

**ENTERPRISE RESOURCE PLANNING AND SUPPLY CHAIN
PERFORMANCE OF SUGAR MANUFACTURING COMPANIES IN
KENYA**

BY

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DECLARATION

This research project is a product of my own work and it has not been presented to any other institution of learning for an award of any kind.

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This research project was carried out by the student under my supervision and approval

Signature: _____ **Date:** _____

MR GERALD ONDIEK

DEDICATION

This research project is dedicated to my beloved wife, Salome Valery Osidiana and our children, Jamal Joshua Asewe and Mical Margaret Asewe for their unending support and love.

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My sincere gratitude goes to individuals who immensely assisted towards the conceptualization and preparation of this research project.

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ABSTRACT

Sugar manufacturing companies in Kenya are currently struggling with operational challenges with most of them operating below capacity. The sugar sector is driven by various forces and the operating environment is prone to political interference due to the existence of cartels. The sugar manufacturing companies therefore need to develop unique competencies and capabilities to ensure provision of excellent customer services along the sugar sector value chain. In the quest of improving both operational and supply chain performance, most of the sugar manufacturing companies are enhancing the power of technological advancement and institutionalizing ERP systems within their operations and business partners. The objective of this study was to elaborate the relationship between ERP and supply chain performance of sugar manufacturing companies in Kenya. The study adopted a survey and descriptive design research methodology. A descriptive study was adopted to solicit attitudes or views of sugar companies' managers who apply ERP towards supply chain operations, decision making, and supply chain performance measurement and evaluation. A quantitative analysis was undertaken on the data collected using the SPSS software for statistical packages. The analysis results were displayed as frequency tables, means, and standard deviations. SPSS analysis was performed to create histograms, frequency distributions, and other measures. From the research findings, it was established that indeed there exists a significant relationship between ERP and the performance of the supply chain of the sugar manufacturing companies in Kenya. The researcher makes a number of recommendations as detailed in the findings; the need for continuous improvement and ensuring enterprise-wide coordination of all the ERP systems within the companies in order to realize full ERP benefits. Further, the study recommends an in-depth investigation and analysis of the supply chain performance of the entire value chain from unprocessed material suppliers (outgrowers), sugar processors and distributors for effective operation and control. Finally, major players in ERP systems applications should also enhance the flexibility and the adaptability of high-end ERP systems for sugar manufacturing companies. This includes systems integration, instituting cost-effective hands-on user trainings and tailor-making of ERP modules to address local industry requirements.

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LIST OF ABBREVIATIONS

ERP:	Enterprise Resource Planning
IT:	Information Technology
ICT:	Information Communication Technology
KSB:	Kenya Sugar Board
OP:	Organization Performance
SCP:	Supply Chain Performance
SAP:	Systems Applications & Products
SCM:	Supply Chain Management
SCOR:	Supply Chain Operations Reference

CHAPTER ONE: INTRODUCTION

1.1 Background of the study

The challenging and diverse economic surrounding of today has presented significant challenges to business organizations around the world. Companies have now entered a new, more dynamic and complicated business environment (Chen & Lin, 2009). Most enterprises have shifted their focus from supply chain management from the factory level to enterprise wide supply chain management (Gunasekaran et al. 2005). Enterprise resource planning systems are computer development modules that support functional areas such scheduling, production, delivery, finance and operation. Large & medium scale manufacturing firms have adopted ERP systems in order to improve customer service experience, enhance production capabilities while reducing overheads during the production process. Technologically, ERP modules not only incorporates the front and back office processes but also the production companies' internal and external supply chains. According to Zhang et al. 2011, it has been realized that majority of companies have been found to implement ERP systems with the aim of improving their operational capabilities, including leadership, strategic achievement, IT and technology, operations and their business (Zhang et al. 2011)

This study is anchored in Systems Theory (Stichweh, 2011) Virtual organizations Theory & Barney's (1991) Resourced Based View Theory. Chikere & Nwoka 2015 posits that systems theory assembles different components of a complex supply chain including human capital, financial capabilities, and intellectual knowledge in order to form a subsystem that eventually becomes part of a larger supply chain or network system. Virtual organizations are independent companies that are geared on reacting to market opportunities. The organizations build a network of distributors, producers to achieve maximum efficiency and responsiveness. Lavassani et al (2009). Resourced based view theory propagates the benefits that are accrued to an entity as a result of having the right resources for its existence. The said resources may be in form of financial capability, physical locations, human and intellectual labor and advancements in technology among other desirable capabilities.

The sugar sector is a major contributor to the Kenyan economy, (KSI, 2009). In recent years, the sector has faced a number of challenges that include high production costs compared to other countries in the world, low capacity utilization and factory inefficiencies. Such problems led to the development of new business approaches to improve their operations including investment in incorporation of information technology across the supply network of sugar. According to Kegode (2005), the value chain of the sugar sector is made up of three main components; production, processing and distribution. A holistic approach is required by all the industry players in the sugar sector supply chain for the rapid enhancement of the competitiveness of the sugar manufacturing firms in Kenya. The aim of this research is to elaborate and seek to propagate the connection between ERP and performance of the supply chain of Kenya sugar manufacturing companies.

1.1.1 Enterprise Resource Planning

Enterprise resource planning refers to software packages which consists of many modules, including finance, production, sales, and human resource, that provides integrated information across various departments in organizations through the essential embedded business processes. According to many authors, Adaileh and Abu-alganam (2010) and Baymout (2014), ERP is a model information system through which different departments within an organization communicates. It enhances international coordination, standardizes the data processing procedures, and integrate the departmental operations data.

Klaus et al (2000) argues that ERP is basically an enterprise wide collection of management modules which links consumers and suppliers to a full supply chain ,offering a high level of cross-functional alignment between the various functions of business processes which seeks to establish the highest consumer quality and long term performance productivity. ERP dimensions include intergration, management of materials, planning of production, distribution, quality management, procurement and control. Intergration is inter-departmental collaboration through shared information system. Shatat & Udin (2012) argues that integration enhances total supply chain visibility and costs reduction. Materials management is a set of process that includes activities of acquisition of varies types of materials, controlling their storage and managing their flow to different places within a manufacturing enterprise. ERP

systems enhances inventory optimization and control. Based on an array of historical data and sales forecasts, ERP production planning module enhances the utilization of production capacity, input production parts, components and material resource requirements. Chenhal R. (2003) further defines controlling as procedure for evaluating performance and taking the necessary steps in order to have the final desired outcome as anticipated. ERP controlling module offers an integral support in the process of work of the business enterprise.

1.1.2 Supply Chain Performance

Simchi-Levi et al. (2006) defines supply chain performance as the approaches of evaluating the effectiveness and efficiency of the supply chain. According to Jamie et al. (2010), the performance of the supply chain can be measured on its own without consideration to the other business functions within the enterprise. Performance measurement approaches like the Balance Score Card (BSC) and the SCOR model (2010) have been suggested by various experts including the Supply Chain Council.

