ENTERPRISE RESOURCE PLANNING (ERP) SYSTEM AND SUPPLY CHAIN PERFORMANCE

A CASE STUDY OF JOINT MEDICAL STORES

BY

ADAYO DAVID

REG. No. 14/U/13816/GMSC/PE

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DECEMBER, 2018

DECLARATION

I, **Adayo David**, hereby declare to the best of my knowledge that, the work presented in this research proposal entitled ***"Enterprise Resource Planning (ERP) and Supply Chain Performance"; A Case Study of Joint Medical Stores (JMS)***" is original and has never been presented in any university or other institution of higher learning for any award.

Signature:..... Date: 06/Dec/2018

ADAYO DAVID

14/U/13816/GMSC/PE

APPROVAL

This is to certify that this research titled ***"Enterprise Resource Planning (ERP) and Supply Chain Performance"; A Case Study of Joint Medical Stores (JMS)***" has been carried out by **Adayo David** under our supervision and has been submitted with our approval in partial fulfillment of the requirements for the award of the degree of Master of Science in Supply Chain Management of Kyambogo University.

Signature:..... **Date:** 6th December 2018

DR. OBANDA PETER

PRINCIPAL SUPERVISOR

Signature:..... **Date:** 07/12/2018

DR. FRANCIS SSENNOGA

SECOND SUPERVISOR

DEDICATION

I dedicate this research to the Almighty God who always blesses me in all my endeavors and to my parents, wife and brother who has always encouraged me.

In a special way I want to thank the staff of Joint Medical Stores for their acceptance, substance, direction and love offered during data collection. May the Almighty God reward themabundantly.

ACKNOWLEDGEMENTS

I extend my sincere appreciation to the Almighty God for his love and kindness that has seen me through this study.

Appreciation to my Supervisors Dr. Obanda Peter, Dr. Francis Ssennoga and Mr. Pule Samuel for all the wisdom and guidance they offered to me and not forgetting the entire staff of the Kyambogo University who in one way or another contributed to the success of this work, your contribution can never be quantified but will always be reminiscent whenever I read this report.

Great thanks to management and staff members of JMS for their time and for honestly participating in the study, without their input this study would not have been successful.

Great thank to my entire family members especially my daddy, Mum, aunts, uncles sisters, brothers for their support, encouragement, and love they showed me. I thank my parents for sacrificing the little they had, and invested in my education. This sacrifice that you made failed in other peoples' homes. Thank you for looking after me and enabling me to acquire a lifelong investment.

I would like to thank my friends, course mates and all members of the various discussion groups to which I belonged to, for their invaluable efforts and advice which saw me through to the final copy of this report and throughout the time in University.

Thank you all.

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LIST OF ACRONYMS

DRP	Distribution Requirement Planning
DPM	Distribution Process Management
EDI	Electronic Data Interchange
EPRC	Economic Policy Research Centre
ERP	Enterprise Resource Planning
IS	Information Systems
IT	Information Technology
JMS	Joint Medical Stores
KPI	Kampala Pharmacy Industry
LAN	Local Area Network
LIS	Logistics Information System
MoH	Ministry of Health,
MRP	Material Resource Planning
NGO	Non-Governmental Organisation
NMP	National Medicines Policy
NPSSP	National Pharmaceutical Sector Strategic Plan
SCM	Supply Chain Management
UCMB	Uganda Catholic Medical Bureau
UPMB	Uganda Protestant Medical Bureau
EMHS	Essential Medicines and Health Supplies
GH	General Hospitals
HC	Health Center
HF	Health Facility
IMT	Inventory Management Team
PDU	Procurement Disposal Unit
RRH	Regional Referral Hospital

ABSTRACT

The purpose of the study was to examine the effect of Enterprise Resource Planning (ERP) Systems and Supply Chain Performance using JMS as the case study. Specifically the study undertook to examine the effect of Enterprise Resource Planning system configuration, implementation and evaluation on supply chain performance at Joint Medical Stores. The study used a case study design adopting qualitative and quantitative approaches. Data was collected from a sample of JMS staff who were pharmacists, PDU, warehouse, customer care and logistics staff. The study found a positive significant relationship between ERP and supply chain performance and it was the most significant predictor of the variance in supply chain performance. The study found a positive significant relationship between ERP system implementation and supply chain performance at JMS implying that ERP system implementation positively affect supply chain performance especially where the staff use the system to complete reliable upstream supply chain data, distribution process management, retail and e-commerce as well as for back office activities and it was the second most significant predictor of the variance in supply chain performance at JMS. There was no significant relationship between ERP system evaluation and supply chain performance. To enhance medical supply chain performance, the management of JMS and related firms should Task the ERP developer/vendor to adequately identify user needs and configure the ERP software to support upstream supply chain undertakings, and distribution process management activities at JMS; task the Vendor to strengthen the ERP system reliability to provide consistent, real time and up to date data on medical supplies; recruit more ERP specialists to offer internal technical expertise for promptly trouble shooting ERP system failures.

CHAPTER ONE

INTRODUCTION

1.0 Background to the Study

This chapter presents the background to study, the purpose of the study, the statement of the problem, the objectives of the study, research questions, the scope, definition of key words and significance of the study.

1.1.0 Historical background

The rapid growth of information and communication technologies (ICT) motivated by microelectronics, computer hardware and software systems have influenced all facets of computing applications across organization and sectors. This was on the realization that management needed efficient information systems to improve competitiveness by cost reduction and better logistics (Gunasekaran, et al., 2009; Adam, 2015).

Enterprise Resource Planning (ERP) systems solutions date back to the 1960s and specifically from accounts and inventory management when manufacturing organizations increasing faced with the challenge of monitoring production and sales operations (Jacobs & Weston, 2007; Elragal & Haddara, 2012). ERPs as part of the wider information system explosion were sought to as solution of integrated data management necessary to support functional units operations especially when the data would be fully integrated to facilitate decision making and planning (Jacobs & Weston, 2007; Motiwalla & Thompson, 2008).

In the 1970s, ERP systems were similar to Manufacturing Resource Planning (MRP) systems and were used by other types of organizations. In the 1980s new software systems called Manufacturing Resources Planning (MRP II) were introduced with emphasis on optimizing manufacturing processes

by synchronizing the materials with production requirements. MRP II included areas such as shop floor and distribution management, project management, finance, human resource and engineering (Jacobs & Weston, 2007).

ERP systems according to Elragal and Haddara (2012) first appeared in the late 1980s and the beginning of the 1990s with the power of enterprise-wide inter-functional coordination and integration. Based on the technological foundations of MRP and MRP II, ERP systems integrate business processes including manufacturing, distribution, accounting, financial, human resource management, project management, inventory management, service and maintenance, and transportation, providing accessibility, visibility and consistency across the enterprise. During the 1990s ERP vendors added more modules and functions as "add-ons" to the core modules giving birth to the "extended ERPs." These ERP extensions include advanced planning and scheduling, e-business solutions such as Customer Relationship Management (CRM) and SCM (Gunasekaran, et al., 2009; Adam, 2015).

In the new millennium more efficient ERP system spanning the entire enterprise with consolidated data enabled by modern information technology systems were adopted (Plex, 2015). The adoption of ERP systems forced organizations to reengineer their business processes to accommodate the logic of the software modules for streamlining data flow throughout the organization. These software solutions, unlike the old, traditional in-house-designed company specific systems, are integrated multi-module commercial packages suitable for tailoring and adding "add-ons" as and when required (Awsi, 2013; Plex, 2015).

However, the use of ERPs in the supply chain has mixed results with some crediting the use of ERP for enhancing supply chain performance and the overall firm competitiveness; whilst some studies reports of failure to achieve the expectation of its adoption (Fisher, 2006; Ifinedo, et al., 2010; Awsi,

2013).On the contrary, there research focusing on the influence of ERP system on supply chain performance in the health sector in developing countries has remained scanty. On the basis of the narrow body of knowledge, this study undertook to examine the influence of ERP on supply chain performance in a not for profit medical supplies supply chain sector in Uganda.

1.1.1 Theoretical background

This sub section presents a brief overview of the Resource Based View (RBV) of the firm and theory of constraints and how they underpin this study. A detailed review of the theory and its criticisms is presented in chapter two.

The Resource Based View (RBV) of the firm initially proposed by Penrose (1959), Wernerfelt (1984) and later strengthened by Barney (1991) posits that firm performance is determined by the resources it owns. The firm with more valuable scarce resources is more likely to generate sustainable competitive advantage. This study therefore borrows from the RBV and identifies the ERP systems as providing hard and software resources, data and network resources, people resources that are used as capabilities for SCM, distribution management, e-commerce operations, and back office management for customer service. The use of ERP which is an invaluable resource in the medical supply chain as suggested by RBV lead to the overall organizational performance of JMS on its mandate of procurement, storage and distribution of essential medical suppliers in Uganda.

Theoretically, the study was guided by the Theory of Constraints (TOC), by Goldratt (1990) which postulates that every organization must be understood as a system with a goal; hence every action taken by any part of the system must be judged by its impact on that goal. A system constraint may be defined as anything that significantly prevents a system from improving its performance towards that

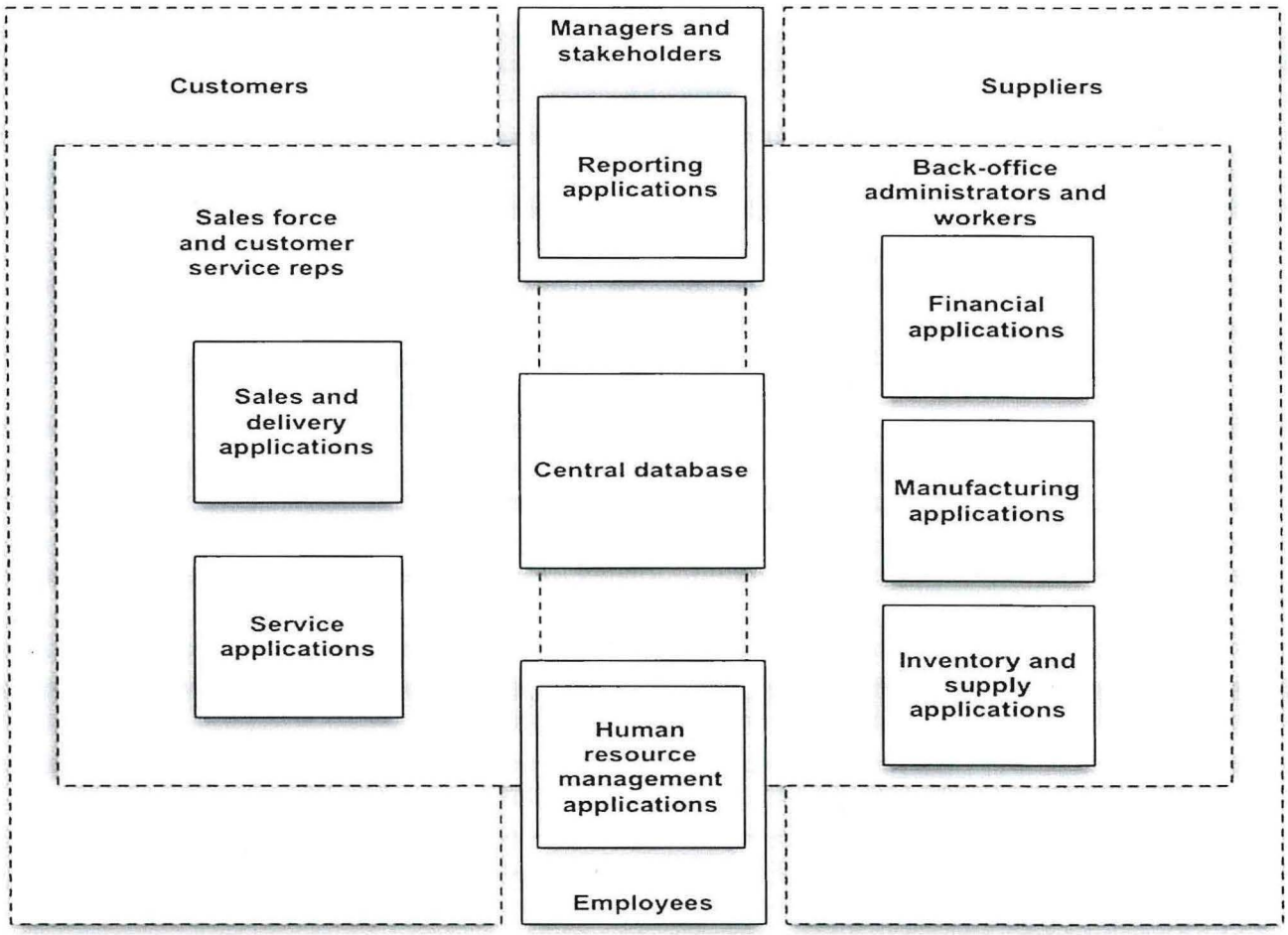
goal (Goldratt, 1990). The theory of constraints asserts that every organizational system presents at least one constraint that may be physical such as, a facility with limited capacity and efficiency, administrative such as a policy or procedure, or it might be a behavioral constraint. Policy or procedural constraints often arise when an organization experiences significant changes in its environment while its policies and operations remain unchanged.

