

**// WEB BASED PROCUREMENT TECHNOLOGY AND
OPERATIONS PERFORMANCE OF THE COUNTY
GOVERNMENT OF MACHAKOS //**

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**A RESEARCH PROJECT SUBMITTED IN PARTIAL
FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF
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DECLARATION

This research project is my original work and has not been presented or submitted for the award of any other degree or reward.

Sign. .....

Date. 17/12/2018.....

HENRY NTHARI NJERU

D61/77104/2015

This Research project has been submitted for examination with my approval as the University Supervisor

Sign. .....

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I acknowledge the almighty God for His invaluable support through this project. My sincere acknowledge also to my supervisor Dr. Wainaina Githii, Lecturer at the University of Nairobi for his valuable contributions, guidance and encouragement during the entire period of this research project.

DEDICATION

I dedicate this work to my wife, Mercy Mbogo, my daughter, Blessing Wakio and my only brother Roy Kamwende, you really inspired me to achieve my goals.

ABSTRACT

In the past few years, public procurement has gone through significant evolution; the manual traditional processes experienced a facelift due to internet-based procurement that enhances efficiency and effectiveness in public service delivery. The objective of this study was to examine the web-based procurement technology and operations performance of Machakos County Government. The study employed three theories i.e. the Technology Acceptance Theory, Resource-based theory and Transaction Cost Theory. The study was conducted in Machakos County Government and both purposive sampling and simple random sampling were employed for selection of procurement and finance staff. The main instrument for data collection was structured questionnaires that allowed for uniformity of responses. The data was analyzed using descriptive statistics and Karl Pearson's coefficient of correlation was used to determine the relationship between the two independent variables namely, web based enterprises resource planning and E-sourcing and operational performance on the other hand the dependent variables. The main findings are that implementation of web based procurement technology leads to improvement in quality of services offered, and cost reduction facilitated by sharing of information and technology usage. The study as well noted a significant positive relationship between web based procurement technology and operational performance of the organization.

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CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

In a globalized and very competitive business atmosphere, both private and public sector should be conversant with advanced technologies in the industry. Technology help to minimize costs on operations while still ensuring that the desired and intended goals of the organization are met. The emergence of technology in market has resulted to invasion of e-markets for most sectors of business. That has made it easy to connect business- to -business and business -to- commerce linkages. The advantages associated with purchasing on an online platform does not only involve cutting on expenses but as well improves operations of a company. It assists business owners to do business with only few suppliers that they have chosen having better strategies for buying while still cutting down costs associated with the administration (Pearcy & Giunipero, 2010).

Traditionally, procurement involved slow and manual procedural as well as systematic processes catering for transactions associated with procurement (Hawking, 2004). Electronic procurement takes a very significant role in the business-to-business procurement and this has increased over the recent years. Good coordination of the company results from a web-enabled B2B e-procurement and hence transactions involving less cost (Subramaniam & Shaw, 2012). Currently, organizations have started to find out on what decisions should be put to place and the way they cope with business pressures as far as web based procurement is concerned.

Most firms have made it key to ensure that their procurement functions are getting better over the last few decades. This is because the function has proven to be a strategic unit for many organizations because huge costs can be cut down through prudent procurement hence increase in service delivery and profitability (Pearcy & Giunipero, 2010). Since a number of costs can be cut down through procurement procedures, the association of low costs with procurement has induces the many institutions to embrace procurement technology.