The balance score card is a quality measurement system which can help business executives to define key performance drivers and metrics while providing the right direction for strategic execution (Kaplan & Norton 1992). While BSC was not explicitly designed for measuring performance in the supply chain, its concepts provide excellent guidelines for its application. Balance score card approach proposes monitoring a small number of integrated supply chain metrics perspectives namely: financial, consumer, internal business, and creative and development outlook.

The Council established the reference structure for supply chain operations (SCOR) in 1996. The SCOR model outlines a comprehensive framework that can be adopted by experts to measure both the operations and quality of the entire supply chain. Meyr et al. (2002) posits that the SCOR model is developed on five core internal and external processes namely plan, source, manufacture, deliver and return. Hundreds of

measurement metrics supports the SCOR model alongside five main performance outputs which are efficiency, responsiveness, flexibility, cost, and asset metrics.

1.1.3 Sugar Manufacturing Companies in Kenya

Kenya's sugar manufacturing companies are divided into two categories. Some of them are parastatals and other private owned sugar processing factories. The companies that are owned and managed by the Government include Mumias, Chemelil, Muhoroni, Sony, and Nzoia. On the other hand, the private ones include Butali, TransMara, SOIN, West Kenya, Kibos & Allied Processing Plant. As at now, about 250,000 small-scale farmers rely on this industry. They supply more than 92% of the nation's total milled cane. Other than these supplies, over six million Kenyans depend on that industry either directly or indirectly.

All operations of the sugar firms are moderated by the Kenya Sugar Board (KSB). Safeguard policies initiated by COMESA protect the sugar industry in Kenya. Despite the remarkable progress made during the safeguard period, the sugar sector is still not ready for a free trade regime on the product. For that matter, Kenya asked for additional period of extension which is now in force.

Given the contribution of the safeguard measures, the strategic positioning of this industry has become extremely important, and the companies are facing stiff competition from new entrants. Most firms in the COMESA area produce sugar at a comparatively lower cost. Therefore, Kenyan sugar manufacturing companies might encounter more problems than their counterparts in the small tariff regions. Many of them are working towards mitigating the risks by diversifying into other viable fields.

1.2 Research Problem

Li et al. (2006) posits that enterprise resource planning is known alongside other operational benefits to lower the costs across manufacturing entities supply chain systems and in effect, improve supply chain performance. In order for organizations to compete more efficiently in a global business space, firms must employ the use of technology more specifically, enterprise resource planning in their operations (Sunil & Sameer 1998). In recent years, several studies on emerging enterprises have pointed out to the fact that investment in ERP adoption has immensely contributed towards achieving organizational efficiency and enhanced both internal and external collaboration within the enterprise. Even though dynamic technological systems of the firm may positively contribute to supply chain performance, there is no strong empirically grounded evidence in research literature in Kenya that supports this idea.

Kenya's sugar has been unable to compete with cheap sugar imports both from international producers and COMESA after the Free Trade Agreement (FTA) was launched (FAO, 2012). Kenyan sugar remains uncompetitive mainly due to the high cost of production despite decreases in world sugar prices. For the Kenyan sugar companies to enhance their competitiveness, there is a need to manage efficiently not only the individual actors within the sugar supply chain or series but the whole value chain from unprocessed material suppliers, sugar processors, distributors, and the logistics. In Kenya, a larger percentage of sugar companies are currently grappling with the main problem of provision of quality service to the customers which critically is the root cause of a negative performance of the supply chain.

Several research studies both locally and internationally have investigated the concept of ERP and supply chain performance. Mashari & Zairi (2000) investigated the concept of supply-chain transformation with the adoption of ERP concluded that implementation of ERP enhances the emergence of supply chains that are focused on value creation whilst allowing more supply system flexibility alignment and interactive change across internal and external business networks. In China, Arunachalam et al. (2006), investigated ERP integration with several supply chain management systems of manufacturing enterprises. The investigation concluded that

implementation of robust ERP systems eventually doesn't enhance the capacity of business enterprises to realize the desired supply system flexibility and demand forecasting capabilities.

Various experts have conducted many studies on the implementation of ERP among several manufacturing firms (Sandberg, 2007). They have done the same among large retailers (Sandberg and Abrahamsson, 2010). Through this strategy, they have established the exceptional contribution of ERP in the business world. Scholars in Kenya, such as Mwingi and Andebe (2011), also researched the same subject and discovered that companies that succeed especially in the international market promote the sharing of a wide variety of promotional information between retailers and manufacturers.

From the above analysis, organizations have access to adequate credible academic studies that can assist them to understand the link. Moreover, the research offers them an opportunity to compare the relation between enterprise resource planning performance and organizational performance (OP) and make the right decisions. However, organizations still experience problems since none of the researches have been able to address adequately the factors that influence a fundamental constituent of supply chain management. Presently, scientific reviews have been paying attention on the personal impact of SCM and ERP. In most cases, they have provided that positively contributes to the performance of organizations. Nevertheless, research has produced mixed results for ERP. The overall impression is that SCM mediates the prospective impact of ERP on the activities of business entities.

A review of a number of studies provides proof that there exist close interrelations between supply chain performance and ERP. However, these relationships are not all in the affirmative. Further, from the existing literature, it is not clear what the ERP disposition of the Kenyan sugar industry is and how the disposition affects supply chain performance. The question whether the adoption of ERP will enhance the sugar sector value chain to reconfigure its capabilities to become globally competitive and survive the anticipated regional sugar trade liberalization has not been investigated. This has motivated the current study on the right link between ERP and SCP of Kenya sugar manufacturing entities. This study therefore seeks to enhance knowledge

expansion by answering the question: What influence does ERP systems have on supply chain performance on sugar manufacturing entities in Kenya?

1.3 Research Objective

To determine overall relationship between ERP and supply chain performance in sugar manufacturing entities in Kenya

H₀: There exists no relationship between ERP and supply chain performance in Kenya's sugar manufacturing companies.

1.4 Value of the Study

The study aims at providing the Government with guidelines to come up with supportive policies on supply chain strategies since effective supply chain systems will result to efficient utilization of resources. Consequently, gearing to the achievement of the economic pillar of the vision 2030. The study findings will help researchers find out how Enterprise Resource Planning will impact supply chain performance. The research will also provide reference materials that could equip the researchers with more knowledge and understanding on this pertinent economic subject. The outcome of this study will be able to empower sugar firms to realize the optimum usage of ERP system once they have effectively implemented it. It will ultimately help them to achieve enhanced supply chain management performance. This research will improve the rate of technology diffusion among different companies, as it will reduce the chances of ERP systems failure. For that matter, it will promote the need of other firms in the country to adopt ERP systems.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

In this chapter, several theories that are closely related to the research problem will be examined together with the existing literature on ERP and supply chain performance. Further, a comprehensive theoretical and empirical review of the study variables will be undertaken while identifying the emerging research gaps

2.2 Theoretical Review

The following theories provide the theoretical foundations of the proposed research; Systems Theory (Stichweh, 2011), Virtual Organizations Theory & Barney's (1991) Optimization Theory.