In support of the TOC, (Krajewski et al., 2007) contend that TOC is an approach for management that focuses on whatever impedes progress toward the goal of maximizing the flow of total value-added funds or sales less discounts and variable costs. Bottleneck is in the process, but a constraint can be anywhere in the SC. In the context of supply chain, the TOC suggests that the inefficiencies in the supply chain will compel management to adopt ERP system by automating all the process. However, adoption of ERP may be faces with an array of constrains that need to be identified to achieve the objectives of the supply chain there by contributing to supply chain performance. In using the TOC, this study noted that supply chain performance in JMS, dependents on the extent to which the JMS identifies ERP system constraints synchronize the supply chain process using an appropriate software and monitor the performance of the ERP.

1.1.2 Conceptual Background

This subsection defines the key concepts of ERP and supply chain performance in the context of supply chain. Enterprise Resource Planning (ERP) is an enterprise-wide information system that integrates and holds all the business processes in the entire organization (Davenports, 1998). The ERP as an information system is designed to integrate and enhance the business processes in an organization by easing the smooth flow of communal information and practices across the entire organization as shown in figure 1.1 below.

Figure 1.1Showing ERP system with the integrated business processes



Source: Davenports (1998) model over the ERP System.

In the context of supply chain and physical distribution Baily (2008) identifies four (4) key components of; -distribution process management, supply chain management, retail and e-commerce and back-office operations. Key elements in Distribution Process Management include Distribution requirement planning, Sales Management, quality management, customer relationship management and barcoding and radio-frequency identification (Baily,2008; Bozarth & Handfield, 2008).The SCM covers four Supply chain areas of warehousing management, transportation management system, Global trade management and supplier relationship management. The retail and e-commerce

component covers retail and e-commerce software enables the sale of goods and services to business and directly to customers to include web-based multichannel commerce for both business-to-business (B2B) and business-to-customer (B2C) audiences by providing opportunities to search, compare, and purchase goods online. It also includes retail and Point of sale POS for recording, tracking analysis at retail locations online or conventional stores. Back-office operations include finance; contract, refund, and chargeback processing and human resource system applications for managing functional related tasks (Baily, 2008; Bozarth and Handfield, 2008). This study borrows from the above conceptualization of ERP in the distribution context and considers ERP components of SCM, distribution management, retail and e-commerce and back office operations embedded in the ERP and evaluate the extent to which it is configuration, use and evaluation in the management of medical supplies.

Information system evaluation considers two level of evaluation to include quality evaluation which is comparison of what the users make between their service prospect and service conception. The second evaluation criteria is information system effectiveness which includes system quality, information quality, use, user satisfaction, individual, impact, and organizational impact which components are interrelated and interdependent (DeLone& McLean, 1992).In this study, system evaluation is conceptualized to include two indicators of regularity of reviewing the ERP system and system troubleshooting.

A compressive and unified definition of supply chain performance is hard to come by. However, many scholars who have identified a number of indicators of supply chain performance. Shepherd, Günter (2012) spells out time, cost, flexibility, quality, and innovativeness (Elrod et al., 2013) equally identifies time, cost, flexibility, quality while (Chimhamhiwaet al., 2009) also cost, time, quality, technological innovation, society, and customer satisfaction. Furthermore, (Anand, Grover 2015)

defined supply chain performance to include transport optimization, inventory optimization, information technology optimization, resource optimization. However, this study considered the time, cost and quality indicators of supply chain performance.

1.1.3 Contextual background

The JMS was founded in 1979 as a joint venture between the Uganda Catholic Medical Bureau (UCMB) and the Uganda Protestant Medical Bureau (UPMB). JMS is licensed to by National Drug Authority to engage in import, export, whole sale of medicines and related health care supplies. It is registered as a corporate body established under the Trustees Incorporation Act (Cap 165). The aim was to supply and empower the over 3000 health facilities country wide with easy sustainable quality access to medical supplies, equipment and related health care and training services to the people of Uganda at an affordable price and to the glory of God.

JMS was initially set up to supply medical relief to the health facilities owned by the Protestant and Catholic churches. With time, however, JMS evolved into a not-for-profit wholesale enterprise, procuring, storing and selling over 2000 products. JMS expanded its regular customer's base to include church founded health facilities, national and international NGOs, government health units, private clinics and hospitals, private pharmacies and schools (National Medicines Policy, 2015)

To deliver the essential medical supplies, JMS changed her work operations strategy from the traditional push systems to an information pull or order based systems. JMS realigned its supply chain operations by employing an Enterprise Resource Planning (ERP) for collaborative Planning, Forecasting, and Replenishment of inventory (JMS, Strategy Plan 2010-2015). However, JMS continued to record service performance challenges such as excessive inventory, stock outs, and wrong deliveries (Economic policy research centre January 2010) Drugs are not procured on time as specified, whereas in some instances drugs expire or wrong drugs have been procured (National Medicines Policy, Ministry of Health 2015-2020), (UBoS 2009, National Service Delivery Survey Report). This could be blamed on inefficiency of their

ERP systems. It was against this background that the researcher undertook a study to examine the effect of Enterprise Resource Planning (ERP) Systems and Supply Chain Performance at JMS.

1.2 Statement of the Problem

Adoption of ERP system, its configuration, implementation and systems evaluation is undertaken envisaging enhanced overall firm supply chain performance (Gunasekaran, et al., 2009; Elragal & Haddara, 2012; Adam, 2015). However, despite the use of ERP information system at JMS to deliver optimal medical supplies and health service on its mandate manifests significant gaps. For instance there have been reports that drugs are not procured on time as specified by end users, or wrong drugs have been procured, drugs expire in the shelves, as well as transportation of medical supplies route loading. This has meant that the JMS incurs high costs in medical supplies recalls and their disposal (MoH Newsletter, August, 2017; National Medicines Policy, 2015-2020). Management anecdotal reports associate the supply chain performance gaps to the ERP system synchronization, implementation/usage and system evaluation. At the time of inception of this study, there has been no published empirical study examining the influence of ERP on supply chain performance in JMS. This study therefore undertook to examine the influence of ERP system and supply chain performance at JMS Uganda.

1.3 Purpose of the Study

The purpose of the study was to examine the effect of Enterprise Resource Planning (ERP) Systems and Supply Chain Performance at JMS as the case study.

1.4 Objectives of the Study

1. To determine the effect of Enterprise Resource Planning system configuration on supply chain performance at Joint Medical Stores.

2. To assess the effect of Enterprise Resource Planning system implementation on supply chain performance at Joint Medical Stores.
3. To examine the effect of Enterprise Resource Planning system evaluation on supply chain performance at Joint Medical Stores.

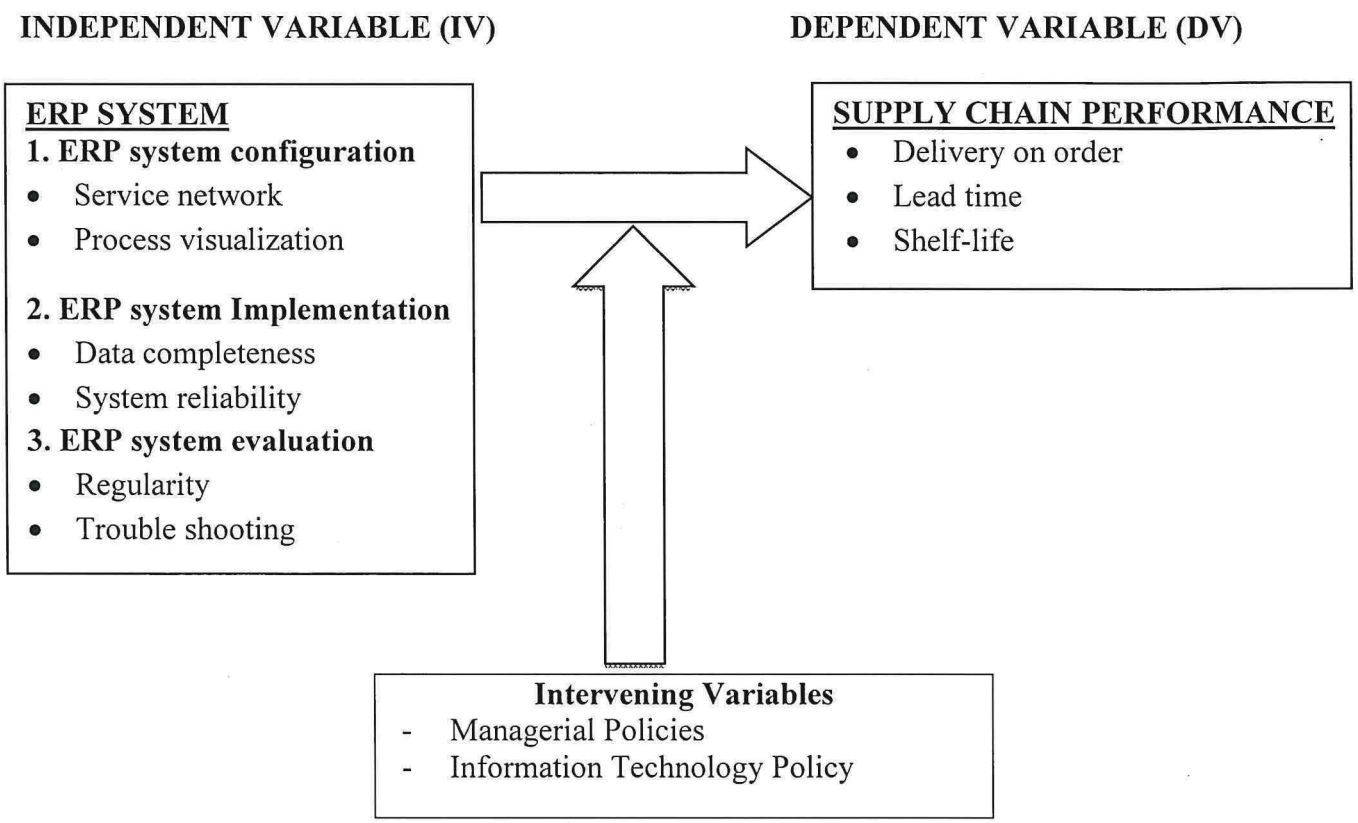
1.5 Research Questions

1. What is the effect of ERP system configuration on supply chain performance at JMS?
2. How does ERP system implementation affect supply chain performance at JMS?
3. To what extent does ERP system evaluation influence supply chain performance at JMS?