According to Lin and Shaw (2014), implementation of Web-based procurement systems would result to effective processes of operation for the buying company as well as enhancing efficiency in the process of having orders fulfilled. The key goal for orders fulfillment is that supplier is expected to deliver products that are of good quality at the specified place and in time (Lin & Shaw 2014). This is achieved through sharing of information. For instance, the County Government of Machakos has automated its revenue collection system by use of Local Authority Integrated Financial Operation Management System (LAIFORM), the system has capped revenue leakages, ensured shared information, maximized collection of revenue for support of County development agenda and improved service delivery to her citizens (Machakos County Government report, 2013). The County in the year 2015 dedicated itself to invest in ICT and rolled out the implemented of Integrated Financial Management Information System (IFMIS) across all the County ministry. The system has improved internal procurement and payment processes resulting to better service delivery (Machakos County Government integrated development plan, 2015). Although the IFMIS system is in operation at the County, various modules like E-sourcing, E-auction/reverse auction and E-catalogue have not been implemented (Auditor general report, 2015)

1.1.1 Web-based Procurement Technology

Broadly, Web based procurement technology can be seen as an end-to-end solution which streamlines as well as integrate many processes of procurement in the entire organization. (Barasa, Gregory & Okwaro, 2017). Web-based Procurement technology has varying definitions, but its general one is that it's the application of internet-based technology in the undertaking of majorly purchasing of goods and services, (Wu et al., 2010). This system is IT based which comes at the completion of the supply transaction. Therefore, procurement technology is a form of trading that utilizes the Internet platform such web-based Enterprises Resource planning (ERP) and electronic data interchange (EDI). The advantages brought by this system have earned it popularity as it is associated with a reduction in transaction turn-around time and cost cutting (Arrowsmith S., 2012).

The influence of web-based technology on businesses is the increased speed of activities as well as avenues for conducting business in the competitive and dynamic world we are in today. Capability of providing solutions that are cost friendly and sustainable has become important. There is so much pressure on businesses to better how they give responses to clients, make efficient operations and product development as well as transparency in resources utilization. As a result of the emergent application of ICT, companies are being coerced on transition to virtual e-procurement and supply chain philosophy in order for the company to be competitive (Carabello, 2016).

1.1.2 Operations Performance

According to Slack et al. (2007), there are five variables that indicate improved performance in the discipline of operations which are: flexibility of the system, increased speed, cost effective, dependability and quality. The variables are crucial objectives strategized to improve performance which are applied in every operation of an enterprise. Dependability refers to acting as per the promise and being in time. Speed means doing things quickly. Flexibility refers to ability to modify operations of a business with ease so as to satisfy the business new needs. Cost performance is about doing things economically and Quality is about doing things right.

Operations performance is the degree at which different departments of the organization work in harmony to achieve organization goals and objectives. To measure the operations performance, the organization should establish a performance measurement system. This is done due to increasing diversity in organization variety in service provision and for the organization to gain competitive advantage in the market (Gunasekaran, 2014). The SCOR model is the mostly used in assessing the operations performance in procurement performance. The SCOR model groups the procurement process in to sages; plan, source, make, deliver and return. The performance measures using the SCOR models are categorized into Cost, Quality, Time, Flexibility, and dependability dimensions (Slack N., Chambers S. & Johnston R., 2007).

According to Kakwezi and Nyeko (2016) how effective and efficient the procurement process is determining the performance of the purchasing process. An organization is inclined to assess its performance based on its set goals, the areas it needs to improve on before it decides to put in processes for improvement. This involves of comparison of actual and the expected output (Richard et al., 2009).

1.1.3 Machakos County

Machakos County is one of devolved units in the Republic of Kenya. Machakos has 8 constituencies including Yatta, Machakos Town, Masinga, Mwala, Mavoko, Matungulu, Kathiani and Kangundo. The County Government of Machakos is headed by a Governor and is sub divided into forty wards. The County governments has eleven departments namely department of Public Service, labour, ICT and cooperative development, transport, Roads, public works and housing, department of health and emergency services, department of trade, economic planning and industrialization, department of water, irrigation and sanitation ,department of decentralized units, urban areas and municipalities, department of tourism sports and culture, department of education, youth and social welfare, agriculture, and finally County treasury and revenue allocation (Machakos County Government , 2013).