2.2.1 Systems Theory

The theory focusses on the arrangement of the elements and the relationship between each of them. Chikere and Nwoka (2015).By evaluating the way these parts work together and relate with each other, firms can determine the properties of their systems. This holistic approach is necessary for establishing all the factors that impact a supply chain. Ludwig Von Bertalanffy (1973) found that organizations should interact with their external environment to be efficient. However, classical school philosophers, such as Henry Fayol, Frederick Winslow Taylor, and Max Weber, offered a differing opinion. They considered firms as closed systems. Bertalanffy's proposition led to the development of system concepts that got international recognition for its ability to increase the efficiency and effectiveness of global firms despite that they operate in dynamic and changing environments.

Organizations need to assess their management systems to find ways to align their internal subsystems with each other continually. As businesses grow, their subsystems also advance and become more complicated than before. Since organizations have to ensure they coordinate with each other, firms must continuously evaluate these

systems (McShane and Von Glinow, 2003). The industry to which an organization belongs and the global and local economic system are some of the factors that influence the operations of business entities (Wehrich et al., 2008). These researchers hold that, according to their basic input-out model, firms receive input, convert them, and then export the outputs to the external environment. According to Fowler (2000), systems theory looks at the various intricate variables within the company supply chain hence establishing the extent of systems interdependence and a more reliable robust approach on the entire organizations supply chain.

2.2.2 Virtual Organizations Theory

Virtual organizations businesses that are focused on responding to market opportunities. According to L. M. Camarinha-Matos and Hamideh Afsarmane (2005) when these enterprises envisage cooperation with other firms, and they ensure that they create a network that can handle the manufacturing processes or complex services to be highly competitive.

The concept of virtual organizations requires a structural design that can adequately handle the cooperation process as well as the activities which enhances the support of infrastructure. To achieve supply chain flexibility and responsiveness, a big number of virtual organizations are currently improving on establish a comprehensive end to end supply chain network that comprises suppliers, manufacturers and business support systems. The adoption of virtual organizations of the entire supply chain performance while enabling a continuous coordination and constant collaboration within the business environment.

2.2.3 Optimization Theory

Optimization theory holds that organizations can increase their capacity for optimizing operations and profits by putting into consideration the broader subsets of their business. At the same time, they can achieve great results by evaluating how significant processes impact each other as well as the traditional approaches of looking for opportunities for advancement. Davis (2008) requires companies to utilize solutions that can help them concurrently optimize a wide variety of their services and products across their sourcing, production as well as distribution processes. He thinks

that the supply chain solutions often cause some problems, as they break these functions into separate modules and ensures that managers run each of them separately. In this way, David considers that firms lose more resource when they manage different services independently than when they do it together. Cooper et al. (1997), say that when each organization tries to sub-optimize their respective results, instead of integrating their activities and goals for the benefit of the entire chain, sub-optimization occurs. Thus, business entities can successfully formulate a suitable strategy in particular situations when they work together.

2.3 Enterprise Resource Planning and Supply Chain Performance

Enterprise Resource Planning systems are critical systems that ensure the success of enterprises. These systems guarantee improved transparency across the supply chain, given that they efficiently eliminate information distortions. Moreover, they enhance the velocity of information as they ensure the instant transmission of data. In this regard, professionals regard that the adoption of ERP could be the perfect remedy for many problems that have plagued the supply chain for decades. Koh et al. (2006) hold that the integrated information system is the building block of SCM, and its usage will guarantee that most organizations reap the maximum returns from their supply chains.

Given that suppliers are decisive for the success of SCM and they are located across the world, organizations need to integrate the activities that take place inside and outside their direct control (Esteve & Pastor, 2001). For this kind arrangement to operate efficiently, an enterprise-wide information system is required to help in facilitating the sharing of all critical pieces of information (Ballou et al., 2000).

Shatat and Udin (2012) adequately examined the link between the ERP and SCMP in Malaysia. The researcher posted the questionnaire to the manufacturing companies that use the resource planning system. TMIS or IT executives were targeted, respondents. They provided several responses. However, only 80 of them were usable. The researched analyzed them and ultimately identified a vital connection between ERP and SCMP. Nevertheless, the responses revealed a less essential link between workflow management and SCM performance.

Samaneh and Abdi (2014) concentrated on analyzing the impact of Information Technology (IT) on Supply Chain Integration (SCI) via the appropriate ERP mediator. Given the complexity of this model, the scholars conducted a structural equation model (SEM) to examine its fit and seven hypotheses. They used a questionnaire to gather data from three Iranian firms. The analysis revealed that support of the top management and the general It skills factor improve the success of ERP, which ultimately positively influences Supply Chain Integration.

Karimi et al. (2007) also conducted a series of studies on the efficiency of ERP and its effectiveness. They also considered the benefits of the system and concluded that ERP systems enhance the production process and lead to improved profitability and competitiveness. Additionally, Federici (2009) studies all the components of ERP outcomes. The expert agrees with Madapusi and D'Souza (2012) that ERP allows enterprises to realize their operational performance goals, such as ensuring improvement in the quality of information sharing, inventory management, and timely inventory delivery.

Incea, Imamoglu, Keskin, Akgund, and Efee (2013) evaluated the various extents of SCM practices and enterprise resource management systems. Furthermore, they assessed the connection between competitive advantage and organizational performance. The researchers targeted 138 Turkish companies' executives. They used Turkish Path analysis to test the authenticity of the research hypotheses. Prior studies had suggested that the practices and ERP have a favorable impact on the performance of firms.

Nzuki, Musyimi, & Odongo, 2015) also examined the factors that determine the ERP adoption among the Nairobi-Metropolitan-based corporate members of the Kenya Association of Manufacturers (KAM). They selected a third of the firms in each of the 14 sectors of KAM and then utilized the proportional stratified random sampling procedure to construct a sample of 141 companies out of the 417 members who operate within the area of the target. Consequently, the experts administered the questionnaires to the identified respondents. However, they interviewed 17 ERP

organizations. The professionals used the logit model to assess the effect of the factors on ERP adoption and discovered organizational composite as a critical factor in the process. Moreover, the research established that the ERP system could improve effectiveness through integration and the instantaneous sharing of information.