1.6. Conceptual framework

The model below shows the relationship between ERP (independent variable) and Supply chain performance (dependent) variable using a many to one approach that guided the study and development of objectives as well as themes of the study.

Figure 1.2: Conceptual Framework showing relationship between Enterprise Resource Planning (ERP) and Supply chain performance.



Source: Davenports (1998) ERP System model Modified by the researcher.

Figure 1.2 above indicates that the Independent Variable which is Enterprise Resource Planning (ERP) System affects the Dependent Variable Supply Chain Performance. It indicates that Enterprise Resource Planning (ERP) System measured by ERP Configuration, ERP Implementation/use and ERP systems evaluation affect Supply Chain performance of the organization by influencing delivery on order, lead time and self-life hence effectiveness in operations. The framework further indicates that Intervening variables influencing both the dependent and independent variables are: Management Policies and Information Technology Policy.

1.7. Scope of the Study

1.7.1 Subject scope

The study focused on ERP and its components not limited to ERP configuration, ERP Implementation/usage and ERP evaluation as the Independent Variable (IV). The study concentrated on Supply Chain performance in consideration of delivery on order, lead time and shelf life of medical supplies as the Dependent Variable (DV).

1.7.2 Geographical scope

This study was conducted at Joint Medical Stores (JMS) Non-Governmental Organisation (NGO). Head Office Plot 1828, Gogonya Road, Nsambya-Kampala Uganda. The territorial scope was selected since JMS carries out its operations by means of Supply Chain Information Systems in particular the ERP systems that has fit the analysis of this study than other health sector entities in Uganda, as well within the reach to access information which can be vital to the core to the study.

1.7.3. Time scope

The study covered the epoch from January 2017 to December 2017, the period JMS was implementing its 2015-2020 strategic investment plan but was experiencing challenges in supply chain performance widely associated within its ERP system collation.

1.8 Significance of the Study

Policy makers:

This study shall explore potential areas of improvement regarding, especially the Enterprise Resource Planning (ERP) Systems in the ERP configuration, ERP Implementation/usage and ERP systems evaluation. This will help the government to succeed in achieving its mandated objectives which leverage due to the occurrence of inadequate essential drugs, and medical material in hospitals, school, heal centers, clinics, and dispensaries.

JMS may use the study results to ensure that Enterprise Resource Planning Systems gives adequate importance to eliminate the barriers that have hindered issuance of medical supplies, equipment and quality, cost effective and flexible timely supply chain operations. The study intend to make contribution through the findings which is useful source of information for both the upstream and downstream public and private entities (NGO) to review the areas which need improvements and enhance compliance to the information systems which influence decision making across the organization.

Practitioners: It was expected to enable scholars, practitioners and supply chain professionals to appreciate the constructs that explain Enterprise Resource Planning (ERP) Systems in both public and Non-Governmental Organizations (NGOs) in Uganda and more empirical studies will be conducted to systematically formulate relevant models.

Academicians, Scholars and Researchers: The results of the study shall also add to the existing body of knowledge by reviewing literature for further and future referencing as starting point to carry out similar research on the topic and add to their existing knowledge. They can extend their efforts in the areas which have not been covered by this study.

1.9. Definition of Key terms

For the purpose of this study the following key terms will be defined to have meaning as used in this study:

Enterprise Resource Planning (ERP) in this study refers to the supply chain information system encompassing SCM, distribution process management, retail and e-commerce, back office modules and their synchronization, implementation/usage and system monitoring.

SCM in this study refers to an application/module for effecting warehousing, transport planning, and collaboration with Global trading partners, and supplier relationship management.

Distribution process management in this study refers to the application/module for effecting distribution requirement planning, sales management, purchasing, quality management, customer relationship management and bar-coding RFID.

Retail and e-commerce in this study refers to the application/module offering a plat form for B2B, B2C and POS interface.

Back office in this study refers to the application/module for accounting and finance, human resource and refund management.

Supply chain performance in this study refers to meeting the time, quality and cost expectations in medical supplies.

Time in this study refers to the ability to consistently deliver on the agreed due date

Quality in this study refers to the degree to which medical supplies confirm to specification and conditions

Cost in this the ability to deliver medical supplies minimal costs

CHAPTER TWO

LITERATURE REVIEW

2.0. Introduction

This chapter presents a review of related literature on ERP Systems and supply chain performance based on what other scholars have observed, opined world over. It is done with view of highlighted literature gaps on ERP and supply chain performance especially for medical supplies. The first section presents the theoretical review. This is followed by the empirical review based on the study objectives of ERP constructs of configuration, implementation/usage and systems evaluation alongside quality of supplies, cost implications and delivery time.

2.1. Theoretical Review

The Resource Based View (RBV) of the firm initially proposed by Penrose (1959), Wernerfelt (1984) and later strengthened by Barney (1991) posits that firm performance is determined by the resources it owns. The firm with more valuable scarce resources is more likely to generate sustainable competitive advantage. In this view, information system and in this case ERP system is considered a valuable organizational resource that can enhance organizational capabilities and eventually lead to higher performance. This study therefore borrows from the RBV and identifies the ERP systems as providing hard and software resources, data and network resources, people resources that are used as capabilities for SCM, distribution management, e-commerce operations, and back office management for customer service. The use of ERP which is an invaluable resource in the medical supply chain as suggested by RBV lead to the overall organizational performance at JMS on its mandate of procurement, storage and distribution of essential medical supplies in Uganda.

Theoretically, the study was guided by The Theory of Constraints (TOC), by Goldratt (1990) which states that every organization must be understood as a system with a goal; hence every action taken by any part of the system must be judged by its impact on that goal. A system constraint may be defined as anything that significantly prevents a system from improving its performance towards that goal (Goldratt, 1990). The theory of constraints asserts that every organizational system presents at least one constraint that may be physical such as, a facility with limited capacity and efficiency, administrative such as a policy or procedure, or it might be a behavioral constraint. Policy or procedural constraints often arise when an organization experiences significant changes in its environment while its policies and operations remain unchanged.

In support of the TOC, (Krajewski et al., 2007) contend that TOC is an approach for management that focuses on whatever impedes progress toward the goal of maximizing the flow of total value-added funds or sales less discounts and variable costs. Bottleneck is in the process, but a constraint can be anywhere in the SC.

The aim of TOC is to maximize profit by making use of the factor which is limiting the process more and more efficiently. TOC is maximizing throughput while minimizing operating expenses for labour, sales and administration. The first step to start utilizing TOC is to find out the constraining factor. Usually constraint is in a one operation unit in the production line. Constraint could be also the limited time of one or a few key employees. When the constraining factor has been identified, management should examine how the capacity of constraint could be increased (Bushong & Talbott 1999). The TOC and its assumption on constraints has been widely used in management especially when it suggests the need to identify system constraints which prevent the firm from achieving its performance expectations.

At the heart of TOC lies a five-step procedure that enables managers to plan the overall process and focus attention on the resources with the greatest potential to be affected by changes to the system. Reflecting the key underlying principle of TOC, that the performance of a system is limited by its constraints these five steps create a framework for TOC implementation and utilization focusing on processes namely:

Step 1.

Identify the system's constraints. The first step is to identify the constraint in the system that limits throughout or progress toward the goal.

Step 2.

Decide how to exploit the constraint(s). Decide on a plan for the primary constraint that best supports the system's goal. This requires taking advantage of the existing capacity at the constraint, which is often wasted by making and selling the wrong products, and by improper policies and procedures for scheduling and controlling the constraint.

Step 3.

Subordinate everything else to the above decisions. Alter or manage the system's policies, processes, and/or other resources to support the above decisions. Management directs its efforts toward improving the performance of the constraining task or activity and any other task or activity that directly affects the constraining task or activity.

Step 4.

Elevate the constraint(s). Add capacity or otherwise change the status of the original resources as the dominating primary constraint. In this step, additional capacity is obtained that will increase (elevate) the overall output of the constraining task or activity. This differs from step 2 in that the added output

comes from additional purchased capacity, such as buying a second machine, tool, or implementing new technology.

Step 5.

Return to step 1. Do not let inertia become the new constraint go back to step 1, but do not allow previous decisions made in steps 2 to 4 to become constraints. As a result of the focusing on processes. The improvement of the original constraining task or activity may cause a different task to become a constraining task or activity. Inertia could blind management to additional steps necessary to improve the system's output now limited by a new constraint.

An important aspect of the TOC steps is their orientation towards performance improvement efforts aimed at achieving functional and whole organizational performance. TOC, unlike many continuous improvement, initiatives intend to reduce operational expenses and which by its inherent nature would be limited (Larsson, 2008), it makes more sense to focus improvement efforts on increasing policy effectiveness (Boyd & Gupta, 2004). In the context of supply chain, the TOC suggests that the inefficiencies in the supply chain will compel management to adopt an ERP system by automating all the process. However, adoption of ERP may be faced with an array of constrains that need to be identified to achieve the objectives of the supply chain there by contributing to supply chain performance. In using the TOC, this study noted that supply chain performance at JMS, is dependent on the extent to which JMS identifies ERP system constraints synchronize the supply chain process using an appropriate software and evaluates the performance of the ERP systems along its supply chain.

2.3. Empirical Review

2.3.1. Enterprise Resource Planning (ERP) system configuration and supply chain Performance

A recent study by (Liu et al., 2016) attribute supply chain performance to the existence and nature of interrelationships between multiple components of SCI and IT competency and their effects on the firm performance. In particular, ERP fit as "moderation" approach indicates that supply chain information proficiency could strengthen the rapport of Supply chain operational and financial performances. Furthermore, ERP fit as "profile deviation" approach reveals that the more similar the supply chain information proficiency configurations are to those of the top performers in the high-level SCI group, the higher their operational and financial performance. However, in the medium and low-level SCI groups, the SCI-SCIT proficiency fit is positively significant, which is associated with financial performance and insignificantly associated with operational performance.

Furthermore, (Daniel et al., 2015) discusses that in absence of quality visibility and shared initiatives, the challenging management of suppliers, supply chain disruptions inventory availability, expiry rates and customer demand trends can cause large losses, which tantamount to ill-purchased inventory.

Daniel et al., (2015) moreover depicts that an ERP system helps the organizations to maximize their inventory investments by offering a clear quality overview of stock records and data, and how they connect to every department, company-wide to ensure the condition of the supplies is absolute to meet end user satisfaction. This can be through: creating traceable records through assigning SKUs, expiry dates, and units of measure, serial numbers, lot numbers, and attributes; adding notable features to products to locate items within the warehouse, storage requirements, sales rates, special handling; Keeping tabs on stock that is sluggish or about to expire. Lysons, K. & Grillingham, (2006) also added that keeping an inventory of items that are not historically profitable; tracking stock items of consumer

for the organization to identify top-tier customers and their needs; breaking down costs by overhead, materials, shipping, and more to get the true cost to value to manage the total cost of ownership, and value engineering across the supply chain.