The major strengths of Machakos County include: It is close to the capital city which is Nairobi County, massive arable land availability, livestock, wild game, tourist attraction sites, strong gender supporting NGOs, rangeland and a resilient local community with developed mechanism of survival. Apart from Konza Techno City, the County Government has also a master-plan intended to uplift the well being of the County through the vision of the planned Machakos City just adjacent to Machakos Town (Machakos County Government master plan, 2013).

According to Public Procurement Oversight Authority Report, (2014), the County Government was on the spot in 2014 over irregular procurement practices. The tenders in question include one of installing CCTV cameras at the Town of Machakos, buying of 15 Subaru cars for the County Government, building a home for the governor in the town, drilling of boreholes, and procurement of workshop service as well as matters relating to foreign and domestic travels by the County officials. The

County Government has since then partially adopted web based procurement technology in its procurement processes (Auditor general report, 2015).

1.2 Statement of the Problem

Lankford (2004) noted that companies which have integrated internet successfully into their supply chain management remain competitive as compared to the ones that have not. Web-based procurement solutions targets workflows automation as well as streamlining of the core process in an organization so as to increase efficiency in the chain of supply (Davila et al., 2003). Public procurement operates in an atmosphere of accelerated changes spurred by technology, programs reviews, political and public demands on quality services provision (Bolton, 2006; Eyaa & Oluka, 2011).

Public Procurement promotes social, industrial and environmental policies (Bales & Fearon, 2016)). Previously, Kenyan system on public procurement has gone through significant developments and institutional strengthening. It has transitioned from lack of regulations and legal framework in 1960s to one under National Treasury Circulars regulations in 1970s, to establishment of Public Procurement and Disposal (PPD) Act in 2005, then introduction of procurement technology in 2007 and finally the current Public Procurement and Disposal (PPD) Act in 2015.

Despite several public procurement reforms; poor performance is still being experienced and has been cultivated as a result of legislations that fail to spur technology application in the process of procurement, unskilled human labor, lack of resources, constraints in the economy, inadequate infrastructure, failure to cooperate by suppliers, and high adoption costs on web-enabled purchasing system (Malela, 2010).

Web-based procurement technology has become an integral practice of life for many enterprises in the world today as many of them practice at least one form of it, like e-procurement and e-sourcing. The significance of it is to ensure efficiency in operations by replacing or improving trading activities with e-business (Essig et al., 2014). Chan and Lu (2014) discovered that those organizations that incorporated web-based procurement technology strategies encountered less costs on transactions and realize efficiency in their processes and thus facilitating better operational performances.

According to Kim *et al.* (2014) on policies, obstacles as well as the use of web-based procurement technology indicates that implementation of procurement as part of the strategies to bettering performances has been incorporated by just 33% of state owned corporations. The study also reveals that public sector' procurement technology has not been fully utilized with Internet being used for web- browsing and e-mails only (PPOA, 2013). The study therefore seeks to examine the web- based procurement technology and operations performance in the County Government of Machakos.

1.3 Study Objectives

1.3.1 General Objective

The most important objective was examining the web-based procurement technology and operations performance of the County Government of Machakos.

1.3.2 Specific Objectives

- i) To establish the role of web-based procurement technology on operations performance of the County Government of Machakos
- ii) To determine the relationship between the web -based procurement technology and operations performance of the County Government of Machakos.

1.5 Significance of the Study

The research findings will be beneficial to the County Government of Machakos to learn and formulate policies and operational practices that support implementation of internet based procurement technology an instrument of enhancing their operations performance. The outcomes and recommendations of this research also will shade more right on the role of web based procurement technology in public sector operations and will assist stakeholders appreciate the holistic approach to implementation of internet- based technology in procurement processes.

The procurement managers and staff will benefit with source of material in developing and harnessing their procurement function as a source of competitiveness in the present day evolving and dynamic business environment. The research provides

background information for other researchers and scholars who may be willing to conduct further studies in relation to this study. The findings also can serve as a benchmark and provide a better understanding for organization intending to adopt the web based procurement technology.