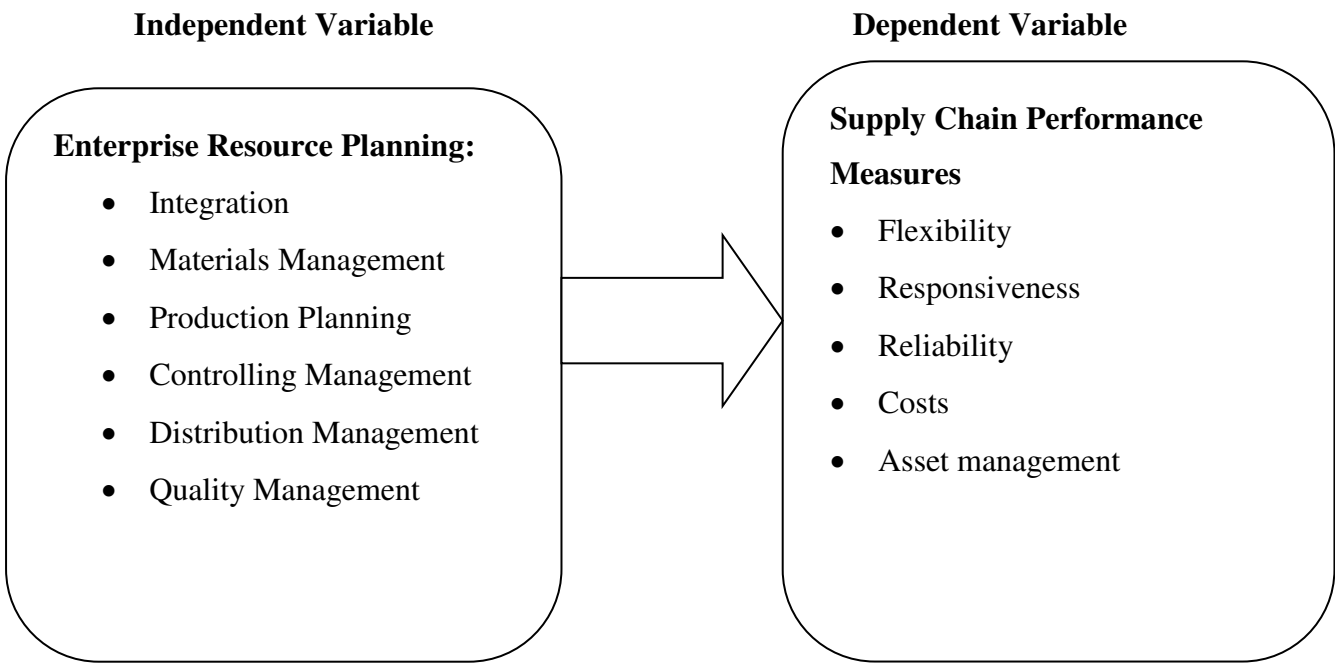
2.4 Summary of Research Gaps

In reviewing the impact of post ERP implementation and how its resultant contribution to supply chain performance, the available literature has witnessed both conceptual and empirical contributions. Most of the studies done internationally and locally have concentrated on systematic ERP implementation and how the systems influence firms operational performance but few have focused on supply chain performance.

From the conclusions of these studies, it is therefore cognizant to state that there exist close interrelations between performance and ERP. Further, past research findings propose that ERP is a contributor of supply chain performance in technical segments, including globalization, transparency, and standardization. On the contrary, it was also revealed that present ERP systems can derail progress in supply chain performance from a strategic standpoint due to their typical single-organization scope and their low flexibility.

2.5 Conceptual Framework

A conceptual framework is a concise depiction of the occurrence under examination that is accompanied by either a graphical or visual illustration of the main factors involved (Mugenda and Mugenda 2003). The independent variables are integration, materials management production planning, and controlling. However SCP is considered as the dependent variable. It is measured around supply chain reliability, responsiveness, flexibility, and cost reduction.



Source: Researcher (2019)

CHAPTER THREE: RESEARCH METHODOLOGY

3.0 Introduction

This third chapter provides a vivid description of the research design that was employed by the researcher to reach the findings; the procedure that followed the target population and sample design. Additionally, it describes the tools that have been used, the sequence of events, the adopted method and tools for data collection and validation, reliability test techniques used as well as statistical analysis relied on to achieve the goal of this study.

3.1 Research Design

According to Best and Kahn (2010), research design are the methods and procedures used to acquire accurate information. This research study adopted a survey and descriptive design research methodology. Akhtar (2016) explain that descriptive research answers the questions, what, who, where, how, and when. It is used to study the current situation and describes the phenomena as it exists. A descriptive study was adopted to solicit attitude or views of sugar companies' managers who apply ERP towards supply chain operations, decision making, and supply chain performance measurement and evaluation. Furthermore, the study was also quantitative, where quantification was done in about the means of collecting and analyzing data. Most people do research on supply chain management use the quantitative method. Traditionally, other experts have used surveys and created a broad quantitative basis for the sole purpose of testing different relevant theories (Golicic et al., 2005).

3.3 Population of the Study

The population is the overall collection of elements that the professional wants to make some inferences. On the other hand, the target population is the members of a set of people or events that the expert intends to generalize their findings (Cooper and Schindler, 2006). In the case of this study, the target population was the sugar manufacturing companies in Kenya. The Agricultural and Food (2017) provides that the country has twelve sugar manufacturing companies, as shown in Appendix II.A census approach was utilized.

3.4 Data Collection

This research study used the questionnaires instrument through a census survey to collect the primary data. The study applied a census survey since the number of sugar firms is not so large, and therefore, the researcher was able reach all of them. Kothari (2004) holds that researchers should not resort to a sample survey when the universe is small.

The instrument for collecting data was the questionnaire. It is the most actively used in various business surveys (Kothari, 2004). The questionnaire questions were structured. Structure questions spell out the set of response alternative and format. Questionnaires was emailed to MIS, Finance managers and Supply chain managers of each of the sugar firms with a request to return after completing the same.

3.5 Data Analysis

A quantitative analysis was undertaken on the data collected using the SPSS software for statistical packages. To make sense of the data, a summary was made to expose the design of the symbolic value in the data, and how they differ. A descriptive or summary statistics was utilized to illustrate or recapitulate the data to help in the construction of a rational image of the data. The analysis results was displayed as frequency tables, means, and standard deviations.SPSS analysis was performed to create histograms, frequency distributions, and other measures.

The following regression equation was modelled:

$$SCP = \alpha_0 + IM\alpha_1 + MM\alpha_2 + PP\alpha_3 + CM\alpha_4 + QM\alpha_5 + DM\alpha_6 + \varepsilon$$

Where:

SCP = Supply Chain Performance;

α_0 = constant;

IM = Integration Management

MM = Materials Management

PP = Production Planning

CM =Controlling Management

QM = Quality Management

DM = Distribution Management

ε = Error Term

CHAPTER FOUR: DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Introduction

The findings of this research are depicted in the following chapter. Primary data was collected, modelled and analyzed through SPSS software.

4.2 Response Rate

A total of eleven firms each issued with two questionnaires for both MIS executives and the Procurement Managers. Out of the total dispatched questionnaires that were distributed to the eleven sugar manufacturing companies, 22 were filled hence realizing a response rate of 100% due to the small sample size.