Mittelstädt et al., (2015) examined the effects of information complexity and presentation as a key aspect of usability with consideration of human factors on decision quality and found that ERP system data configuration fosters users' decision quality if simplified. Furthermore, interactive effects of two different aspects of information complexity (data amount and task complexity) as well as compensatory effects through human factors were revealed. The study concludes that user-centered design processes can substantially contribute to a successful implementation of complex information systems, such as ERP systems there by contributing to SC performance.

Beheshti et al., (2014) attribute supply chain performance to use of an effective ERPsoftware which has emerged as a key enabler of system integration in organizations to reduce redundancy, improve efficiency, productivity and performance concludes that firms implement ERP not only to improve operations efficiency but to be more responsive to the customer needs in the global economy. In today's product IT system, products behave both passive and lively ERP actors regarding their information (Trentesaux& Thomas, 2013) usually, a product does not carry its own information, but it carries radio frequency identification bar code (RFID) tag which provides a connection to its information stored in a set of databases.

In a related study Crocker, Jessop & Morrison (2012) further expounds that Inbound and outbound logistics management, storage and supply of products for an integrated supply chain enables timely tracking of medical supplies, inventory levels of different categories and values, records of projected

demand of customers etc. which helps in managing favorable lead times for the supply and delivery of goods and services throughout the product life cycle of the stock.

2.3.2. Enterprise Resource Planning (ERP) system implementation/usage and supply chain Performance

In the study of (Processpro et al., 2016) he explained the clients about the activities carried out when implementing ERP systems for businesses: these include but not limited to; develop a Strategy, define the standards, test, validate, and reconcile staff tasks to improve supply chain operations thus supply chain performance enhancement.

On another note, the study carried by (Seyed et al., 2013) extracts that, ERP plays a major role in Vendor Managed Inventory (VMI) that is a process whereby distributers generate orders based on the demand created and availability of supplies. Similarly, in a study carries out by Addo-Tenkorang and Helo, (2011) in their review report found that the ERP system eases the smooth flow of communal information and practices across the entire organisation leading to overall reduction in cycle's time. This study does not equally relate to the context of Medical supplies in a land locked country like Uganda. The benefits from using an ERP system related to purchasing and supply chain which can be: Lower inventory (Damijan2009; Velcu, 2007). In an empirical study, (Smadi et al., 2007) in his study of ERP among manufacturing companies in Jordan attributes implementing ERP systems to reduction on cycle time through improving efficiency flow, and quickly generating monetary information. Although the study qualifies ERP to reduction of lead time, it was not based in the context of medical supplies.

Higher inventory turnover Velcu et al., (2007). Decreased order lead-time Hendricks et al., (2001) On-time shipment Leon et al., (1999). Order cycle times (the time from when an order is placed until the product or service is delivered) can be reduced, resulting in improved throughput, customer response

times, and delivery speeds Cotteleer and Bendoly, (2006). The implementation process by Moller et al., (2005) involves finding the right people who will be trained and be able to gain knowledge on this ERP business practices and operational processes for quicker response time, quality supplies with cost effective coordination with their suppliers, distributors, and customers.

2.3.3. Enterprise Resource Planning (ERP) system evaluation and supply chain Performance

Bellgran and Säfsten, (2010) state that to determine values or results using evaluation, an operating system or a change of system should represent the base for relevant decisions in production and supply chain environment. Due to the urgent call for sustainability and accentuate movement towards sustainable production, evaluation activities focusing on the use of resources in systems play an outstanding role when it comes to changing existing systems towards sustainable ones.

Nah and Delgado (2006) found that lack of proper understanding of the project needs and the inability to provide leadership and guidance to the project are the main factors when ERP implementation fails. Thus, effective project management should define clear project objectives, develop a work and resource plan, and carefully track the project's progress and evaluate it against achievement of its objectives. In related study, Forslund and Jonsson, (2007) in their study of the "efforts to evaluate and strength an information system" Forecasting on supply performance leads to large proportion of the suppliers. They receive orders from customers and make forecasts. An evaluation of the system leads to the finding that there were system quality inefficiencies that made the forecast data unreliable.

Tsai et al., (ND) in their study that three of five dimensions of supply chain performance are reliability, responsiveness, and assurance, which have a significant positive relationship with the performance provided by systematic ERP vendor and consultant in the ERP. Secondly, system performance improvement has a significant positive relationship with the system quality, Information

quality, system Use, User Satisfaction, Individual Impact, and Organizational Impact. After variables deletion procedure, the System Quality dimension is measured with Data accuracy, Database contents and Data currency. The Information Quality dimension is measured with Usefulness of Information, and Understandability of information. The System Use dimension is measured with Frequency of report requests, and Voluntariness of ERP system use. The 'User satisfaction dimension is measured with Software satisfaction, and Overall satisfaction. The Individual impact dimension is measured with Job performance, Decision quality, and Information awareness. The Organizational impact dimension is measured with the sub-dimension of Financial, and sub-dimension of 'Internal business processes.

Research by Abdullah, Albeladi and Atiah(2013) reports that effectiveness evaluation leads to learning in how best the ERP could be improved leading to real-time tracking of goods,, real-time information on delivery time, supports Just-in-Time (JIT) manufacturing and retailing, enabling organizations to make strategic decisions. Albeladi and Atiah (2013) further report an effect evaluation of RFID effectiveness leads to improved tracking of high-value items/assets, reduced shrinkage and shipping errors in the supply chain.

Gilaninia et al (2011) observes that fast data transfer and information technology in supply chain resulting in increased cooperation between the supply chain and finally, increased efficiency throughout the supply chain. Effective supply chains are considered as the key to creating network of sustainable competitive by improving relations inside and outside the organization. Effective information sharing as one of the most basic capabilities of the supply chain process is considered. Purpose of this paper seeks to the effect of information technology on supply chain performance.

Kashani and Baharmast (2017) study show that a lean and agile supply chain is effective on supply

chain performance and supply chain performance is effective on firm performance. Efficiency of information systems moderates the effect of lean supply chain on supply chain performance and firm performance. However, flexibility of information systems does not moderate the effect of agile supply chain on supply chain performance and firm performance.

2.4. Summary of Literature Review

The review of extant literature reveals increasing research on ERP configuration supply chain performance. However, the studies focusing on ERP configuration and supply chain performance have remained scanty especially for land locked countries like Uganda. Similarly there is a growing body of literature on ERP usage and supply chain performance but few studies have focused on medical supply chain. Moreover, studies focusing on ERP evaluation and medical supply chain performance are still nascent calling for expanded research. In the need to fill the knowledge and practice gaps, this study examines the influence of ERP configuration, implementation/usage, and evaluation on supply chain performance at JMS of Uganda a land locked country.

CHAPTER THREE
RESEARCH METHODOLOGY

3.0 Introduction

This chapter presents the methodology that was used during the study. It involves the research design, area of study, study population, sample size and selection, sampling techniques, data collection instruments, procedure of data collection, reliability and validity of instruments, data analysis, measurement of variables, data presentation and analysis, ethical considerations and the limitations to the study.

3.1 Research Design

The researcher adopted a case study design which focused on a single entity. The case study approach was adopted in order to place more emphasis on an in-depth contextual analysis of events and their interrelationship (Yin et al., 2009). According to Cooper and Schindler (2008), a case study research design bases on a practical, logical and structured manner of the organization relating to the area of study. The case study research design was also useful for testing whether a specific theory and model actually applied to phenomena in the real world, Yin et al., (2012). The study used structured questionnaires having both open-ended and closed ended questions to obtain quantitative data. While qualitative data was obtained using interview guide to achieve the desired results. According to Creswell et al. (2003), qualitative research helps in getting an in-depth analysis of the problem under investigation and qualitative research was applied in order to describe current conditions and obtained the relationship between the variables while the qualitative method captured a lot of data in a relatively short time.

3.2 Study Population

The study population comprised a target population of 80 staff of JMS Pharmacist, PDU, Customer Care, Logistics and warehouse. This population was considered because they are the ones who use the ERP on their day to day medical supplies operations.

3.3 Sampling Technique and sampling selection

3.3.1 Sample size

In this study the number of individuals in the targeted population was known in advance as staff lists indicating members for each category are readily available at the office of Human Resource Manager at JMS. The ultimate sample size of 76 respondents from a target population of 80 that were derived using sample table (Appendix IV) developed by (Krejeie and Morgan 1970) sample guiding table. Triangulation was used to obtain multiple information from respondents at different intervals/days. This aided in validation of results.

Table 3.1: Sample selection and Sampling Size of the respondents

Category of respondent	Population	Sample	Sampling technique
Pharmacists	12	12	Purposive
PDU	5	5	Purposive
Customer care	8	8	Purposive
Logistics	20	19	Simple random
Warehouse	35	32	Simple random
Total	**80**	**76**	

Source: JMS Human Resource Report (2015)

3.3.2 Sampling Technique

The study used purposive sampling that involves the researcher using own judgment or common sense regarding the participants from whom the information was collected. The selection of the respondents was based on the researchers experience with the respondents possession of the required information

on the use of ERP based on (Amin et al., 2005) Guidance on Purposive sampling. The study also used simple random sampling where by a sample is obtained from a population in a way that samples of the same size have equal chance of been selected (Shahrokh, Dougherty& Edward, 2014).

3.5. Data Collection Methods

This study used primary sources mainly the questionnaire and interview administered on the selected respondents. Each of the data collection method is explained in detail below.

3.5.1. Questionnaire survey

The study used a self-administered questionnaire that was delivered at the respondent's office and picked within one week from date of delivery. The choice of the questionnaire as supported by Tran et al (2013) is that it is easier and economical to administer on a large sample and collect a reasonable amount of data in short time than any other method could provide. Mugenda and Mugenda (2005) stated that questionnaires are used to obtain vital information about the population and to ensure a wide coverage of the population in a short time. In addition Sekaran (2003) states that questionnaires are efficient data collection mechanisms where the researcher knows exactly what is required and how to measure the extent to which supply chain performance in terms of quality, cost, and time have been attained at JMS as a result of ERP systems in terms of ERP system configuration, ERP system implementation/usage, and ERP systems evaluation. They were also less expensive and save time and they do not need much skills to administer them. Closed ended questions were used with detailed guiding instructions as regards the way respondents will be required to fill them independently with minimal supervision. This was possible because the respondents was literate and was given enough time to fill the questionnaires.

3.5.2. Interviewing method

The study used key informant interviews where the researcher meet face to face with the selected interviewees and ask them a set of questions on the interview schedule from which responses were recorded on a note book as advised by (Amin, 2005).The meetings for the respondents under this category were all considered including both male and female administrators. This tool was used because it was faster to use in the field work study because it gave the researcher a chance to interact with staff with authority and detailed information about the interrelationship between ERP systems and supply chain performance which provides able facts in the course of the interview. Interviews were carried out with two staff one from IT and the one from the procurement.

3.6. Data collection Instruments

3.6.1. Questionnaire

Two sets of questionnaires scored on Likert scale ranging from 1 for strongly disagree, 2= disagree, 3 = not sure, 4 = agree to 5 for strongly agree was used, one focusing on ERP to be filled by the JMS staff (see appendix I) and JMS focusing on supply chain performance. Questionnaire is a set of techniques of data collection in which individuals are asked to respond to a standard (same) set of questions in a predetermined order as cited in (Saunders et al, 2003). The researcher used structured, close-ended questionnaires. Structured, close-ended questionnaires helped elicit responses specific to this case-study, and seemed economical and time-saving as they were easily administered (Mugenda & Mugenda, 2003; Amin, 2005). The 5-point Likert scale was employed to collect responses on the relationships between the variables under the study. Data on the variables of the Enterprise Resource Planning (ERP) System were collected using the 5-point Likert scale to measure the strength of each variable in the ERP System configuration, ERP System implementation/usage and ERP System evaluation.

