement below please **circle** the appropriate **number** that best describes level of agreement or disagreement on the organization.

[Likert scale; Strongly Disagree (1), Disagree (2), Neutral (3), Agree (4), Strongly Agree (5)**]**

800.	**Supply Chain Performance**	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
801.	**Quality**					
801(a)	Our company product quality provision has improved	**1**	**2**	**3**	**4**	**5**
801(b)	Our company demand planning quality has improved	**1**	**2**	**3**	**4**	**5**
801(c)	Our supplier product quality has improved	**1**	**2**	**3**	**4**	**5**
801(d)	Our supplier delivery time has improved	**1**	**2**	**3**	**4**	**5**
801(e)	Our company distribution services has improved	**1**	**2**	**3**	**4**	**5**
802..	**Efficiency**					
802(a)	Our organization operational cost has improved	**1**	**2**	**3**	**4**	**5**
802(b)	Our organization inventory cost has improved	**1**	**2**	**3**	**4**	**5**
802(c)	Our organization transport cost has improved	**1**	**2**	**3**	**4**	**5**
802(d)	Our organization labor cost has improved	**1**	**2**	**3**	**4**	**5**
802(e)	Our firm has precise supply chain cost knowledge and control mechanism.	**1**	**2**	**3**	**4**	**5**
803.	**Responsiveness**					
803(a)	Our organization supply chain has the ability to deliver product on-time to final customer.	**1**	**2**	**3**	**4**	**5**
803(b)	Our organization supply chain has the ability to deliver shipments on variable size on a frequent basis to final customers.	**1**	**2**	**3**	**4**	**5**
803(c)	Our organization supply chain has the ability to deliver zero-defect products to the final customer.	**1**	**2**	**3**	**4**	**5**
803(d)	Our organization supply chain has the ability to deliver value-added services to the final customer.	**1**	**2**	**3**	**4**	**5**
803(e)	Our organization supply chain has the ability to minimize waste.	**1**	**2**	**3**	**4**	**5**

APPENDIX II

TIME PLAN OF THE RESEARCH

SN.	Activity	Duration							
		2017				2018			
		Sept	Oct	Nov	Dec	Jan	Feb	Mar	Aug
1.	Preparation and submission of proposal								
2.	Data collection								
3.	Data processing and data analysis								
4.	Discussion of the findings and submission of the research report								

OTHER ATTACHMENTS