4.3 Demographic characteristic of Respondents

Demographic information was presented in the form of tables as detailed below.

4.3.1 Education Level of Respondents

Respondent's level of education to was established for purposes of assessing the validity and accuracy of the study population's responses. The observations are illustrated.

Table 4.1: Education Level

	Frequency	Percent
Post Graduate	3	13.6
Undergraduate	14	63.6
Diploma	3	13.6
Others	2	9.1
Total	22	100.0

Author (2019)

Table 4.1 illustrates that 3 out of 22 have attained post graduate studies, 14 have attained undergraduate, 3 have attained diploma and 2 have other level of education. The findings correspond to 13.6%, 63.6%, 13.6% and 9.1% in that order. The findings

imply that most (63.6%) of the respondents have attained undergraduate education level.

4.3.2 Employment Duration

This section presents findings on employment duration of the respondents.

Table 4.2: Employment Duration

	Frequency	Percent
More than 10	5	22.7
5 to 10	9	40.9
Less than 5	8	36.4
Total	22	100.00

Author (2019)

Table 4.2 illustrate that 5 out of 22 respondents have been employed for more than 10 years, 9 have been employed for between 5 to 10 years and 8 have been employed for less than 5 years. The finding represent 22.7%, 40.9% and 36.4% in that order. The findings imply that most (63.6%) of the respondents have been employed for 5 and more years.

4.3.4 Duration of Operation

Table 4.3: Duration of Operation

	Frequency	Percent
More than 10	17	77.3
5 to 10	5	22.7
Less than 5	0	0.0
Total	22	100.0

Author (2019)

The above table illustrates that 17 out of 22 respondents are of the view that the companies have been in operation for more than 10 years and 5 have been in operation for between 5 to 10 years. The data correspond to 77.3% and 22.7% in that

order. The findings imply that majority (77.3%) of the companies have been in operation for not more than 10 years since inception.

4.3.5 Duration of ERP usage

The findings on the duration of ERP usage is illustrated below.

Table 4.4: Duration of ERP system usage

	Frequency	Percent
More than 10	2	9.1
5 to 10	9	40.9
Less than 5	11	50.0
Total	22	100.0

Author (2019)

From the above table, it is evident that 2 out of 22 respondents are of the view that enterprise resource planning has been used for more than 10 years, 9 are of the view that ERP has been in use for 5 to 10 years and 11 are of the view that ERP system has been in use for less than 5 years. The findings represent 9.1%, 40.9% and 50.0% in that order. The findings imply that half (50.0%) of the sugar companies in Kenya have used ERP system for less than 5 years.

4.4 ERP Systems Dimensions

The researcher focused on six dimensions of ERP systems and their interrelation with the supply chain of sugar companies in Kenya. This section presents findings on ERP systems dimensions. The frequencies and percentages of the six ERP dimensions responses is tabulated as below.

4.4.1 ERP system Integration

The section presents findings on ERP system integration.

Table 4.5: ERP system Integration

	5	4	3	2	1	N	Mean	Std. Deviation
Internal information is integrated	12	4	0	2	4	22	3.82 (0.346)	1.622
External information is integrated	4	16	0	2	0	22	4.00 (0.161)	0.756
Organization reporting is improved	4	4	6	8	0	22	3.18 (0.243)	1.14
Information is Consistent	8	8	0	6	0	22	3.82 (0.260)	1.22
Overall Mean							3.71	1.18

Source, Author (2019)

Table 4.5 illustrates that the respondents agree that external information is integrated, internal information is integrated and that information is consistent. The findings correspond to mean of 4.00, 3.82 and 3.82 in that order. It is also evident from table 4.5 that respondents are indifferent with regards to improvement in organizational reporting, this findings infer to mean of 3.18.

4.4.2 Material Management

This section presents findings on material management.

Table 4.6: Material management

	5	4	3	2	1	N	Mean	Std. Deviation
In bound Logistics capabilities	9	5	5	3	0	22	3.91(0.236)	1.109
Out bound Logistics capabilities	6	10	3	2	1	22	3.82(0.234)	1.097
Inventory is well managed	8	11	0	2	1	22	4.05(0.232)	1.09
Storage location management	9	5	3	3	2	22	3.73(0.296)	1.386
Raw materials quality check enhancement	4	11	6	1	0	22	3.82(0.169)	0.795
Overall Mean							3.87	1.1

Source, Author (2019)

Table 4.6 illustrates that respondents agree that inventory is well managed, there exist in bound logistics capability and there exist out bound logistics capability. This results infer to mean of 4.05, 3.91 and 3.82 in that order. Respondents agree that raw materials quality check enhancement and there exist Storage location management. This is represented by mean of 3.82 and 3.73 in that order.

4.4.3 Production Planning

This section presents findings on production planning.

Table 4.7: Production Planning

	5	4	3	2	1	N	Mean	Std. Deviation
Enhancement of production planning budgetary allocation	12	4	0	2	4	22	3.82(0.346)	1.622
Shift allotment details are up to date	8	8	5	1	0	22	4.05(0.192)	0.899
Ease of capacity planning	3	15	4	0	0	22	3.95(0.123)	0.575
Effectiveness of master production schedule	4	16	0	2	0	22	4.00(0.161)	0.756
Service system flexibility	2	13	1	3	3	22	3.55(0.215)	1.011
Overall Mean							3.87	0.97

Source, Author (2019)

Table 4.7 illustrate that respondents agree that Shift allotment details are up to date, there is effectiveness of master production schedule and there is Ease of capacity planning. This is represented with mean score of 4.05, 4.00 and 3.95 in that order. It is also worth to mention that respondent agree that there is enhancement of production planning budgetary allocation and service system flexibility with a mean score of 3.82 and 3.55 in that order.

4.4.4 Control Management

This section presents findings on control management. Table 4.8 illustrates the observations

Table 4.8: Control Management

	5	4	3	2	1	N	Mean	Std. Deviation
Easy monitoring of processes	3	10	3	5	1	22	3.41(0.243)	1.141
Feedback system is enhanced	4	10	3	2	3	22	3.45(0.277)	1.299
Compliance is easy to evaluate	4	10	4	3	1	22	3.59(0.234)	1.098
Ease of tracking customer complaints	2	11	1	6	2	22	3.23(0.263)	1.232
Overall Mean							3.42	1.19

Source, Author (2019)

Table 4.8 above illustrate that respondents agree that compliance is easy to evaluate, with a mean score of 3.59. It is also evident that respondents are indifferent with regards to enhancement of feedback system, ease of process monitoring and ease of tracking customer complaints. This results infer to mean score of 3.45, 3.41 and 3.23 in that order.

4.4.5 Quality Management

This section presents findings on quality management. Table 4.9 illustrates the observations.