3.6.2 Interview Guide

The study used semi-structured interview questions focusing on ERP dimensions of ERP systems configuration, ERP systems implementation/usage and ERP systems evaluation from which the research draw qualitative data to complement the questionnaire data. The researcher conducted interviews using a semi-structured interview guide to supplement the data collected using the questionnaire method, which enabled the researcher obtain more relevant quality information from respondents' responses that could not specifically be captured in the questionnaires (Saunders et al,

2003). Interviews are known for eliciting responses about complex and deep issues that may not be well qualified where a questionnaire has been employed.

3.7 Validity and Reliability of data

Validity refers to the extent to which research results can be accurately interpreted & generated to other populations. Research tools were first prepared, presented to the supervisors who checked on their correctiveness. The supervisors' comments were used to improve the questionnaire by eliminating all errors. Pretesting of questionnaires also was done by administering questionnaires to 10 respondents within the target population but outside the sample this helped to identify the gaps and made modifications accordingly. The researcher ensured that questions are relevant in order to have meaningful and reliable results represented by variables in the study, Mugenda and Mugenda (2005).The researcher used the formula below to establish validity of the research tool taking only variables scoring above 0.70 as suggested by Nunnally & Bernstein (1994).

$$\text{Content Validity Index (CVI)} = \frac{\text{No of items declare valid}}{\text{Total No of items}}$$

The results of CVI are presented in table 3.2 below.

3.7.2 Reliability

Reliability refers to the consistency of the questionnaire items in measuring the study variables usually by way of pre-test (Amin, 2005). Commonly used reliability tests include test-retest, split half but this study preferred the SPSS generated Cronbach's Alpha coefficient which has wide acceptance given its statistical reliance to ascertain the instrument reliability Nunnally and Bernstein, (1994). Only variables scoring above 0.70 were retained in respect of Nunnally and Bernstein (1994) guidance and the results are presented below.

Table 3.2: Validity and Reliability Results

Variable	CVI	Cronbach's Alpha	Items
ERP System Configuration	.800	.898	10
ERP Systems implementation	.700	.733	10
ERP Systems evaluation	.833	.778	6
SC performance	.714	.7I7	7

Source: Primary data

Table 3.2 above shows that all variables yielded CVI and Cronbach's Alpha which is greater than 0.70 suggesting the instrument was relevant and consistent in measuring ERP and supply chain performance at JMS.

3.8 Research Procedure

The researcher obtained an introduction letter from Kyambogo University introducing himself to the executive director of JMS, the letter introduced the researcher as a student of Kyambogo University and explained the purpose of the research. In addition, the letter requested for assistance to be offered to the researcher. The researcher recruited a research assistant to ensure that the influence of personal factors of the research during data collection are minimised by bringing a person who was neutral about the research variable relationships and the selected organization of study. The researcher trained the research assistant on the tools for three days before going to the field to ensure quality work. The researcher made contact with various staff and together they make appointments when to carry out the study. This approach enabled the researcher to make proper planning and mobilization of resources. The researcher together with the research assistant went to the respondents to collect data on the agreed dates.

3.9 Data Analysis

3.9.1 Quantitative data Analysis

Descriptive statistics of mean and standard deviations was used to analyse the questionnaire responses in relation to each variable used in the study. Pearson's correlation statistics was used to test the relationships at 99 and 95 confidence limits. The resultant Pearson's correlation coefficient was used to determine the strength of the relationship and its direction (+ or -). A multiple regression analysis using analysis of variance statistics of adjusted R^2 values, beta, t values and significance values as suggested by (Amin et al., 2005) was used to determine the extent to which independent variable predict the variance in the dependent variable.

3.9.2 Qualitative Data Analysis

The study used the content analysis technique to analyse qualitative data where themes identified in the respondent's narratives on ERP systems and supply chain performance was analyzed for their implications, inferences and conclusions. Further qualitative analysis involved comparing the qualitative data with the quantitative findings.

3.10 Measurement of Variables

ERP was measured using (Davenports et al., 1998) ERP model while supply chain performance was measured using (Mentzer et al., 2001) supply chain performance guidelines in the supply chain context. The characteristics of the respondents were measured at nominal and ordinal.

3.11 Ethical considerations

The researcher considered that it is essential to discuss ethical requirements within a research. Ethical concerns emerged as early as when choosing research topic, formulating the research design and how to accesses the data needed to finalize the research Saunders et al., (2012).

Ethics is defined as the standards of behavior that guides the study conduct in relation to the right of those who become subject of the work, or affected by it" (Saunders et al., 2012). For this study, the ethical considerations can be divided and accounted for in two primary parts. The first part, concern ethical considerations addressing the organization as a whole, involving all business processes, personnel and documentations within the organization. The second part concerns all respondents participating in this thesis. The ethical consideration was initiated as early as January 2017, when applying to undertake a research at JMS. At JMS, classification of documents and information on different categorization and levels as well as supply chains operations on regular basis. This required cautiousness from the author at all times. All respondents were informed that they could be anonymous if they preferred and that participation was voluntary. JMS agreed on giving the authors permission to use institutional specific information. However, a few respondents requested not to be referred to as name and therefore they were referred to in terms of their working title. In order to overcome ethical issues, the author considered the code of ethics, along with the principles that follows such obligations as discussed in (Sunders et al., 2012). Confidentiality and anonymity were adhered to and any data provided was entirely for the academic purposes only. Finally, the author had no previous experience or connection to the JMS or the respondents within this research.

3.12 Limitations of the study

The research was affected by limited accessibility to secondary data about the case study.

Some of the respondents were not willing to give complete information as they looked at research as a threat to the organizational status. The researcher endeavored to make his questions and interview as objective as possible and also obtained an introductory letter from the university to introduce him to the organization where he conducted the research.

The boundaries within which the researcher conducted the study were wide in such a way that, narrowing down the study to suit the researcher's ability was not easy. The researcher however used an appropriate sampling technique convenient for the research by choosing one Joint Medical Store out of the many existing companies that deliver health services and medical supplies in Uganda and later generalize the findings.

The use of the case-study research design chosen to take into consideration the short time-frame for the academic research constrained the researcher from collecting data from other companies that deal in medical care and services to further boost the study's reliability.

CHAPTER FOUR

PRESENTATION, ANALYSIS AND INTERPRETATION OF RESULTS

4.0. Introduction

This chapter presents, analyses and interprets the study findings of the effect of ERP on supply chain performance in JMS based on the information obtained from the study questionnaire and interviews. It presents the response rate, background information about the respondents and empirical findings on the effect of ERP dimensions of configurations, implementation, and evaluation on supply chain performance of medical supplies by JMS using descriptive statistics, correlation and simple regression.

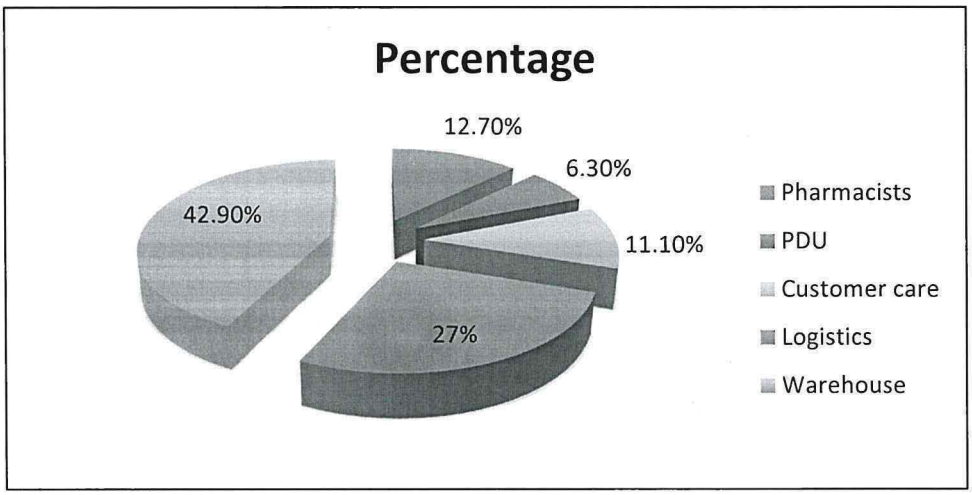
4.1. Response Rate

A total of 76 JMS questionnaires were issued but 63 usable questionnaires were returned in time for consideration in the study giving a response rate of 83% that is high. Amin (2005) asserts that response rate of 50% is good enough for correlation test to test the relationship between the variables since the results are representative of the population from which the sample was selected.

4.2. Background Information of Respondents

The JMS respondents were asked to indicate their job categories, education level and time worked with JMS supply chain and the finding are presented blow-using graphs.

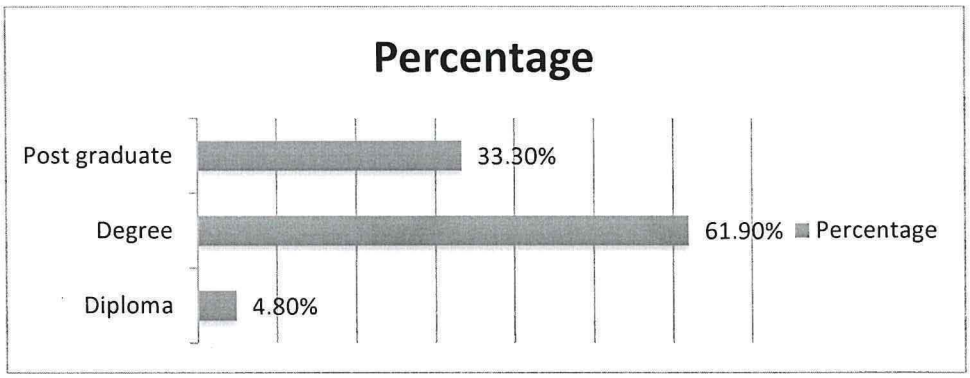
Figure 4.1: Job category of JMS respondents



Source: Primary data

The findings I figure 4.1 show that majority of 42.9% of the respondents were warehouse personnel followed by 27% who were logistics personnel, 12.7% who were pharmacists, and 11.1% who were customer care personnel u and 6.3% who were from PDU. The results are therefore representative of JMS personnel directly involved in the supply chain for medical supplies using the automated ERP system.

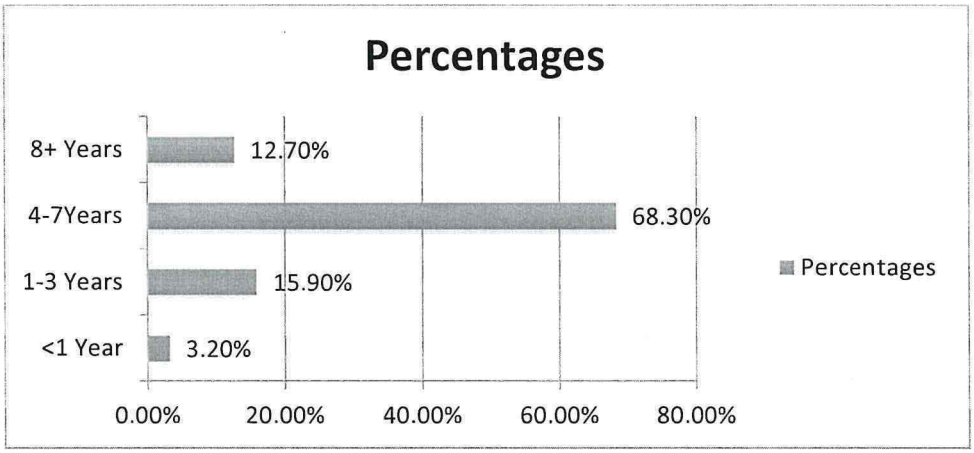
Figure 4.2: Level of education of JMS respondents



Source: Primary data

The findings show that majority of 61.9% of the respondents had attained university degree while 33.3% had attained a postgraduate level of education and only 4.8% had attained a diploma. The implication was the respondents had adequate knowledge to comprehend the question asked on ERP by virtue of their high level of education where 95% had degree level of education and above.