CHAPTER TWO

LITERATURE REVIEW

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2.1 Introduction

It targets the theoretical framework and literature that has been discovered on the usage of web based procurement technology and operations performance of the organizations.

2.2 Theoretical Framework

The research employed 3 theories. These are: Technology Acceptance Model (TAM), Resource-Based Theory (RBT) and Transaction Cost Theory. These theories are chosen because they are the most relevant for this study.

2.2.1 Technology Acceptance Model

According to Lai (2016), the security and design spur the system as well as its characteristic potentials whereas the recognized ease and usefulness remains the major stimulants to the users and can explain or leads to consumers' respond to use system. TAM tries to assist practitioners and researchers in distinguishing why a specific system or technology would be accepted or not and pursue the best techniques by explaining other than just having predictions. TAM gives an assumption that a user of a computer is rational and will use the information systematically so as to make a decision on either to or not to adopt that technology at the place of work. Davis (1986) discovered three key determinants of acceptance of technology which related to effectiveness and cognition and were a suggestion from other studies conducted earlier. He started with TRA and did adapt it just as a platform for causal links between assumed ease of use, usefulness, desire to give an explanation of technology adoption and attitude towards the use of technology.

The TAM theory is fundamental to the study as it informs the research on how technology acceptance impact on effective implementation of the procurement technology in County government.

2.2.2 Resource-Based Theory

The pursuit for technology in supply chain and its management has been a key principle of reliance (Pressutti, 2013). Resource-based theory (RBT) has become promising framework that can be used in the analysis of the sources of IT and its sustainability in the field of procurement (Baily, 2008). As far as RBT is concerned, IT weighed as economic rent is obtained from resources set strategically (Bales & Fearon, 2016).

The resource based theory holds the rapid changes in the external environment, every organization have different kinds of resources that give them uniqueness in the market relying on the environment industry. The uniqueness of wealth is termed to be rare, more valuable and not easy to imitate by others. Such resources include human capital, physical assets and equipment, technological advances i.e. software application, financial resources among others. Generally, such resources are perceived to be unique and competitive in nature and aid the organization special hitch in their operations (Barney, 1991). On the other note, Lopez (2005) asserted that not all the resources will create competitive advantage for the firm, but they can only do so if they are well integrated and coordinated.

The implementation of public procurement as a whole require that the public entities to have capabilities in term of professionally trained, skilled and experienced employees in the field of procurement as well as competent and reliable manager who can direct and organize employee in executing duties as provided in the Public Procurement and Disposal Act, 2015 (suppliers practitioners management Act, 2007).

The theory informs the research how effective and efficient use of resources assist in realizing quality service delivery and promote competitiveness in public sector.

2.2.3 Transaction Cost Theory

The usage of IT over time has led to cutting down of costs associated with transactions as well coordination which has broadly been recorded in literature (Bakker *et al*, 2008). IT facilitates electronic market places, cut down expenses associated with searching information on the prices and product offerings and enhances supply chain collaboration through sharing of information (North & Douglass C., 1992).

Uncertainty as far as supply chain is concerned results from demand, technology, supply and new market development uncertainty (Koufteros, 2011). Uncertainty in the chains of Supply arises from unpredictable fall of events which happen in the upper ends of the chain and is related to inadequate raw materials and delayed deliveries. Demand uncertainty is the unpredictable fall of events happening in the downstream of the chain of supply (Koufteros, 2011).

The conclusion drawn from this theory is that the use of procurement technology can be of important link to effective and efficiency operations performance to the County Government by enhancing service quality and cost reduction. For example: In case a supplier is not able to predict prices of inputs in the correct way, he/she will hesitate to contract, that locks the company in a fixed price for a long duration (Arrowsmith, 2012).