Table 4.9: Quality Management

	5	4	3	2	1	N	Mean	Std. Deviation
Information Quality Management	4	9	5	2	2	22	3.5	1.185
System Quality Visibility	5	12	1	4	0	22	3.82	1.006
Raw material quality checks enhanced	2	11	4	4	1	22	3.41	1.054
Inventory inspections are enhanced	7	9	2	3	1	22	3.82	1.181
Overall Mean							3.64	1.11

Source, Author (2019)

Table 4.9 above illustrates that respondents agree that there is system quality visibility, inventory inspection is enhance and there is information quality management. This is represented by mean of 3.82, 3.82 and 3.5 in that order. With regards to enhancement of system quality check respondents are indifferent with a mean score of 3.41.

4.4.6 Distribution Management

This section presents findings on distribution management. Table 4.10 illustrates the observations.

Table 4.10: Distribution Management

	5	4	3	2	1	N	Mean	Std. Deviation
Timely delivery of orders	3	14	3	2	0	22	3.82	0.795
Easy order tracking	4	10	2	5	1	22	3.5	1.185
Purchase order confirmation is easy	1	13	4	2	2	22	3.41	1.054
System facilitates reverse logistics	3	12	3	2	2	22	3.55	1.143
Overall Mean							3.64	1.11

Author,(2019)

Table 4.10 illustrates that respondents agree that there is timely delivery of orders, ERP system facilitate reverse logistics and it is easy to track orders. This results are presented with mean score of 3.82, 3.55 and 3.5 in that order. Respondents are

indifferent with regards to ease of purchase order confirmation with a mean score of 3.41.

4.5 Supply Chain Performance

In this section the researcher presents findings on performance of the supply chain. To measure how ERP impacts on the sugar manufacturing companies supply chain performance, the researcher adopted five performance attributes as specified by the latest SCOR Model (SCC, 2007a). The performance attributes advocated by the SCOR model consists of reliability, responsiveness, flexibility, costs and supply chain asset metrics.

4.5.1 Supply Chain Reliability

Supply chain reliability was evaluated as a performance measure. Under reliability three metrics were utilized; delivery performance, order fill rate and perfect order fulfillment.

Table 4.11: Supply Chain Reliability

	5	4	3	2	1	N	Mean	Std. Deviation
Delivery performance is improved	7	13	2	0	0	22	4.23	0.612
Order fill rate has improved	4	12	6	0	0	22	3.91	0.684
Perfect order fulfillment has improved	1	14	4	3	0	22	3.59	0.796
Overall Mean							3.91	0.70

Source, Author (2019)

Respondents agree that supply chain reliability has improved. Results in Table 4.11 illustrate that delivery performance is improved with a mean score of 4.23. Improvement in Order fill rate and improvement in Perfect order fulfillment, with a mean score of 3.91 and 3.59 that order.

4.5.2 Supply Chain Flexibility

Flexibility within the supply chain is the agility of a supply chain to respond to changes in the marketplace to gain or sustain competitive advantage (SCC,2007a).Under flexibility two metrics were used by the researcher to measure flexibility namely supply chain response time and production flexibility. Table 4.2 illustrates the findings

Table 4.12: Supply Chain Flexibility

	5	4	3	2	1	N	Mean	Std. Deviation
Improvement in supply chain response time	2	10	4	5	1	22	3.32	1.086
Production Flexibility has improved	4	11	2	4	1	22	3.59	1.141
Overall Mean							3.46	1.11

Source, Author (2019)

Table 4.12 illustrate respondents agree production flexibility has improved, with a mean score of 3.59. However, respondent are indifferent when it comes to Improvement in supply chain response time with a mean score of 3.32

4.5.3 Supply Chain Responsiveness

The researcher used order fulfillment lead time as a metric to assess supply chain responsiveness in the sugar manufacturing companies. Table 4.13 illustrates the findings.

Table 4.13: Supply Chain Responsiveness

	5	4	3	2	1	N	Mean	Std. Deviation
Order fulfillment lead time improved	4	12	3	2	1	22	3.73	1.032
Overall Mean							3.73	1.032

Source, Author (2019)

Majority of the respondents are in agreement that Order fulfillment lead time has improved, this is represented with a mean score of 3.73.

4.5.4 Supply Chain Costs

Under supply chain costs, three metrics were used by the researcher to measure costs; Total cost of supply chain management, Cost of goods sold and Warranty return Costs (Reverse logistics cost).Table 4.14 illustrate the findings

Table 4.13: Supply Chain Costs

	5	4	3	2	1	N	Mean	Std. Deviation
Total Supply Chain Management costs has reduced	6	14	2	0	0	22	4.18	0.588
Cost of Goods Sold has reduced	4	13	5	0	0	22	4.05	0.653
(Reverse Logistics) costs has reduced	1	12	6	3	0	22	3.5	0.802
Overall Mean							3.91	0.681

Source, Author (2019)

Table 4.13 illustrates that majority agree that Total Supply Chain Management costs has reduced with a mean score of 4.18, this is followed by Cost of Goods Sold has reduced and reduction in cost of reverse logistics, with a mean score of 4.05 and 3.5 in that order.

4.5.5 Supply Chain Asset Management

Supply chain asset management is an organization's success in handling resources to meet supply chain demand satisfaction within the supply chain. The metrics adopted and the findings are as per the table 4.14.

Table 4.14: Supply Chain Asset Management

	5	4	3	2	1	N	Mean	Std. Deviation
Improvement of Cash to Cash cycle time	2	13	2	4	1	22	3.5	1.058
Inventory turnover has improved	4	8	4	5	1	22	3.41	1.182
Asset return ratio has improved	3	14	3	1	1	22	3.77	0.922
Overall Mean							3.56	1.054

Source, Author (2019)

The table illustrates that that Asset return ratio has improved with a mean of 3.77, most respondents agree that Cash to Cash Cycle time has improved with a mean of 3.5 and most are indifferent with regards to improvement in Inventory days of supply with a mean score of 3.41.

4.6 Regression Analysis

Findings on regression is presented in this section.

4.6.1 Model Summary

Table 4.15: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.460 ^a	.212	-.103	.415

a. Predictors: (Constant), DM, PP, CM, QM, MM, IM

Author (2019)

The value of R represents the multiple correlation coefficients which measure the quality of the prediction of the dependent variable. From table 4.15 it is evident that the R = 0.460 for Enterprise Resource Planning which shows a weak level of prediction. The R squared which is the coefficient of determination for Enterprise Resource Planning = 0.212 indicating that the model explains 21.2% of the total variance (the adjusted R squares = - 0.103) of Supply Chain Performance. This means that only 21.2% of supply chain performance is explained by Enterprise Resource Planning. The remaining 78.8% of the variations in supply chain performance are explained by other factors that are not studied in this research.