Figure 4.3: Time worked with JMS



Source: Primary data

The findings in figure 4.3 shows that majority of 68.3% of the respondents had worked with JMS for 4- 7 years while 12.7% had worked for more than 8 years. The implication was that 80% of the respondent had adequate experience in the use of the ERP in JMS since they had worked with the entity for more than 4 years.

4.3. ERP configuration and JMS supply chain performance

The first objective of the study was to determine the effect of Enterprise Resource Planning system configuration on supply chain performance at Joint Medical Stores. To start with ERP configuration according to the conceptual framework ERP configuration was one of dimensions of the independent variable undet two indicators of service network and visualization measured using 10 item score on a five point Likert scale ranging from 5= Strongly Agree, 4= Agree, 3= Not Sure, 2= Disagree, and 1= Strongly Disagree. A mean result below 3.0 suggests inadequate configuration while a mean result of

≥3.0 suggests a adequate configuration of the particular ERP application for executing medical supply related tasks.

Table 4.1: Descriptive results for ERP configuration

	SDA	DA	NS	A	SA	Mean	Std. Dev
	Percentages						
1. The ERP software is adequately configured to support upstream supply chain activities in JMS	54	23.8	6.3	7.9	7.9	1.92	1.286
2. The ERP software is adequately configured to support distribution management activities in JMS	33.3	39.7	4.8	7.9	14.3	2.30	1.387
3. The ERP software is adequately configured to support retail and e-commerce activities in JMS	1.6	12.7	12.7	38.1	34.9	3.94	1.030
4. The ERP software is adequately configured to support back office activities in JMS	14.3	7.9	6.3	27	44.4	3.79	1.450
5. The ERP software use in JMS adequately considers needs	42.9	31.7	7.9	9.5	7.9	2.08	1.274
6. The ERP software can configure additional modules	1.6	15.9	7.9	39.7	34.9	3.92	1.067
Visualization							
7. The ERP software provides adequate visualization of upstream activities in JMS	1.6	12.7	7.9	39.7	38.1	4.02	1.024
8. The ERP software provides adequate visualization of distribution management activities in JMS	6.3	14.3	9.5	33.3	36.5	3.79	1.259
9. The ERP software provides adequate visualization of retail and e-commerce activities in JMS	1.6	12.7	7.9	42.9	34.9	3.98	1.008
10. The ERP software provides adequate visualization of back office activities in JMS	7.9	15.9	9.5	27	39.7	3.75	1.344

Source: Primary data

Table 4.1 shows that majority of 81% of the respondents agreed that the ERP at JMS enables them to effectively carry out warehousing operations (mean = 3.94) while another majority of 73% agreed that the ERP software is adequately configured to support retail and e-commerce activities (mean 3.94). Similarly, a total of 71.4% of the respondents agreed that the ERP software is adequately configured to support back office activities (mean 3.79) while another majority of 74.6 % agree that the ERP software can configure additional modules indicated by mean (mean = 3.92). The implication was that about 7 in every 10 users of the ERP system in JMS where satisfied with the level of ERP configuration which enabled them to effectively perform warehousing, retail and e-commerce and back office operations.

However, majority of 77.8% disagreed that the ERP software is adequately configured to support Upstream supply chain activities at JMS (mean = 1.92) while 73% disagreed that the ERP software is adequately configured to support distribution management activities in JMS (mean = 2.3). The implication was that about 8 in every 10 staff were dissatisfied with the level of ERP software configuration for upstream and distribution process management factors with adversely affects supply chain performance due to less linkages of the medical service networks.

Table 4.1 above further shows that majority of 77.8% agreed with adequate visualization of downstream activities (mean 4.02), 69.8% agreed with adequate visualization of distribution management activities (mean 3.79), 77.8% adequate visualization of retail and e-commerce activities in JMS (mean 3.98) while 66.7% agreed with adequate visualization of back office activities in JMS (mean 3.75). The implication was that the ERP system provided for adequate visualization of the

necessary display/visualization options of supply chain management activities an attribute of the system that enhances soupy chain performance in JMS.

Asked on the application in the ERP used by JMS one IT officer interviewed had this to say:

> Information Systems adapted by JMS comprised of EDI, IFS, MRP, and ERP. Considering increased competition owing to very fast changing needs and preferences of customers, major IS factors that influence business performance in JMS, is integrating all the business processes expressed in different parameters of stores and ware housing, accounts, procurement, distribution of JMS, is one of the strategic goals of controlling flow of information and supply along the chain. Another interviewee stated that quick transfer of data from one system to another using software, hardware and network, curtails longer approval, authorization and response time, which influences quick decision support system, hence achieving competitive advantage and improving the quality of rendered service along the chain in relation to the strategy of JMS.

The interview findings reveal software competence gaps in the ERP system which need to be strengthened to address user needs. Any efforts to strengthen the stem should consider the user needs in the whole supply chain.

4.3.1. Correlation analysis between ERP configuration and supply chain performance

To test if there was a significant relationship between ERP configuration and supply chain performance at JMS, a correlation analysis was conducted using Pearson's correlation coefficient and significance statistics. The findings are presented in the table below.

Table 4.2: Correlation Matrix between ERP configuration and supply chain performance

		ERP configuration	Supply chain performance
ERP configuration	Pearson Correlation	1	
	Sig. (2-tailed)		
	N	63	
Supply chain performance	Pearson Correlation	.350**	1
	Sig. (2-tailed)	.005	
	N	63	63
*. Correlation is significant at the 0.05 level (2-tailed).			

Source: Primary data

$P \leq 0.05$

The correlation analysis findings in Table 4.2 reveals a positive significant relationship ($r = 0.350$; $p < 0.05$) between ERP system configuration and supply chain performance at JMS. This means that the ERP system configuration is related to supply chain performance especially where the staff use the system is adequately configures service networks and provided for adequate visualization of upstream supply chain, distribution process management, retail and e-commerce as well as for back office activities.

4.4. ERP implementation and supply chain performance

The second objective of the study was to assess the effect of ERP system implementation on supply chain performance at Joint Medical Stores. ERP implementation according to the conceptual framework ERP implementation was one of dimensions of the independent variable under the indicators of data completeness and system reliability measured using 10 item score on a five point Likert scale ranging from 5= Strongly Agree, 4= Agree, 3= Not Sure, 2= Disagree, and 1= Strongly Disagree. A mean result below 3.0 suggests inadequate implementation while a mean result of ≥ 3.0 suggests adequate implementation consideration of the particular ERP application.

Table 4.3: Descriptive results for ERP implementation

	SDA	DA	NS	A	SA	Mean	Std. Dev
	Percentages						
Complete record							
1. The ERP in JMS provides a complete record to the suppliers on required medical supplies	7.9	9.5	7.9	30.2	44.4	3.94	1.281
2. The ERP in JMS provides a complete record from the suppliers on required medical supplies	7.9	11.1	7.9	30.2	42.9	3.89	1.297
3. The ERP in JMS provides a complete record of orders from the customers on required medical supplies	6.3	19	4.8	34.9	34.9	3.73	1.298
4. The ERP in JMS provides a complete record of orders to the customers on required medical supplies	7.9	9.5	7.9	30.2	44.4	3.94	1.281
5. The ERP in JMS provides a complete records for generating Supply chain reports on medical supplies	27	41.3	4.8	23.8	3.2	2.35	1.207
6. The ERP in JMS provides a complete records for back office reports on medical supplies	34.9	47.6	4.8	11.1	1.6	1.97	.999
Reliability							
7. The ERP system in JMS provides consistent information on medical supplies	31.7	44.4	4.8	15.9	3.2	2.14	1.134
8. The ERP system in JMS provide real time data	28.6	44.4	6.3	17.5	3.2	2.22	1.142
9. The ERP system in JMS is up to data	28.6	41.3	6.3	20.6	3.2	2.29	1.184
10. The ERP system in JMS is always available	28.6	39.7	6.3	22.2	3.2	2.32	1.202

Source: Primary data

The findings in table 4.3 shows that majority of 74.6% of the respondents agreed with ERP providing a complete record to the suppliers (mean 3.94), from the suppliers (mean 3.89) while 69.8% agreed that the ERP in JMS provides a complete record of orders from the customers on required medical supplies (mean 3.73) and 74.6% agreed that the ERP in JMS provides a complete record of orders to the customers on required medical supplies (mean 3.94). The implication was the ERP system had a good record transition between JMS and its suppliers and customers.

However, 68.3% disagreed that the ERP in JMS provides a complete records for generating Supply chain reports (mean 2.35), 82.5% disagreed that the ERP in JMS provides a complete records for back office reports (mean = 1.97). The implication was that the ERP system had records gaps in areas of generating complete supply chain and back office reports.

On system reliability 76.1% disagreed that ERP system in JMS provides consistent information on medical supplies (mean = 2.14). Furthermore, 73% disagreed that the ERP system in JMS provide real time data (mean 2.22), 69.9% disagreed that the ERP system in JMS is up to data (mean 2.29) while 68.3% disagreed that the ERP system in JMS is always available (mean 2.32). These findings reveal that about 7 in every 10 users was not satisfied with the level of ERP system reliability since it was inconsistent, did not provide real time data and could be off for some time paralyzing operations.

Asked on the on the challenges in using the ERP, another from PDU had this to say:

> The requirements of SCIS are not limited to fast internet support system, reliable power source to run the system, both the hardware and the software gargets, the technocrats to support the functionality of the systems, and the capital to continuously invest in IS as new versions emerge every single day, alongside capacity building of staff to adapt the new styles of operations to enhance informed decision along the chain.

The IT official interviewed underlined challenges at JMS include but are not limited to:

> Inadequate funds from donors like USAID, MoH, TASO, and this funding sometimes delays, government policies, such as National Medicines Policy, PPDA and Regulations, inadequate

technical staff. One interviewee revealed that there is the challenge of network and competition. Though JMS is the leading NGO not for profit private organisation in medical supplies and health service distribution industry, companies like UHMG, IHK," always impacts on the operations.

The implication was that users regular experienced system failure problems which constrained effecting up and downstream transactions on the medical supplies. This needs to be addressed for enhance supply chain performance.

4.4.1. Correlation analysis between ERP implementation and supply chain performance

To test if there was a significant relationship between ERP system implementation and supply chain performance at JMS, a correlation analysis was conducted using Pearson's correlation coefficient and significance statistics. The findings are presented in the table below.

Table 4.4: Correlation Matrix between ERP system implementation and supply chain performance

		ERP configuration	Supply chain performance
ERP implementation	Pearson Correlation	1	
	Sig. (2-tailed)		
	N	63	
Supply chain performance	Pearson Correlation	.359**	1
	Sig. (2-tailed)	.004	
	N	63	63
*. Correlation is significant at the 0.05 level (2-tailed).			

