

**E-PROCUREMENT AND SUPPLY CHAIN PERFORMANCE IN THE SUGAR
FACTORIES IN KENYA**

BY

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@2021

DECLARATION

DECLARATION BY STUDENT

I certify that this research project has not been previously presented for a degree of University of Nairobi or in any other University.

Signature.....

Date.....20/11/2021.....

James Orori Mogere

APPROVAL BY SUPERVISOR

This research project has been submitted for examination with our approval as the University supervisor.

Signature.....

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DEDICATION

This project is dedicated to my children and my wife, for their support and encouragement.

ACKNOWLEDGEMENT

I wish to acknowledge my lectures at the University of Nairobi and especially my supervisor Mr. Gerald Ondiek, Dr. Mercy Oluoch and Dr. Nixon Omoro for their effective guidance and support during this study.

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LIST OF ABBREVIATIONS

EDI:	Electronic Data Interchange
EIS:	Executive Information System
EMM:	Electronic Material Management
EVA:	Economic Value Analysis
ICT:	Information and Communication Technology
IT:	Information Technology
LAN:	Local area network
SCM:	Supply Chain Management
SCP:	Supply Chain Performance
SCOR:	Supply Chain Operation Reference
TOE:	Technology, Organization and Environment Theory
WAN:	Wide area network

ABSTRACT

Electronic Procurement is an important business avenue for lowering purchasing price and enhancing process efficiency. E-procurement as enabled by ICT development is believed to make procurement more efficient and competitive in the changing manufacturing sector by adding value to processes and thus reduce costs. The purpose of the study was to establish the influence of electronic procurement on the supply chain performance of the sugar factories in Kenya. This study was guided by two theories namely: Technology, Organization and Environment Theory and Technology Acceptance Model (TAM). The research used a descriptive research design. The study was carried out in both public and private sugar factories in Kenya. The Target population for this survey included all the 12 sugar companies in Kenya, both Public and privately owned. Census sampling was used to select the sample because the factories are few. Purposive sampling was used to select 12 procurement managers from the 12 factories. The main data collection instrument was structured questionnaires that were sent through email. The data collected was analyzed through descriptive statistics and inferential statistics. Descriptive statistics involved frequencies, percentages, mean and standard deviation. Inferential statistics used multiple regressions. The study concluded that electronic procurement had influence on supply chain performance of the sugar factories in Kenya ($R=.902$; p value < 0.05). Based on the findings the study recommended the following: That management of the sugar factories in Kenya should embrace electronic procurement components (e-sourcing, e-ordering, e-material management and e-informing) in order to improve supply chain performance. The sugar factories in Kenya should adopt e-procurement in order to enhance profitability, transparency, improve quality of supply chain, cost reduction and increased information sharing.

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Electronic procurement is a significant business path for checking prices and improving on its productivity (Chartered Institute of Supplies, 2012). E-procurement has provided answers for many organizations that have found them competing for the scarce economic resources. Jela (2013) affirms that where information and technology is practiced in supply chain, efficiency and effectiveness in operation are enriched.

In the global calendar, e-procurement has extended its acceptance more so with the coming on of technology. It is believed that rapid e-procurement development started in the USA in the year 2000 and that most government entities continued upholding web existence in every stage of procurement practices (Reddick 2004). The practices of e-procurement in Malaysia were different, where the government enforced its use (Yossuf et al, 2011). Ambe & Baden Horst-Weiss, (2011) believe that e-procurement expand teamwork among suppliers to achieve effectiveness. The supply chain operations are the basis of all business attractiveness and the establishment's ability to revolutionize and advance competitive advantage. Walker Schotanus Bakker & Harland (2013) allude to the fact that it is time supply chain management adjusts its function to be in line with the current prevailing market conditions and innovations. Kaliannan et al. (2009) pointed out that most developed and developing government owned sector economies are embracing e-procurement with expectations of enjoying the benefits that come with it

In the recent past purchasing was done manually and even if there was procurement planning it took long to complete a procurement process. Currently the system is shifting to electronic buying which has been enabled by the internet. It is now procurement and supply chain management which include a chain of activities right from the source of the raw material to the end customer. This has brought about an inventory system that aligns raw-material orders from suppliers directly with production schedules (Chartered Institute of Purchasing & Supplies, 2011). Hence, organizations are encouraged to work with speed in realigning the procurement process and use of information technology support in provision of strategic decisions (Apiyo and Mburu, (2012: Walker Schotanus Bakker, & Harland, 2013).

The study was directed by two theories; Technology-Organization-Environment Theory (TOE) and Technology Acceptance Model (TAM). The TOE theory enabled the explanation

and foresaw the prospects of innovation. Kauffman & Walden, (2001) explain three settings which enable adoption and implementation of new technologies which consist of; Technology, Organization and Environment. Technological context include all technologies relevant to the firm and enabled to describe technologies in use at the firms as well as those that exist at the market but were not used in their perceived usefulness and organizational compatibility (Ojiabo et al,2015); Organizational condition – This helped in understanding the characteristics and resources of the firms which included the size of the firm, amount of slack resources, organizational culture and top management backing, while Industry Environment - Also helped to know the structure of the industry, technology service providers and the government involvement. TAM as projected by Davis (1989) is widely applied and empirically tested. It is believed to be more predictive and strong (Venkatesh & Davis, 2000) as it explains user acceptance behavior. Fishbein & Azjen, (1975) explained that what an individual believes in is what will occupies the mind and that this forms the attitude, further intention will be formed and will end up changing behavior. In his original fashion Davis explains how perceived usefulness, Perceived Ease of Use, attitude and behavioral intent to use helps users in adoption of a new system. Tom Mboya, (2002) focused on unearthing the economic, political and policy factors that impinge on the performance of the sugar industry. Jabuga, (2015) was concerned about productivity problems. Mati, B.M. and Thomas, M.K. (2019) focused on the sector review of the sugar industry. These factories have been found to be operating on under-capacity, thus several problems occasioned from supply chain management related issues such as high operating costs and low development. Therefore this paper addressed such problems and proposes solutions through finding perfect information systems that will help to improve on the SCP. New e-procurement systems have to be sort to cope with the requirement levels of supply chain in these factories. The dynamic environment of today is forcing organizations to embrace new inventive ways which guarantee quality and flexibility. It is through research that organizations will achieve this.