4.6.2 Variance Analysis

Table 4.16: ANOVA

Model	Sum of Squares	d.f.	Mean Square	F	Sig.
Regression	.693	6	.116	.672	.674 ^b
Residual	2.579	15	.172		
Total	3.273	21			

a. Dependent Variable: SCP

b. Predictors: (Constant), DM, PP, CM, QM, MM, IM

Source, Author (2019)

The null hypothesis was

H₀: There is no relationship between Enterprise Resource Planning and Supply chain Performance in Kenya's sugar manufacturing companies.

The study was conducted at 5% significance level. The calculated value is higher than the critical value ($p = 0.674$) which is higher than the significance level of 0.05. This therefore implies that there is no statistical significance. F value is the ratio of two mean square values. The findings in table 4.18 above show ($F = 0.672$), this infer that the variation among group means is more than what the researcher would expect to see by chance. For this reason we fail to accept the null hypothesis and state alternative hypothesis.

H_1 : There is a relationship between Enterprise Resource Planning and Supply Chain Performance in Kenya's sugar manufacturing companies.

4.6.3 Model Coefficients Results

Table 4.17: Model Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	4.441	1.498		2.965	.010
IM	-.073	.175	-.181	-.418	.682
MM	.083	.215	.152	.389	.703
PP	-.164	.323	-.159	-.508	.619
CM	.221	.210	.260	1.050	.310
QM	.067	.165	.114	.408	.689
DM	-.291	.191	-.374	-1.524	.148

a. Dependent Variable: SCP

Source, Author (2019)

From the regression results in Table 4.19, the regression model equation appear as;

$$SCP = 4.441 - 0.073\alpha_1 + 0.083\alpha_2 - 0.164\alpha_3 + 0.221\alpha_4 + 0.067\alpha_5 - 0.291\alpha_6 + \varepsilon$$

The results in table 4.17 imply that there is a relationship between Enterprise Resource Planning and Supply Chain Performance in Kenya's sugar manufacturing companies. The study was conducted at 5% significance level, the findings show p value higher than the significance level for all tested aspects of Enterprise Resource Planning. This implies that there is no statistical significance and we therefore reject the null hypothesis.

The study established that there is a positive relationship between Supply Chain Performance and the following dimensions of Enterprise Resource Planning; Material Management (0.083), Controlling Management (0.221) and Quality Management

(0.067). The findings imply that a unit increase in ERP will contribute to an increase in Supply Chain Performance by a unit of 0.083, 0.221 and 0.067 in that order.

The findings also illustrate that a significant a negative relationship between Supply Chain Performance and the following dimensions of Enterprise Resource Planning; Integration Management (-0.073), Production Planning (-0.164) and Distribution Management (-0.291). These results imply that a unit decrease in ERP will contribute to a decrease in performance of the supply chain by a unit of -0.073, -0.164 and -0.291 in that order.

CHAPTER FIVE: DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

Presentation of the study's findings, conclusions, limitations, and recommendations is elaborated in this chapter. Conclusions and recommendations are intended to address the research goal to establish the relationship between ERP and supply chain performance of the sugar manufacturing companies in Kenya. The researcher sought to address null hypothesis which states that;

H₀: There is no relationship between Enterprise Resource Planning and Supply chain Performance in Kenya's sugar manufacturing companies.

5.2 Discussion

The study findings established that Kenya's sugar manufacturing companies use ERP system, however, a big percentage are at development stage. This is evident from the findings as only 2 out of 22 (9.1%) companies have used ERP for more than 10 years. Otieno J.O (2008) in his study on ERP systems implementation in Kenya revealed that ERP systems have been adopted by a number of large and medium sized companies and more are expected to follow suit.

The study revealed that with regards to ERP system integration, integration of external information was high among Kenya's sugar manufacturing companies. Majority of respondents agree that external information is integrated as represented by a mean of 4.00. This could be as a result of requirement by external business partners like suppliers and out growers within the sugar sector value chain.

The study established that with regards to material management, majority of respondents agree that Inventory is well managed with a mean score of 4.05. Manufacturing companies like sugar companies handle a lot of materials which

require proper handling and availability of such systems contribute to proper handling of materials.

With regards to production planning, the study established that respondents agree that there is improvement in production planning this is reflected by mean scores of 4.05 on Shift allotment details are up to date and 4.00 on effectiveness of master production schedule. Locally, Bamburi Cement Limited and Bidco Oil Refineries Limited have reported better and enhanced control during production after implementing ERP systems (Otieno 2010).

The study also sought to establish control management, most respondents agree that compliance is easy to evaluate. This is represented by a mean score of 3.59. With regards to quality management the study established that majority of respondents agree that system quality visibility has improved and inventory inspections are enhanced. Dudgikar, Kumthekar, and Khot (2012) also are of the view that the quality module nurtures lasting improvements in firm performance. They further stress that the unit performs activities related to performance scheduling, inspection and monitoring as well as compliance. According to Appelrath & Ritter, (2000) the module is also responsible for quality control within the entire enterprise business units hence enhancing system visibility and control.

The findings on distribution management expose that most respondent agree that there is timely delivery of orders and facilitation of reverse logistics. Olhager and Selldin (2003) concur that the ERP delivery system enables day-to-day customer order management by retaining customer information, generating a quote quickly, or transferring the sales order or responding to customers.

.In Kenya, a number of manufacturing companies including; Bidco Oil refineries Ltd, Bamburi Cement Limited, Athi River Mining (ARM), Kenafric and Antarc are some of the manufacturing firms that have deployed ERP systems. The benefits that they have derived from this include; better financial management and increased visibility in the supply chain, material payroll management and business intelligence foresight (Okuttah, 2014).

In reference to measuring supply chain reliability, an improvement has been noted which is represented by mean score of 4.23 on improvement of delivery performance and 3.91 on improvement of order fill rate. The findings on Supply Chain Flexibility established that most of the respondents agree that Production Flexibility has improved as reflected by a mean score of 3.59. Order fulfillment lead time has improved as reported by a mean score of 3.73. The finding also illustrate that Supply Chain Costs and supply Chain Asset Management have improved as represented by mean score of 4.18 on reduced total Supply Chain Management costs and a mean of 3.77 on improvement on Asset return ratio. The findings are consistent with (Gunasekaran & Kobu, 2007; Otieno, 2010; Mabert et al., 2001 and Makari, 2014).

The study was concerned with establishing relationship between Enterprise Resource Planning and Supply Chain Performance in Kenya's sugar manufacturing companies and for this purpose the researcher postulated null hypothesis Ho: There is no relationship between Enterprise Resource Planning and Supply chain Performance in Kenya's sugar manufacturing companies. ANOVA results yield ($p = 0.674$) which is higher than the significance level of 0.05. The research also yielded ($F = 0.672$), this infer that the variation among group means is more than you would expect to see by chance. For this reason we fail to accept the null hypothesis. The findings are consistent with Su and Yang (2009).