Source: Primary data

$P \leq 0.05$

The correlation analysis finding in Table 4.4 reveals as positive significant relationship ($r = 0.359$; $p < 0.05$) between ERP system implementation and supply chain performance at JMS. This means that the ERP system implementation is related to supply chain performance especially where the staff use the

system is complete and reliable data upstream, distribution process management, retail and e-commerce as well as for back office activities.

4.5. ERP evaluation and supply chain performance

The third objective of the study was to examine the effect of ERP system evaluation on supply chain performance at Joint Medical Stores. ERP system evaluation according to the conceptual framework ERP system evaluation was one of dimensions of the independent variable under the indicators of regularity of review and troubleshooting measured using 6 item score on a five point Likert scale ranging from 5= Strongly Agree, 4= Agree, 3= Not Sure, 2= Disagree, and 1= Strongly Disagree. A mean result below 3.0 suggests inadequate evaluation practices while a mean result of $\geq$3.0 suggest evaluation of ERP system in JMS.

Table 4.5: Descriptive results for ERP evaluation

	SDA	DA	NS	A	SA	Mean	Std. Dev
	Percentages						
Regulatory of system review							
1. The management of JMS conducts monthly reviews on the ERP system performance	4.8	7.9	1.6	50.8	34.9	4.03	1.062
2. The management of JMS conducts quarterly reviews on the ERP system performance	4.8	6.3	1.6	44.4	42.9	4.14	1.060
3. The management of JMS conducts annual reviews on the ERP system performance	4.8	15.9	3.2	38.1	38.1	3.89	1.220
Trouble shooting							
4. I can easily trouble shoot basic problems in ERP system	4.8	7.9	4.8	42.9	39.7	4.05	1.099
5. I have access to adequate internal technical expertise to promptly trouble shoot ERP system failures	23.8	55.6	3.2	14.3	3.2	2.17	1.056
6. I have access to adequate external technical expertise to promptly trouble shoot ERP system failures	4.8	9.5	6.3	49.2	30.2	3.90	1.088

Source: Primary data

Table 4.5 shows that majority 85.7% of the respondents agreed that the management of JMS conducts monthly (mean 4.03), quarterly (mean 4.14) and annual ERP system reviews (mean 3.89). The implication was that management undertook to periodically review and update the system a practice which foster supply chain performance if system review recommendations are implemented.

Furthermore, majority 82.6% agreed that ease of trouble shoot basic problems (mean 4.05), access to external technical expertise to promptly trouble shoot ERP system failures (mean 3.90%) but 79.4% disagreed with access to adequate internal technical expertise to promptly trouble shoot ERP system

failures (mean 2.17). These findings reveal that whereas there was effort to put in place required technical expertise, the internal expertise was still inadequate. There is need for a resident ERP team to help trouble shoot the system.

On the strategies for strengthen ERP, the PDU respondent suggested:

> Recruitment of more technical experienced skilled staff, the donor community and the government should increase funding for JMS, and release the funds early enough, JMS should acquire GPS to monitor the distributers to avoid road loading and unnecessary delays, JMS needs to get compatible, latest version software like TALLY to specifically manage stores/inventory in light to easily track expired stock, which expire in shelves unnoticed, JMS should organise quarterly site visits at customer premises to understand their needs and to keep an arm's length relationship so that JMS marketing and sales does not give any chance for the competitor to take advantage of the situations mentioned above, capacity building in terms.

Another went on to suggest:

> In stores we need cold chain on how to follow the room temperature guidelines for each medicine, customers; on when-how to place orders on line, finally with supplier; during [supplier day] to discuss delays, non-conformity to specifications issued and evaluating performance span and results in a given financial year with all suppliers to improve service delivery mechanisms". These are to facilitate smooth running of operations at the entity.

4.4.1. Correlation analysis between ERP evaluation and supply chain performance

To test if there was a significant relationship between ERP system evaluation and supply chain performance at JMS, a correlation analysis was conducted using Pearson's correlation coefficient and significance statistics. The findings are presented in the table below.

Table 4.6: Correlation Matrix between ERP system evaluation and supply chain performance

		ERP evaluation	Supply chain performance
ERP evaluation	Pearson Correlation	1	
	Sig. (2-tailed)		
	N	63	
Supply chain performance	Pearson Correlation	.115	1
	Sig. (2-tailed)	.370	
	N	63	63
*. Correlation is significant at the 0.05 level (2-tailed).			

Source: Primary data

$P \leq 0.05$

The correlation analysis findings in Table 4.6 reveal a no significant relationship ($r = 0.115$; $p > 0.05$) between ERP system evaluation and supply chain performance at JMS. This means that the ERP system evaluation is not related to supply chain performance. The challenges are attributed to significance gaps in regularity of ERP system reviews and trouble shooting.

4.6. Regression model

A multiple regression analysis was undertaken to establish the combined effect of ERP System dimensions of configuration, implementation, and evaluation on supply chain performance using Analysis of Variance ANOVA statistics of adjusted R^2, beta-β, t-values, and significance p. The multiple regressions was also used to establish which among the dimensions ERP system had the most significant effect on supply chain performance. The multiple regression results are presented below.

Table 4.7: Multiple regression model

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.522[a]	.273	.236	.68322

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.559	.677		-.826	.412
	ERP configuration	.329	.099	.371	3.324	.002
	ERP Implementation	.427	.133	.357	3.202	.002
	ERP Evaluation	.133	.116	.129	1.153	.254
a. Dependent Variable: SC Performance						

Source: Primary data

Table 4.7 indicated that the adjusted R^2 shows the variation in supply chain performance that is explained by variation in the ERP system. Thus according to regression results the variations in ERP system explains variation in supply chain performance up to 23.6% (0.236 x 100). This implies that ERP system is a critical factor for explaining supply chain performance. However, there are other variable factors not included in this study that account for the remaining variance of 76.4% in supply chain performance.

The regression results further show that ERP system configuration was the most significant predictor of the variance in Supply chain performance in JMS as per the (β = 0.371, t = 3.324, Sig = 0.002) which is less than the common significance level of 0.05. This implies that a significant change in ERP configuration would result into a greater significant 0.371 unit change in supply chain performance at JMS.

The standardized coefficient statistics further show that ERP implementation was the second most significant predictor of the variance in supply chain performance in the JMS as per the ($\beta = 0.357$, $t = 3.202$, Sig = 0.002) which is less than the common significance level of 0.05. This implies that a significant change in ERP implementation would result into 0.357 unit change in supply chain performance.

ERP evaluation was not a significant predictor supply chain performance as per the ($\beta = 0.129$, $t = 1.153$, Sig = 0.254). Thus a change in ERP evaluation would not result into any significant change in supply chain performance at JMS.

In summary, the high positive regression coefficients between the dimensions of the study and the value of $R^2 = 0.522^a$ indicate that ERP system is strongly related with supply chain performance in JMS.

4.7. Supply chain performance

Supply chain performance was dependent variable and had two indicators of timeliness of delivery and shelf life measured using 7 item score on a five point Likert scale ranging from 5= Strongly Agree, 4= Agree, 3= Not Sure, 2= Disagree, and 1= Strongly Disagree. A mean result below 3.0 suggests poor supply chain performance while a mean result of ≥ 3.0 suggest good supply chain performance.

Table 4.8: Descriptive results for supply chin performance

	SDA	DA	NS	A	SA	Mean	Std. Dev
	Percentages						
1. Time between placing an order and receiving medical supplies from JMS is always within the agreed time.	30.2	39.7	4.8	11.1	14.3	2.40	1.397
2. Medical suppliers orders from JMS arrive on the promised date	42.9	22.2	7.9	19	7.9	2.27	1.394
3. JMS offers a timely return of medical supplies whenever required	49.2	23.8	6.3	12.7	7.9	2.06	1.343
4. We rarely experience stock outs for essential medical supplies	42.9	25.4	7.9	15.9	7.9	2.21	1.358
5. The ERP system has capability to update the shelf life of medical supplies	22.2	50.8	3.2	3.2	20.6	2.29	1.069
6. Medical supplies from JMS are always supplied in suitable conditions for consumption	28.6	34.9	14.3	17.5	4.8	2.35	1.207
7. We rarely experience cases of expired medical supplies	28.6	41.3	6.3	20.6	3.2	2.29	1.184

Source: Primary data

The findings in 4.8 above reveal that about 7 in every 10 respondents disagreed with lead time (mean= 2.40); timely deliveries (mean = 2.27); return policy (mean = 2.21); availability of stock for essential medical supplies (mean = 2.29) in JMS implying that the JMS was constrained to fulfill time requirement performance indicator of supply chain performance.

Furthermore, the respondents disagreed that the ERP system has capability to update the shelf life of medical supplies (mean= 2.35), disagreed that all Medical supplies from JMS were always supplied in suitable conditions for consumption (mean= 2.29) while they disagreed that they rarely experience cases of expired medical supplies (mean = 2.29).

CHAPTER FIVE
SUMMARY, DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.0. Introduction

This chapter presents a summary of the study finding, discussion, conclusions, and recommendation on ERP system and supply chain performance based on the study findings in chapter four. It also presents the limitations and contributions of the study and areas for further research in the last section.

5.1. Summary of the Study Findings

5.1.1. ERP System configuration and supply chain performance

The study found a positive significant relationship ($r = 0.350$; $p < 0.05$) between ERP and supply chain performance at JMS implying that ERP system configuration positively affect supply chain performance especially where the staff use the system to adequately configure service networks and provided for adequate visualization of upstream supply chain, distribution process management, retail and e-commerce as well as for back office activities. ERP system configuration was the most significant predictor of the variance in Supply chain performance in JMS as per the ($\beta = 0.371$, $t = 3.324$, $Sig = 0.002$).

5.1.2. ERP System implementations and supply chain performance

The study found a positive significant relationship ($r = 0.358$; $p < 0.05$) between ERP system implementation and supply chain performance at JMS implying that ERP system implementation positively affect supply chain performance especially where the staff use the system for complete and reliable data for upstream distribution process management, retail and e-commerce as well as for back office activities. The standardized coefficient statistics further show that ERP implementation was the second most significant predictor of the variance in supply chain performance in the JMS as per the ($\beta = 0.357$, $t = 3.202$, $Sig = 0.002$) which is less than the common significance level of 0.05.

5.1.3. ERP system evaluation and supply chain performance

The study found no significant relationship ($r = 0.115$; $p > 0.05$) between ERP system evaluation and supply chain performance at JMS implying that ERP system evaluationdoes not positively affect supply chain performance.

5.2. Discussion of the Study Findings

5.2.1. ERP System configuration and supply chain performance

The study found that ERP system configuration positively affect supply chain performance especially where the staff use the system to adequately configure service networks and provide for adequate visualization of upstream supply chain, distribution process management, retail and e-commerce as well as for back office activities. The study findings relate to a great extent to Liu et al., (2016) who attribute supply chain performance to the existence and nature of interrelationships between multiple components of SCI and IT competency and their effects on firm performance. Daniel Fritsch (2015) moreover also found that an ERP system helps the organizations to maximize their inventory investments by offering opportunities for traceable records through assigning SKUs, expiry dates, and units of measure, serial numbers, lot numbers, and attributes; adding notable features to products to locate items within the warehouse, storage requirements, sales rates, special handling; Keeping tabs on stock that is sluggish or about to expire. Beheshti et al., (2014) attribute supply chain performance to use of an effective ERPsoftware which has emerged as a key enabler of system integration in organizations to reduce redundancy, improve efficiency, productivity and performance. On the basis of the study findings, the study inferred that ERP configuration significantly affect medical supply chain performance.