1.1.1 E-procurement

Electronic procurement is the use of electronic communication to perform business processes between sellers and buyers, (Lysons, 2006). Lee et al (2006) defined electronic-procurement as a system of buying and selling goods and services using the internet and networking systems. It can therefore be defined as a useful tool in business field for facilitating the acquisition of commodities through the internet.

E-Procurement empowers buyers to save on time, do away with middlemen since it deals directly with the manufacturers or authorized dealers, the prices of goods are assured and this is made possible by the use of the internet. For example, this can be done through online tendering (e- tendering) among suppliers.

1.1.2 Supply Chain Performance

It is a comprehensive supply chain's events that meet customer requirements comprising of availability of products, timely provision of stocks and all essential inventory controls. Supply chain involves organizational dealings in both out-going and in-coming connections in diverse ways and activities that generate value to the customer, (Kashmanian R. and Lee, 2013). Supply chain performance helps procurement to come up with the most appropriate criteria based on calculated objectives which guide the way forward Shah, (2009). Ilkka Sillanpaa, (2015) accepted that in practice, measuring SC is a difficult task. SC capability can be measured by use of BSC approaches (Bhagwat and Shama, 2007, Bigliardi and Bottani, 2010). (Gunesekaran et al, (2001), Monetary and non-Monetary metrics (Lawrie and Cobbold, 2004), Six-Sigma approaches (Lin and Li, 2010, Rama et al, 2009). Van Weele, (2010) identified the areas of performance measurement on supply chain as when designing, sourcing, making and during delivery. It is believed that an organization can do a self-assessment by checking its level of performance of the supply chain. In his study Ilkka Sillanpaa, (2015) and Xu and Li, (2009) used different measures of supply chain performance such as quality process, cost, delivery and the balanced scorecard.

Quality has now been widened to include many dimensions De Sousa (2011), when considering delivery as a measure, time assumes the uppermost importance. Organizations that win more orders are those that are fast in delivery thus reducing cost for both internal and external supply chain will progress output. When all orders are serviced within the time frame and the resources are maintained then the organization is considered flexible. The most critical and efficient of all the measures is the costs which begin from the source of the raw material through to the consumer of the end product (Chibba, 2007).

Mutinga, Nyaramba and Okidi (2013) Sourcing time is reduced since it is done electronically and sometime it is system generated lowering administration costs and thus reducing the tendering costs. Nyoike, (2017) concluded that new technologies make work easier by providing automated systems that improve operations. The collaboration between the buyer

and supplier is enhanced as communication is frequent. The researcher emphasized to the manufacturing sector to embrace e-procurement to improve on transparency.

In their study Karungani and Onchiri, (2017) found out that e-procurement was contributory to improvement in organizational performance. The researchers had it that efficiency, monitoring, coordination, control, communication and improved services depended on ICT infrastructure in order to enhance value for money for procurement transactions.

Mongare and Nasidai (2014) recognized ICT as one way of having streamlined the procurement process making it more efficient in scaling down to reduce the operational costs, and enhance transparency. Dixit and Gupta (2009) divulges that the e-procurement practices has enabled organizations in getting right supplies at the right prices it has also provided real time information enabling reduction in costs while ensuring the right product quantity and quality. It has also reduced the use of papers in offices contributing to the conservation of the environment. Employees have been positively affected by e-procurement through time saving at work, the jobs have been simplified and it's easy to understand. The researchers agreed there was enough evidence that ICT has impacted positively on the organization's performance Ruzindana and Kalasakar (2016)

According to Weeks and Namusonge (2016) information communication technology enhances greater all-inclusiveness and transparency in supply chain performance across organizations. Their findings were in agreement with Mongare and Nasidai (2014). Likewise, Hong and Kwon (2012) agree that use technology in procurement process enhances efficiency, cost reduction and wastage of resources.

1.1.3 Sugar Industry in Kenya

The sugar industry in Kenya dates back to 1900s when the first factory was set up at Miwani in 1927. Currently there are 12 factories in Kenya the latest being Sukari Sugar factory build in 2010s (Kenya Sugar Industry strategic plan, 2010-2014) One factory is at the coast while all the rest are located at the western part of the country.

From the year 2015, the Kenya sugar factories in Kenya were put under high cost producers of sugar. Kenya faces very high competition from other neighboring countries when it comes to comparison of cost of production and sale price. The cost of production in Kenya is (USD 870) per metric ton, double the cost of production in the neighborhood. The industry is faced

with a lot of challenges including high cost of inputs, stiff competition and corruption, to overcome all these, an increase in performance need to be emphasized to reduce the costs and become competitive (KSD, 2017).