The finding of this research established that there is a relationship between Enterprise Resource Planning and Supply Chain Performance in Kenya's sugar manufacturing companies, however the level of prediction of this relationship is low this is attributed to ($R = 0.460$) and ($R^2 = 0.212$) which imply that ERP dimensions in the study explained 22.1% of supply chain performance. The other 78.8% of the variations in supply chain performance are explained by other factors that are not studied in this research.

Further, a significant positive relationship between Supply Chain Performance and the following dimensions of Enterprise Resource Planning has been established; Material Management (0.083), Controlling Management (0.221) and Quality Management.

However, a negative relationship between Chain Performance and the following dimensions of Enterprise Resource Planning; Integration Management (-0.073), Production Planning (-0.164) and Distribution Management (-0.291).

5.3 Research Conclusions

The findings established that almost all the entire sugar manufacturing companies in Kenya have embraced and adopted ERP systems within their organizations. However few of them have utilized ERP for not more than ten years.

With regards to ERP dimensions, the study concludes that; Inventory is well managed, Shift allotment details are up to date and there is improvement in production planning. The research further concludes that compliance is easy to evaluate, system quality visibility has improved and inventory inspections are enhanced. It is also important to conclude that there is timely delivery of orders and facilitation of reverse logistics.

The study concludes that with regards to supply chain performance; there is improvement of delivery performance, order fill rate has improved, Production Flexibility has improved and order fulfillment lead time improved. A reduction in total supply chain management costs has been realized while Asset return ratio has improved.

The study further concludes that there exists a significant relationship between ERP systems and supply chain performance. Material Management, Control Management and Quality Management, have a positive relationship with supply chain performance. However, a negative relationship exists on integration Management, production planning and distribution management.

5.4 Recommendations

The study findings established that there exists a commendable take up of ERP systems by Kenya's sugar manufacturing companies. However, full utilization and implementation of ERP systems within the sugar manufacturing companies is not

fully achieved. This study recommends the need for continuous improvement and ensuring enterprise wide coordination of all the ERP systems within the companies in order to realize full ERP benefits.

Furthermore, the study recommends that as the sugar manufacturing companies focus on ERP improvement processes, measurement of the performance of the entire value chain from unprocessed material suppliers (out growers),sugar processors and distributors for effective operation and control. The ultimate success of Kenya's sugar manufacturing companies will significantly rely on proper evaluation of the major players in industry hence allowing total supply chain visibility and control.

Finally, major players in ERP systems applications like SAP should also enhance the flexibility and the adaptability of high end ERP systems for sugar manufacturing companies. This include systems integration, instituting cost effective hands on user trainings and tailor making of ERP modules to address local business unit requirements.

5.5 Limitations of the Study

Kenya sugar manufacturing companies are currently facing a myriad of challenges in their operations with a few of them under receivership. There was also the limitation to two respondents in each of the eleven sugar manufacturing companies due to time limit and financial constraints.

5.6 Suggestions for Further Research

The research was restricted to only six dimensions of ERP sub-variables and their relationship with supply chain performance. Future studies may concentrate on other modules of ERP systems that are either financial or human resource management relevant to enhancing other business performance elements such as financial performance and marketing efficiency.

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APPENDIX I: RESEARCH QUESTIONNAIRE

SECTION A: DEMOGRAPHICS & RESPONDENTS PROFILE

1. Name of Sugar Company.....

2. Your Job Title.....

3. Education Level (Tick the highest level attained)

Post Graduate: Undergraduate: Diploma: Others:

4. Age Range:

More than 50 41-50 31-40 21-30

5. Duration of Employment (Years)

More than 10 5-10 Less than 5

6. Duration of operation of the company (Years)

More than 10 5-10 Less than 5

7. Ownership of the company

Government Private

8. Duration of usage of Enterprise Planning Systems (Years)

Less than 5 5-10 More than 10

SECTION B: ERP SYSTEMS DIMENSIONS

In this section I am going to measure ERP systems dimensions. On a scale of 5 to 1, where 5 is strongly agree and 1 is Strongly disagree. Rate the following statements with regards to ERP system dimensions.

ERP SYSTEMS DIMENSIONS	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
	1	2	3	4	5
INTERGRATION					
Internal information is integrated					
External information is integrated					
Organization reporting is improved					
Information is Consistence					

ERP SYSTEMS DIMENSIONS	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
	1	2	3	4	5
MATERIAL MANAGEMENT					
In bound Logistics capabilities					
Out bound Logistics capabilities					
Inventory is well managed					
Storage location management					
Raw materials quality check enhancement					
PRODUCTION PLANNING					
Enhancement of production planning budgetary allocation					
Shift allotment details are up to date					
Ease of capacity planning					
Effectiveness of master production schedule					
Flexibility of service system to meet particular customer needs					
CONTROLLING					
Easy monitoring of processes					
Feedback system is enhanced					
Compliance is easy to evaluate					
Ease of tracking customer complaints					
QUALITY MANAGEMENT					
Information Quality Management					
System Quality Visibility					
Raw material quality checks					
Inventory inspections are enhanced					
DISTRIBUTION MANAGEMENT					
Timely delivery of orders					
Easy order tracking					
Purchase order confirmation is easy					
System facilitates reverse logistics					

SECTION C: SUPPLY CHAIN MANAGEMENT PERFORMAMNCE

Indicate to what extent ERP systems have had an impact on the supply chain performance of your organization using the following five performance attributes:

- SCF₁=Supply Chain Flexibility
- SCR₂=Supply Chain Reliability
- SCR₃=Supply Chain Responsiveness
- SCC₄=Supply Chain Costs
- SAM₅=Supply Chain Asset Management

On a scale of 5 to 1, where 5 is strongly agree and 1 is strongly disagree.

Code	Supply Chain Performance Measurement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
		1	2	3	4	5
SCR ₂	The Company’s delivery performance is improved					
SCR ₂	Order fill rate has improved					
SCR ₂	Perfect order fulfillment has improved					
SCF ₁	Improvement in supply chain response time					
SCF ₁	Production Flexibility has improved					
SCR ₃	The Company has improved Order fulfillment lead time					
SCC ₄	Total Supply Chain Management costs has reduced					
SCC ₄	Cost of Goods Sold has reduced					
SCC ₄	Warranty returns costs has reduced (Reverse Logistics)					
SAM ₅	Cash to Cash Cycle time has improved					
SAM ₅	Inventory days of supply has improved					
SAM ₅	The company’s asset return ratio has improved					

THANK YOU

**APPENDIX II: LIST OF SUGAR MANUFACTURING COMPANIES IN
KENYA**

- 1 Mumias Sugar Company Ltd
- 2 Nzoia Sugar Company
- 3 South Nyanza Sugar Company
- 4 Muhoroni Sugar Company
- 5 Chemelil Sugar company
- 6 Kibos Sugar and Allied Industries Ltd
- 7 Butali Sugar Mills
- 8 Kwale International Sugar Company Ltd
- 9 West Kenya Sugar Company
- 10 Trans Mara Sugar Factory
- 11 Sukari Industries Ltd