5.2.2. ERP System implementations and supply chain performance

There was a positive significant relationship between ERP system implementation and supply chain performance at JMS implying that ERP system implementation positively affect supply chain performance especially where the staff use the system to complete reliable data,upstream supply chain, distribution process management, retail and e-commerce as well as for back office activities. This study findings echo previous studies such as Seyed et al. (2013) which attribute organisational performance to use Vendor Managed Inventory system which tracks all order records between the suppler and purchasing entity. Similarly, Addo-Tenkorang and Helo (2011) in their review report found that The ERP system eases the smooth flow of communal information and practices across the entire organisation leading to overall reduction in lead time. This study therefore inferred that ERP complete records and reliability significantly contribute to medical supply chain performance at JMS.

5.2.3. ERP system evaluation and supply chain performance

The study found no significant relationship between ERP system evaluation and supply chain performance at JMS implying that ERP system evaluationdoes not positively affect supply chain performance. The findings are contrary to other studies which find a positive significant effect between evaluation and supply chain performance such as Bellgran and Säfsten (2010) evaluations enable to determine values or results of for example an operating system or a change of system. Forslund and Jonsson (2007) contend that an evaluation of the system lead to the finding that there were system quality inefficiencies that made the forecast data unreliable.

5.3. Conclusions of the Study

5.3.1. ERP System configuration and supply chain performance

The study concluded that medical supply chain performance depends on how well the ERP software configures service networks and visualization of upstream supply chain, distribution process management, retail and e-commerce as well as for back office activities. A poorly configured ERP system adversely affects medical supply chain performance.

5.3.2. ERP System implementations and supply chain performance

The study concluded that medical supply chain performance depends on the completeness of data and reliability of the ERP system for effecting upstream supply chain, distribution process management, retail and e-commerce as well as for back office activities. An unreliable ERP system with incomplete data record adversely affects medical supply chain performance.

5.3.3. ERP system evaluation and supply chain performance

The study concluded that ERP system evaluation does not affect medicalsupply chain performance. This means that other ERP dimensions affect supply chain performance of medical supplies at JMS.

5.4. Recommendation of the Study

5.4.1. ERP System configuration and supply chain performance

To enhance medical supply chain performance, the management of JMS and related firms should:

- Task the ERP developer/vendor to adequately identify user needs and configure the ERP software to support upstream supply chain and distribution process management activities at JMS.

- Task the ERP developer/vendor to expand the fields for visualization to all users to effect upstream supply chain activities, distribution process management, retail and e-commerce, and back office operations.

5.4.2. ERP System implementations and supply chain performance

To enhance medical supply chain performance, the management of JMS and related firms should:

- Always audits transaction data to guarantee a generating Supply chain and back office reports on medical supplies.
- Task the Vendor to strengthen the ERP system reliability to provide consistent, real time and up to date data on medical supplies

5.4.3. ERP system evaluation and supply chain performance

To enhance medical supply chain performance, the management of JMS and related firms should:

- Encourage management to sustain the system review activities to identify system gaps for enhancing
- Recruit more ERP specialists to offer internal technical expertise for promptly trouble shooting ERP system failures

5.5 Contributions of the Study

The study helped develop managerial recommendations on supply chain performance time and shelf life of medical supplies there by leading to reduced lead time, minimal stockout levels and delivery on order medical supplies. The module as well enhanced a way of training the staff in key ERP applications/software which are perceived to be challenging to use. The study has also helped cover literature gaps on the influence of ERP system on supply chain performance in the delivery of medical supplies at JMS.

5.6 Limitations of the Study

The study relied on primary data using questionnaires and interview guide with limited use of secondary data that could have reinforced the quality of data use of ERP system and supply chain performance. The study also relied on views of users without consideration of ERP or IT expert/ consultant opinions.

5.7 Areas for Further Research

The study found that ERP system predicted 23.6% of the variance in supply chain performance while other variable factors not included in this study account for the remaining variance of 76.4% in supply chain performance. Other studies need to examine the moderating role of organisational culture on the relationship between ERP system and supply chain performance at JMS.

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APPENDICES

APPENDIX I: QUESTIONNAIRE FOR JOINT MEDICAL STORES STAFF

Dear Respondent,

I am ***David Adayo***a student of Kyambogo University and I am interested in establishing the impact of Enterprise Resource Planning (ERP) information system on supply chain performance at Joint Medical Stores. You are among the selected participants in this study by providing information. This study is a requirement for partial fulfilment for the award of the degree of Master of Science in Supply Chain Management of Kyambogo University and is purely for academic purposes. Therefore the information given will be treated with utmost confidentiality. I therefore request you to spare some time and help me to fill in these questionnaires. Your response is highly appreciated.
Thank you for your cooperation.

Section A: Background Information
Instruction: Please tick the most appropriate option that applies to the topic of study in relation to your organization.
Your job category JMS: Pharmacist [ ] PDU [ ] Customer care [ ] Logistics [ ] Warehouse [ ]
Your highest level of educations Diploma [ ] Degree [ ] Post Graduate [ ]
Length of service at NMS: < 1Year [ ] 1-3Years [ ] 4-7Years [ ] 8+Years [ ]

Section B: ERP configuration
Indicate the extent to which you agree with the following observation on ERP configuration in JMS by indicating strongly disagree (1), disagree (2), Not sure (3), agree (4), strongly agree (5)

Service networks					
1. The ERP software is adequately configured to support supply chain management activities in JMS	1	2	3	4	5
2. The ERP software is adequately configured to support distribution management activities in JMS	1	2	3	4	5
3. The ERP software is adequately configured to support retail and e-commerce activities in JMS	1	2	3	4	5
4. The ERP software is adequately configured to support back office activities in JMS	1	2	3	4	5
5. The ERP software used in JMS adequately considers needs	1	2	3	4	5

6. The ERP software can configure additional modules	1	2	3	4	5
Visualization					
7. The ERP software provides adequate visualization of upstream activities at JMS	1	2	3	4	5
8. The ERP software provides adequate visualization of distribution management activities at JMS	1	2	3	4	5
9. The ERP software provides adequate visualization of retail and e-commerce activities at JMS	1	2	3	4	5
10. The ERP software provides adequate visualization of back office activities at JMS	1	2	3	4	5

Section C: ERP implementation

Indicate the extent to which you agree with the following observation on ERP implementation in JMS by indicating strongly disagree (1), disagree (2), Not sure (3), agree (4), strongly agree (5)

ERP					
Data completeness					
1. The ERP at JMS provides a complete record to the suppliers on required medical supplies	1	2	3	4	5
2. The ERP at JMS provides a complete record from the suppliers on required medical supplies	1	2	3	4	5
3. The ERP at JMS provides a complete record of orders from the customers on required medical supplies	1	2	3	4	5
4. The ERP at JMS provides a complete record of orders to the customers on required medical supplies	1	2	3	4	5
5. The ERP at JMS provides a complete records for generating Supply chain reports on medical supplies	1	2	3	4	5
6. The ERP at JMS provides a complete records for back office reports on medical supplies	1	2	3	4	5
System reliability					
1. The ERP system at JMS provides consistent information on medical	1	2	3	4	5

supplies					
2. The ERP system at JMS provide real time data	1	2	3	4	5
3. The ERP system at JMS is up to data	1	2	3	4	5
4. The ERP system at JMS is always available	1	2	3	4	5

Section D: ERP system evaluation

Indicate the extent to which you agree with the following observation on ERP system evaluation in JMS by indicating strongly disagree (1), disagree (2), Not sure (3), agree (4), strongly agree (5).

Regularity					
1. The management of JMS conducts monthly reviews on the ERP system performance	1	2	3	4	5
2. The management of JMS conducts quarterly reviews on the ERP system performance	1	2	3	4	5
3. The management of JMS conducts annual reviews on the ERP system performance	1	2	3	4	5
Trouble shooting					
1. I can easily trouble shoot basic problems in ERP system	1	2	3	4	5
2. I have access to adequate internal technical expertise to promptly trouble shoot ERP system failures	1	2	3	4	5
3. I have access to adequate external technical expertise to promptly trouble shoot ERP system failures	1	2	3	4	5

Section II:Supply chain performance

Instructions

Please indicate the extent to which you agree with the following observation on JMS supply chain performance using a scale of (1) = strongly disagree (SA), (2) = disagree (3) = not sure (4) = agree (5) = strongly agree.

Delivery on time					
4. Time between placing an order and receiving medical supplies from JMS is always within the agreed time.	1	2	3	4	5
5. Orders from suppliers of JMS arrive on the promised date	1	2	3	4	5
6. JMS offers a timely returns of medical supplies whenever required	1	2	3	4	5
7. We rarely experience stockouts for essential medical supplies	1	2	3	4	5
Shelf life					
1. Medical supplies from JMS are always supplied in suitable conditions for consumption	1	2	3	4	5
2. The ERP system has capability to update the shelf life of medical supplies	1	2	3	4	5
3. We rarely experience cases of expired medical supplies	1	2	3	4	5

END OF QUESTIONNAIRE

THANK YOU FOR YOUR RESPONSE

APPENDIX II:INTERVIEW GUIDE FOR LINE MANAGERS(OFFICERS) AND TOP MANAGEMENT OF JMS

Dear Respondent,

I am **Adayo David**, a final year student of Kyambogo University pursuing a Master of Science in Procurement and Supply Chain Management. I am conducting a study on: "***ERP Systems and supply chain performance a case study of Joint Medical Stores".*** I am required to submit a research report as part of the partial requirements for the award. The purpose of this interview guide is to gather information to enrich the study findings. The study shall be entirely academic and thus any information provided will be treated with utmost confidentiality.

1. What are the active applications modules in ERP system?
2. Comment on the perceived usefulness and ease of use of ERP module?
3. In your own view, what is the influence of ERP application on supply chain performance at JMS?
4. What challenges face ERP application at JMS?
5. Give the strategies put in place to strengthen ERP use at JMS.

"Thank you Very Much for Your Co-Operation"

APPENDIX V: KREJCIE AND MORGAN TABLE FOR DETERMINING SAMPLE SIZE FROM A GIVEN POPULATION

N	S	N	S	N	S	N	S	N	S
10	10	100	80	280	162	800	260	2800	338
15	14	110	86	290	165	850	265	3000	341
20	19	120	92	300	169	900	269	3500	246
25	24	130	97	320	175	950	274	4000	351
30	28	140	103	340	181	1000	278	4500	351
35	32	150	108	360	186	1100	285	5000	357
40	36	160	113	380	181	1200	291	6000	361
45	40	180	118	400	196	1300	297	7000	364
50	44	190	123	420	201	1400	302	8000	367
55	48	200	127	440	205	1500	306	9000	368
60	52	210	132	460	210	1600	310	10000	373
65	56	220	136	480	214	1700	313	15000	375
70	59	230	140	500	217	1800	317	20000	377
75	63	240	144	550	225	1900	320	30000	379
80	66	250	148	600	234	2000	322	40000	380
85	70	260	152	650	242	2200	327	50000	381
90	73	270	155	700	248	2400	331	75000	382
95	76	270	159	750	256	2600	335	100000	384

Krejcie, Robert V., Morgan, Daryle W., ***"Determining Sample Size for Research Activities"*** Educational and Psychological Measurement, (1970).

Note: "N" is population size

"S" is sample size.