Other challenges brought about by another research comprising overstaffing, high inventory levels, employing relatives not considering qualifications and resistance to change especially when new technologies are being introduced. Kiragu, (2012)

1.2 Statement of the Problem

Procurement processes in sugar sector have for a long time had scandals involving finances and is due to poor control of procurement information. This has contributed to the instability in the entire industry; it is therefore rational to start thinking about bringing a new innovative automated procurement system which if adopted can enhance transparency and improve on performance. This can be attested by the fact that services provided by the sugar companies have constantly deteriorated.

Adoption of new procedures of doing things will reduce on the cost of production of sugar per ton to half the current cost which stands at USD 22.5. This will enable the industry to be competing favorably with neighboring countries on sugar production, Kenya National Assembly, (2015). If e-procurement system is put in place, the right price will be charged on the good and services, the right quality will be supplied and at the same time goods will be supplied on time and at the right place this will change the narrative of buying in the sector (Nyasetia, 2019)

Waniani Namusonge and Lagat (2016) investigated in detail the challenges that Nzoia sugar underwent while implementing e-procurement. From their findings it was said the infrastructure was adequate but not good enough to miss challenges. There was poor network coverage and system failure due to power interruption at times and that the human resource was inadequately trained on the new system. Nzobiari F. (2018) challenged cooperative societies to utilize information technology tools for maximum efficiency and proper utilization of resources to be achieved. The need to adopt technology in SC was also supported by Rahab (2014) asserted that ICT in supply chain was the in thing for effectiveness in service delivery and better performance.

From the foregoing researches none has come up with a study on the effect of e-procurement on SCP of sugar factories in Kenya. The study thus seeks to fill the knowledge gap by answering the question, to what extent is supply chain performance affected by electronic procurement in the sugar factories in Kenya?

1.3 Objective of the study

- i. Establishing the effect of electronic procurement on the supply chain performance at the sugar factories in Kenya.

The researcher used four e-procurement components to establish the influence namely; Electronic sourcing, electronic ordering, electronic material management and electronic informing.

1.4 Significance of the Study

The research will offer a chance for procurement entities in the sugar factories to assess procurement activities better management of the supply chain.

Further, the conclusions will be beneficial to policy makers in the sugar factories and also to the policy makers in the government to make informed decisions on procurement policies. The study may also benefit other researchers who may draw knowledge it will provide a foundation for additional research.

The study will enhance significance to the present body of knowledge where the scholars interested in the effect of e-procurement to SCP will discover the study valuable as a source of information..

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

2.2 Theoretical Literature Review

Technology, Organization and Environment Theory and Technology Acceptance Model (TAM) were the two theories that informed the study.

2.2.1 Technology, Organization and Environment Theory

The research intended to define the effect of ICT, particularly e-procurement on SCP. The theory was created in 1990 and has got three features that give researchers the opportunity to describe the various categories and features of an organization. It gives the researcher a chance to investigate deeper into the organization to have an understanding. A company that want to adopt a new technology will investigate the three features which will give the researcher inner understanding of what the organization is lacking. For example whether they have compatible computers for the exercise, where they don't have then they must buy. Where the human resources are not trained on the new technology then there must be arrangement for the same. This will enable one to find out the weak areas like if there is pollution of the environment, the relationship among employee. Once all these have been known then a new technology can be introduced and in case there is resistance to change it can be tackled (Chen, et al, 2006). Competitions among organizations have brought about discovery of new ways of doing things with a view of having competitive advantages against others (Mohamad & Ismail, 2009). Environment context are external factors that organizations have no control over them. For example where government introduces taxes on certain goods or where production is regulated (Lippert & Govindarajulu, 2015).

The model is applicable here as it enables development of strategies on how to expand the sizes of the firm by considering new technologies such as e-sourcing and engagement of human resource with latest skills. The theory answers all questions pertaining to all the practices of e-procurement and will depend on the skills of the human resources, the technology employed for proper linkage between suppliers and customers. Studies by Veit, (2011), Ochieng E. (2016) on e-procurement were anchored on TOE theory making it pertinent in this research.

2.2.2 Technology Acceptance Model, (TAM)

The TAM theory by Davis (1989) states that it's the benefits and ease of use of technology that will inspire its use, (Surendru, 2012). In TAM the attitude of the people working in an organization is what inspires acceptance of technology. Where they feel there will be a reduction of the workload and that it's easy to use the machine, then that technology is deemed useful and they will accept it (Venkatesh, Thong & Xu, 2012). Tam helps in determining and explaining the behavior of the people especially when new technology is being introduced and this will inform why some technologies are accepted and other rejected Chen, Shing-Han and Chien-Yi, (2011). Mutangili, S (2019) advocated for reengineering of current systems in organizations for the adoption of e-procurement this included buying of more computers, networking and retraining of the human resources. Major procurement operations carried out in the sugar factories which can easily be changed by introducing e-procurement includes sourcing, order processing, material management and information sharing, invoicing, payment and material tracking. It is therefore necessary for all the stakeholders of the sugar factories to be made aware how the new system will benefit them and how it is easy to use so that they can appreciate it themselves and accept it for adoption.

2.3 E-procurement and supply chain performance

A study by Faheem and Siddiqui, (2019) used a descriptive design utilizing convenience sampling technique to reach target population. This was possible because convenience sampling is applicable to both quantitative and qualitative studies. The research chose four practices of e-procurement which comprised of e-evaluation, e-design, e-negotiation and e-sourcing. Through the help of partial least square and structural equation modeling, the study authenticated the impact of electronic procurement practices on SCP in Pakistani manufacturing sector. According to this study, not all electronic practices of e-procurement affect SCP positively; therefore through such researches managers will be made to understand e-procurement and its drivers for maximum supply chain performance. The researcher recommended for the industry to embrace new innovative and effective ICT techniques to expand SCP. The previous research was done in Pakistan industry while the present research will be done in sugar factories in Kenya. In addition, the previous study used

analyzed data using structural equation modeling while the current study adopted both correlation analysis and descriptive statistics to analyze quantitative data.

Another study carried out by Jyh-Jeng and Shu-Hua (2015) on e-procurement in Taiwan, the researcher used a questionnaire method and distributed to 127 people across the industry and the facts were examined using regression model. The conclusions of the study showed that where employees are scientifically selected and the appropriate IT system put in place, the effect on services will be positive and will in turn affect the SC performance. Though the past research focused on e-procurement value to SCP, the present focused on the relationship between e-procurement and SCP at sugar factories in Kenya.

Mutangili,(2019) collected data using a descriptive research design. It recorded a substantial result on performance. It was concluded that there was a possibility of finding affordable transaction costs in the market. Though the past study majored on the e-invoicing the present study was geared towards the effect of e-procurement on SCP.

A study on the effects of electronic procurement by Barngetuny and Kimutai (2015), the researchers used the questionnaires and interviews to collect quantitative and qualitative data. They employed stratified and purposive sampling technique, analyzing quantitative data using frequency distribution and qualitative data using content analysis. The study affirmed the influence and capability of electronic procurement on SCM that enables decentralization of procurement processes and centralization of strategic procurement processes which boost transparency in the supply chain management. Firms are encouraged to use e-procurement in order to enjoy price reductions and also save time (Anderson, 2001, Eyholzer and Hunziker, 2000). E-procurement make it possible to send tender documents electronically, it enables order tracking and tracing and also reduce sourcing time, Eadie et al, (2007 quoted in Barngetuny (2015) asserting that e-procurement is rapid and efficient sourcing and as a result staff is reduced which in turn bring a reduction in the overall cost in the supply chain management. The earlier research was carried out in County government and current was carried at the sugar factories in Kenya.

An exploration of the effects of electronic procurement on the supply chain management by King'ori (2013) the research utilized purposive sampling method and descriptive statistics where the result revealed a strong bond between e-procurement and SCM. The study concluded that all those organizations that aspire to have competitive advantage must

embrace e-procurement in their supply chain. The economy having forced companies to shift their operations to e-procurement to enjoy improved financial controls and eliminate wastage of time in their supply chain processes the researcher thought it was important for such a research to be done at the sugar factories in Kenya.

2.4 Knowledge Gap

From previous studies, electronic procurement has been seen as the indicator for organizational performance. The research by Muhia and Afande (2015) showed that electronic communication positively influenced procurement performance, the study addressed e-communication, e-order processing, customer service level and procurement cost reduction. Not all components of e-procurement were included in the research to which this study intended to fill.

N.F.Rajab, G. Namusonge, and N. Shaelle (2016), utilized the questionnaire method but also used secondary data collection methodology. Some studies have linked electronic procurement with SCP but have used other practices of e-procurement. The researcher was therefore filling this knowledge gap by considering other e-procurement practices like; e-sourcing, e-ordering, e-materials management and e-informing with the intention of giving recommendation to improve the buying of goods and services at the sugar factories in Kenya.

Additionally, Faheem and Siddiqui, (2019) used a descriptive design utilizing convenience sampling technique to reach target population. The research used four other e-procurement practices. Through the help of partial least square and structural equation modeling, the study authenticated the impact of e-procurement practices on SCP in Pakistani manufacturing sector. According to this study, not all electronic practices of e-procurement affect SCP positively; therefore through such researches managers will be made to understand e-procurement and its drivers for maximum supply chain performance. It is therefore; more appreciated for the industry to advance an inventive and effective process which satisfies all the needs of organizational supply chain. The previous research was done in Pakistan industry while the present research was done in sugar factories in Kenya. In addition, the previous study used analyzed data using structural equation modeling while the current study will adopt correlation analysis and regression analysis

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2.5 Conceptual Framework

E-procurement was anticipated to have an effect on the DCP at the sugar factories in Kenya. The independent variable will be the various components of the e-procurement (e-sourcing, e-ordering, e-material management and e-informing) while the dependent will be the supply chain performance. The supply chain performance will be measured through: transparency, improved quality, cost reduction, increased information sharing and profitability.

Figure 1.

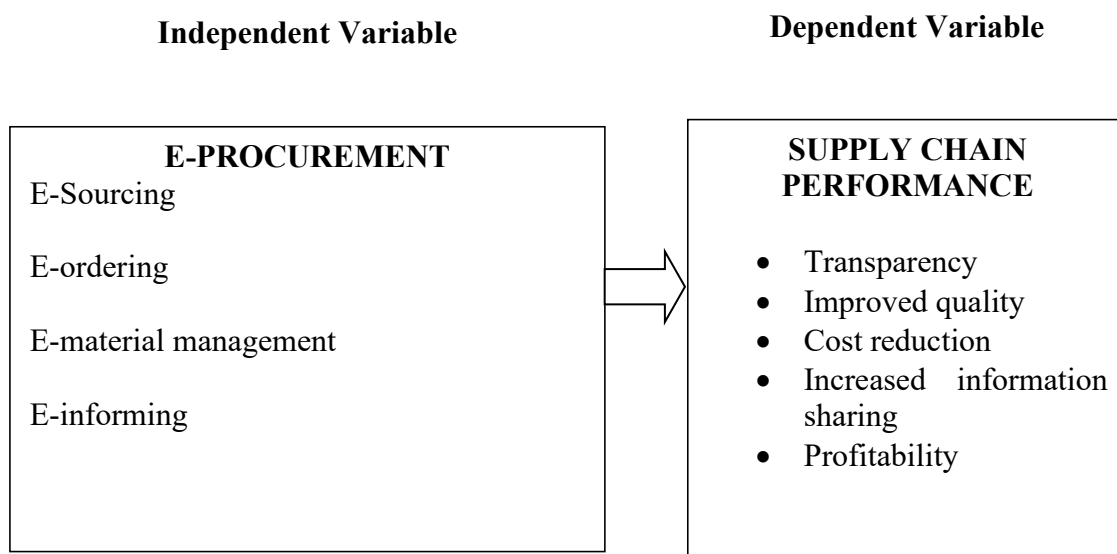


Figure 1. The probable correlation between E-procurement and supply chain performance.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This is comprised of the design, area, population, data collection, data analysis and presentation.

3.2 Research Design

The research used a descriptive and inferential design. It utilized questionnaire to collect data and helped in establishing the effect of e-procurement on SCP (Creswell, 2013). The design helped the researcher to identify the characteristics, frequencies, trends and categories of the various sugar factories in Kenya. It was useful because not much is known about how e-procurement influences the SCP in the sugar factories in Kenya. The research design helped the researcher in understand the how, when and where questions which this study was all about so that in future someone can research the reasons why it happened. Mugenda and Mugenda, (2003) asserts that a descriptive research design was the most effective where quantitative and qualitative data is involved and this study involved both quantitative and qualitative aiming to define the effect of e-procurement aspects and SCP. In his study Mutangili (2019) used a descriptive design and concluded that by the use of e-invoicing there was significance in operation of the organization, The method was faster hence saving payment time, the security of the documents were guaranteed as well as a reduction of paper work.

3.3 Study Area

The research was done in both public and private sugar factories in Kenya.

3.4 Population

The research covered the 12 factories in Kenya. All of them were given questionnaires. Shown on table 1.

Table 1. Target Population

Factory	Ownership	Target Population
1.Muhoroni	Public	1
2.Sony	Public	1
3.Mumias	Public	1
4.Nzoia	Public	1
5.Kibos	Private	1
6.Miwani	Public	1
7.Chemilil	Public	1
8.West Kenya	Private	1
9.Soin	Private	1
10.Butali	Private	1
11.Transnara	Private	1
12.Sukari	Private	1
TOTAL		12

Source: HR office of the sugar factories (2019)

3.5 Sample Size and Sampling techniques

3.5.1 Sampling technique

The use of census sampling was because the factories were few. The processing firms are situated in different geographical regions. This ensured that all the factories were represented in the study, Cooper and Schindler (2011). Questionnaires were distributed to purchasing managers from each sugar factory.

3.5.2 Sample size

Census Sampling was used and all the 12 were selected and purposive sampling to select all procurement managers. This was because the numbers of factories were relatively few and purposive sampling was used because it is a non-probability sampling.

3.6 Data Collection

3.6.1 Data Source

The study was both quantitative and qualitative statistics.

3.6.2 Data Collection method

Questionnaires were distributed to all procurement managers to collect primary data. The study collected secondary data by reading and analyzing information from reports, journals, research papers, books, magazine articles and newspapers.

3.7 Data analysis and presentation

Descriptive statistics and inferential statistics were used to analyze data. Descriptive statistics provided the description of the phenomenon of the study. Qualitative data was analyzed through inferential statistics which involved multiple regressions. Multiple regression analysis tested the level of significance of the variables in the study.

The model used;

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \epsilon \dots \text{Equation 1}$$

Where:

Y is the dependent variable, (SCP)

$\beta_0, \beta_1, \beta_2, \beta_3, \beta_4$ are regression coefficients to be estimated

X1 is the E-sourcing

X2 is the E-ordering

X3 is the E-material management

X4 is the E-information

ϵ is the error term

CHAPTER FOUR: DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1 Introduction

This chapter deals with data analysis, presentation and interpretation of the research findings.

4.2 Return rate

The findings are shown in Table 2.

Table 2: Return rate of research instrument

	Frequency	Percent
Issued questionnaires	12	100%
Returned questionnaires	12	100%

Table 2 shows that the study distributed 12 questionnaires to the targeted respondents. All the questionnaires were returned and this accounted for 100 percent which is 50% over and above the 50% that is appropriate.

4.3 E-Sourcing and SCP

The research was to find out the influence that e-procurement has on the SCP at the sugar factories in Kenya. The responses were guided by the 5 likert scale of: 1-strongly disagree, 2-disagree, 3-undecided, 4-agree and 5-strongly agree. The descriptive results are shown in Table 3.

Table 3: Descriptive statistic between electronic sourcing and supply chain performance at the sugar factories in Kenya

Statement	N	Mean	Std. Deviation
It enables sourcing to be done online hence reducing the cost of advertising	12	4.17	1.115
Supplier appraisal is ably done online saving time	12	4.25	1.138
The location of the supplier is determined online enabling usage of shortest route to save on cost	12	4.08	.996
Overall score	12	4.17	1.083

Key: 1.0-1.4 strongly disagree; 1.5-2.4 Disagree; 2.5-3.4- Neutral; 3.5-4.4 Agree and 4.5-5.0 strongly agree

Table 3 shows that the respondents agrees that electronic sourcing enables sourcing to be done online hence reducing the cost of advertising (mean=4.17; std. deviation=1.115), supplier appraisal is ably done online saving time (mean=4.25; std. deviation=1.138) and the location of the supplier is determined online enabling usage of shortest route to save on cost (mean=4.08; std. deviation=.996). The overall score indicates that respondents agreed that electronic sourcing influenced performance of the supply chain at the sugar factories in Kenya (mean=4.17; std. deviation=1.083).

4.4 E-ordering and SCP

The research was to find out the influence of e-ordering on SCP at the sugar factories in Kenya. The responses were guided by the 5 likert scale of: 1-strongly disagree, 2-disagree, 3-undecided, 4-agree and 5-strongly agree. The descriptive results are shown in Table 4.

Table 4: Descriptive statistics between electronic ordering and supply chain performance at the sugar factories in Kenya

Statement	N	Mean	Std. Deviation
It improves transparency	12	4.00	.739
Reduction of human errors	12	3.83	.718
Reduction of process time	12	4.50	.522
Easy follow-up and tracking of orders in progress	12	4.67	.492
It improves supplier-customer relationships	12	4.08	.793
Overall score	12	4.22	0.653

Key: 1.0-1.4 strongly disagree; 1.5-2.4 Disagree; 2.5-3.4- Neutral; 3.5-4.4 Agree and 4.5-5.0 strongly agree.

The findings was in agreement that it was easy to follow-up and tracking of orders in progress (mean=4.67; std. deviation=.492) and reduced process time (mean=4.50; std. deviation=.522). Also the respondents agree that electronic ordering improves transparency (mean=4.00; std. deviation=.739), Reduce of human errors (mean=3.83; std. deviation=.718), and improved supplier-customer relationship (mean=4.08; std. deviation=.793). The overall reveals that respondents agreed that electronic ordering influenced performance of the supply chain at the sugar factories in Kenya. (Mean=4.22; std. deviation=.653).

4.5 E-material management and SCP

The research was finding out the influence that e-material management has on the SCP at the sugar factories in Kenya. The responses were guided by the 5 likert scale of: 1-strongly disagree, 2-disagree, 3-undecided, 4-agree and 5-strongly agree. The descriptive results are shown in Table 5.

Table 5: Descriptive statistics between E-MM and SCP.

Statement	N	Mean	Std. Deviation
The stocks in the warehouses are accessible by management at all times	12	3.92	.996
It enables the management ascertain the total stock at any given time	12	3.92	.669
It enables re-order levels to be kept and maintained	12	3.58	1.165
It reduces the carrying costs since re-order quantities are maintained	12	4.42	.515
Overall score	12	3.96	0.836

Key: 1.0-1.4 strongly disagree; 1.5-2.4 Disagree; 2.5-3.4- Neutral; 3.5-4.4 Agree and 4.5-5.0 strongly agree

The stocks in the warehouses are accessible by management at all times (mean=3.92; std. deviation=.996), It enabled the management ascertain the total stock at any given time (mean=3.92; std. deviation=.669), It enabled re-order levels to be kept and maintained (mean=3.58; std. deviation=1.165) and It reduced the carrying costs since re-order quantities are maintained (mean=4.42; std. deviation=.515). The overall result shows that respondents agreed that performance of the supply chain was influenced by e-material management at the sugar factories in Kenya (mean=3.96; std. deviation=.836)

4.6 E-information sharing and SCP

The research was finding out the influence of e-information sharing and SCP at the sugar factories in Kenya. The responses were guided by the 5 likert scale of: 1-strongly disagree, 2-disagree, 3-undecided, 4-agree and 5-strongly agree. The descriptive results are shown in Table 6.

Table 6: Descriptive statistics between electronic information sharing and supply chain performance at the sugar factories in Kenya.

Statement	N	Mean	Std. Deviation
Supply chain partners are able to view supplier catalogues online enabling them to make best choices of their suppliers	12	3.92	.793
Collecting data on suppliers' earlier custom is done online improving quality of information	12	4.17	.937
Distributing pricing data and sharing other nominal data is done online reducing wastage of time	12	3.92	1.240
References are consulted electronically thus improving the quality of services	12	4.17	.718
Overall score	12	4.05	0.922

Key: 1.0-1.4 strongly disagree; 1.5-2.4 Disagree; 2.5-3.4- Neutral; 3.5-4.4 Agree and 4.5-5.0 Strongly agree

The findings here was in agreement that supply chain partners are able to view supplier catalogues online enabling them to make best choices of their suppliers (mean=3.92; std. deviation=.793),and distributing pricing data and sharing other nominal data is done online reducing wastage of time (mean=3.92; std. deviation=1.240). Also the respondents agreed that collecting data on supplier's earlier customers is done online improving quality of information (mean=4.17; std. deviation=.937). In addition, the respondents agree that and references are consulted electronically thus improving the quality of services (mean=4.17; std. deviation=.718). The overall score shows that respondents agreed that performance of the supply chain was influenced by e-information sharing at the sugar factories in Kenya. (mean=4.05; std. deviation=.922).

4.7 E-procurement and SCP

The research was finding out the influence of e-procurement on the SCP in sugar factories in Kenya. The responses were guided by the 5 likert scale of: 1-strongly disagree, 2-disagree, 3-undecided, 4-agree and 5-strongly agree. The descriptive results are shown in Table 7.

Table 7: E-procurement and Supply chain performance.

Statement	N	Mean	Std. Deviation
Transparency	12	4.17	.718
Improved quality of supply chain	12	4.50	.522
Cost reduction	12	4.33	.492
Increased information sharing	12	4.42	.900
Profitability	12	4.08	.669
Overall score	12	4.3	0.66

Key: 1.0-1.4 strongly disagree; 1.5-2.4 Disagree; 2.5-3.4 Neutral; 3.5-4.4 Agree and 4.5-5.0 Strongly agree

The findings were in agreement that e-procurement improved quality of supply chain (mean=4.50; std. deviation=.522). In Addition, respondents agreed that electronic procurements led to transparency (mean=4.17; std. deviation=.718), cost reduction (mean=4.33; std. deviation=.492), increased information sharing (mean=4.42; std. deviation=.900) and profitability (mean=4.08; std. deviation=.669). The overall score reveals that respondents agreed there was influence on the SCP due to use of e-procurement (mean=4.3; std. deviation=.66).

The findings confirms Barngetuny and Kimutai (2015) who established that electronic procurement on SCM enabled decentralization of procurement processes and centralization of strategic procurement processes which boost transparency in the supply chain management.

4.8 Inferential results

The inferential statistics used multiple regressions.

4.8.1 Regression analysis

Multiple regression analysis tested the level of importance of the variables in the study.

Table 8: Electronic procurement and supply chain performance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.902 ^a	.813	.706	.22428

a. Predictors: (Constant), electronic information sharing, electronic material management, electronic ordering, electronic sourcing

Table 8 displays a resilient relationship between e-procurement and SCP ($R=.902$; p value < 0.05). The R square shows that electronic procurement components contributed to 81.3 percent variation in SCP. The results also displays that 18.7 percent of the SCP at the sugar sector in Kenya was contributed by other factors outside this study.

The finding concurred with King'ori (2013) who highlighted that e-procurement in the supply chain improves financial controls and eliminates wastage of time in the supply chain processes.

Table 9: ANOVA of e-procurement and SCP

Model	Sum of Squares	df	Mean Square	F	Sig.	
1	Regression	1.528	4	.382	7.594	.011 ^b
	Residual	.352	7	.050		
	Total	1.880	11			

a. Dependent Variable: supply chain performance

b. Predictors: (Constant), electronic information sharing, electronic material management, electronic ordering, electronic sourcing

Table 9 reveals that Electronic procurement had substantial effect on SCP in the sugar factories in Kenya ($F=7.594$; $p \text{ value} < 0.05$). The finding indication is can be used to make conclusions; the independent variable (electronic information sharing, electronic material management, electronic ordering, electronic sourcing) are good predictor of dependent variable (supply chain performance).

Table 10: Coefficients of E-procurement and SCP at the sugar factories in Kenya.

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.119	.649		1.724	.128
electronic sourcing	.115	.160	.200	.720	.495
electronic ordering	.112	.331	.128	.339	.745
1 Electronic material management	.361	.214	.505	1.682	.136
electronic information sharing	.189	.153	.270	1.230	.259

a. Dependent Variable: supply chain performance

Electronic material management contributed highest to the SCP, followed by electronic information sharing, electronic sourcing, and electronic ordering and then with the B values of .361, .189, .115 and .112 respectively. Similarly, electronic material management is the most significant followed by electronic information sharing, electronic sourcing, and electronic ordering.

Regression model:

$$SCP = 1.119 + 0.115(ES) + 0.112(EO) + 0.362(EMM) + 0.189(EIS) + \varepsilon \dots\dots\dots \text{Equation 2}$$

The above regression equation simply means that for every unit of the supply chain performance is influenced by 0.115 units of electronic sourcing, 0.112 units of electronic ordering, 0.362 units of electronic material management and 0.189 units of electronic information sharing at the constant value of 1.119 units.

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

Summary

5.2 Summary of findings

The study revealed that respondents agreed that electronic sourcing enables sourcing to be done online hence reducing the cost of advertising (mean=4.17; std. deviation=1.115), supplier appraisal is ably done online saving time (mean=4.25; std. deviation=1.138) and the location of the supplier is determined online enabling usage of shortest route to save on cost (mean=4.08; std. deviation=.996). The overall score indicates that respondents agreed that electronic sourcing influenced SCP at the sugar factories in Kenya (mean=4.17; std. deviation=1.083).

Further, on electronic ordering the finding of study showed that respondents strongly agree that is easy to follow-up and tracking of orders in progress (mean=4.67; std. deviation=.492) and reduced process time (mean=4.50; std. deviation=.522). Also the respondents agree that electronic ordering improves transparency (mean=4.00; std. deviation=.739), Reduce of human errors (mean=3.83; std. deviation=.718), and improved supplier-customer relationship (mean=4.08; std. deviation=.793). The overall reveals that respondents agreed that electronic ordering influenced SCP at the sugar factories in Kenya. (Mean=4.22; std. deviation=.653).

In addition, the study result shows that stocks in the warehouses are accessible by management at all times (mean=3.92; std. deviation=.996), It enabled the management ascertain the total stock at any given time (mean=3.92; std. deviation=.669), It enabled re-order levels to be kept and maintained (mean=3.58; std. deviation=1.165) and It reduced the carrying costs since re-order quantities are maintained (mean=4.42; std. deviation=.515). The overall result shows that respondents agreed that electronic material management influenced SCP at the sugar factories in Kenya (mean=3.96; std. deviation=.836)

Moreover, about electronic information sharing the study revealed that respondents agreed that supply chain partners are able to view supplier catalogues online enabling them to make best choices of their suppliers (mean=3.92; std. deviation=.793),and distributing pricing data and sharing other nominal data is done online reducing wastage of time (mean=3.92; std.

deviation=1.240). Also the respondents agreed that collecting data on suppliers' earlier customers is done online improving quality of information (mean=4.17; std. deviation=.937). In addition, the respondents agree that and references are consulted electronically thus improving the quality of services (mean=4.17; std. deviation=.718). The overall score shows that respondents agreed that electronic information sharing influenced SCP at the sugar factories in Kenya. (mean=4.05; std. deviation=.922).

Finally, the study findings on SCP showed that respondents strongly agreed that improved quality of supply chain (mean=4.50; std. deviation=.522). In Addition, respondents agreed that electronic procurements led to transparency (mean=4.17; std. deviation=.718), cost reduction (mean=4.33; std. deviation=.492), increased information sharing (mean=4.42; std. deviation=.900) and profitability (mean=4.08; std. deviation=.669). The overall score reveals that respondents agreed that electronic procurement influenced SCP (mean=4.3; std. deviation=.66).

The regression results displayed a resilient affirmative correlation between electronic procurement and supply chain performance ($R=.902$; p value < 0.05). The R square shows that electronic procurement contributed to 81 percent variation in SCP in the sugar factories in Kenya. The study results show that 19 percent of the SCP was contributed by other factors outside of this study

5.3 Conclusion

The objective was to establish the influence of electronic procurement on the supply chain performance at the sugar factories in Kenya. From the findings, embracing electronic sourcing by the sugar factories in Kenya would enhance supply chain performance, e-ordering affords improved usage of time and guarantee transparency of the supply chain processes.

Founded on the results, the study concluded that accepting e-material management will improve stock levels and reduce obsolete stock and the study also concluded that e-information sharing improves levels of understanding and customer relations. The research therefore concluded that e-procurement had a strong effect on SCP ($R=.902$; p value < 0.05). ($.902^2 = .81$) that e-procurement contributes to SCP by 81% while the 19% was contributed by other factors outside the study.

5.4 Recommendations

Founded from conclusions, the recommendations were: That sugar factories should intensify the use of e-sourcing, that sugar factories should enhance the use of e-ordering, that sugar factories should make use of e-material management systems to ensure efficiency and effectiveness of material management and stock level controls. Similarly the sugar factories should embrace e-information sharing as this was found to increase supply chain performance. The sugar factories in Kenya should adopt e-procurement in order to enhance profitability, transparency, improve quality of supply chain, cost reduction and increased information sharing.

5.5 Limitations of the Study

Generalization is restricted to factories in Kenya and cannot include international sugar companies, other countries are technologically ahead. The research adopted a descriptive and inferential study design. The questionnaire had predetermined questions and answers leaving no option for personal opinions making respondents to answer questions the way they did.

5.6 Suggestions for Further Research

1. Moderating effect of government policy in the influence of technology in the SCP on the public institutions in Kenya.

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Appendix 1: Research Questionnaire

You have been selected to participate in the study on the E-procurement and supply chain performance in sugar factories in Kenya. Your participation will be highly valued and appreciated and all information you give on this study will be considered confidential and will be used for academic purposes only.

SECTION A: Electronic sourcing

To what extent do you agree or disagree with the following statements on the relationship between electronic sourcing and supply chain performance?

Key: 1-Strongly Disagree, 2-Disagree, 3-Undecided, 4-Agree, 5-Strongly agree

E-Sourcing practices	1	2	3	4	5
It enables sourcing to be done online hence reducing the cost of advertising					
Supplier appraisal is ably done online saving time					
The location of the supplier is determined online enabling usage of shortest route to save on cost					

SECTION B: Electronic Ordering

To what extent do you agree or disagree with the following statements on the relationship between electronic order processing and supply chain performance?

Key: 1-Strongly Disagree, 2-Disagree, 3-Undecided, 4-Agree, 5-Strongly agree

E-order processing practices	1	2	3	4	5
It improves transparency					
Reduction of human errors					
Reduction of process time					
Easy follow-up and tracking of orders in progress					
It improves supplier-customer relationships					

SECTION C: Electronic Material Management

Indicate the extent to which you agreement with the statements below

Key: 1-Strongly Disagree, 2-Disagree, 3-Undecided, 4-Agree, 5-Strongly agree

E-material management practices	1	2	3	4	5
The stocks in the warehouses are accessible by management at all times					
It enables the management ascertain the total stock at any given time					
It enables re-order levels to be kept and maintained					
It reduces the carrying costs since re-order quantities are maintained					

SECTION D: Electronic Information sharing

To what extent do you agree or disagree with the following statements on the relationship between electronic information sharing and supply chain performance?

Key: 1-Strongly Disagree, 2-Disagree, 3-Undecided, 4-Agree, 5-Strongly agree

E-Information sharing practices	1	2	3	4	5
Supply chain partners are able to view supplier catalogues online enabling them to make best choices of their suppliers					
Gathering information on suppliers' previous clientele is done online improving quality of information					
Distribution of information about pricing and exchanging other technical information is done online reducing wastage of time					
References are consulted electronically thus improving the quality of services					

SECTION E: E-procurement and Supply chain performance

To what extent do you agree or disagree with the following statements on the influence of e-procurement on supply chain performance?

Key: 1-Strongly Disagree, 2-Disagree, 3-Undecided, 4-Agree, 5-Strongly agree

Supply Chain Performance	1	2	3	4	5
Transparency					
Improved quality of supply chain					
Cost reduction					
Increased information sharing					
Profitability					

Thank you for your participation