This theory informs the research how the use of web-based technology results to low cost of business operations which is cascaded to final expenses of services and therefore monetary value is achieved.

2.3 Web-based Procurement Technology

There are various forms through which web-based procurement technology can be implemented these includes; E-tendering, E-sourcing, E-auction/reverse, Web-based Enterprise Resource Planning, E-collaboration, E-order processing and E-communication. However, the study focused on Web-based Enterprise Resource Planning and E-sourcing which are viewed to offer solutions which streamlines the processes of procuring and integrates them in the enterprise (Albores et al, 2012).

A web-based Procurement technology system is a complex application containing many functions that are usable and help the company process activities relating to purchasing transactions. The usage of this system can result to strengthening the ability of searching, enhance faster and even increased accuracy of transmitting data, provision of plenty and quicker information, and cut down on the costs of coordination and communications. Therefore, Web-based procurement does influence four of the key business-to-business tasks of an organization; purchase processing, search, coordination as well as monitoring and control (Subramaniam & Shaw, 2012).

To achieve the advantages of Web-based e-procurement, comprehension of factors that affect value forming is required in order to develop a solution so as to enhance system implementation (Subramaniam & Shaw, 2012). Procurement technology systems play a crucial role in the B2B purchasing through streamlining processes of buying and provision of information required to reach effective decision making on purchasing (Osmonbekov *et al.*, 2012). Studies conducted earlier are for the notion that implementation of web-enabled procurement system, companies have benefited greatly (Barbieri & Zanoni, 2015).

2.3.1 Web-Based ERP (Enterprise Resource Planning)

Web based ERP gives way for more flexibility to the company and improve sharing of information in the business that facilitates good decisions being made across all the organization levels (Latamore & Berton., 1999). Access to Web based ERP allows for modification of the main business of the enterprise to suit the suppliers and customers requirements hence, growing the firms' competitiveness potential.

A web-based ERP system typically includes the following two characteristics that are part of study variables; internal process integration and real time information that enhance the decision making abilities and information flow of the company. (Albores et al, 2012). Web-based (ERP) is a business management platform which entails integrated software sets, which when implemented successfully integrate and manage the entire functions for the business. The sets does consist materials management, mature business applications production planning, tools for distribution, supply chain, human resource, customer information and computer integrated manufacturing. They have the capability of facilitating increased information flow amongst all processes of the supply chain (internal and external) in the firm (Bozarth et al, 2014).

In the recent atmosphere of doing business, firms aim at beating the competition through global expansion as well as satisfying the requirements of the customers. Firms focus on attaining higher delivery services through generation of more output associated with least expenses in the supply chain. With regard to that, web based enterprise resource planning (ERP) appears essential for the firm to grow stronger potentials, grow its performance , become more competitive and facilitate making of better decisions (Agarwal & Prasad, 2014).

2.3.2 E-sourcing

E-sourcing is a process of identification and selection of new supplier to deliver goods or services in a specified category through electronic means (Kock & Nosek, 2015). E-sourcing is amongst the best e-purchasing practices that organizations are employing to reduce costs and has tremendously reduces the time take from identifying the supplier, negotiation and contract signing. A survey by SAP found out that organization that has adopted use of e-sourcing applications their cycle time reduced between 30% and 75%. The e-sourcing creates a collaborative environment for buyers and suppliers by providing a centralized portal where they can share information effectively. Rink and Fox (2009) argued that supplier contact is part of the sourcing process thus it needs to be established.

E-sourcing is an internet-based application and decision support tool that facilitates the interaction of suppliers and buyers by online auctioning and reverse auction. However, it is more related to online auctioning that facilitate cost reduction through resultant competition (Engelbrecht-Wiggans & Katok, 2006). An online auction is a service in which purchasing transactions arising from competitive processes of bidding are carried out. Collier and Marsha (2006) alludes that an online auctions have become more crucial of e-commerce space having potential large players like Yahoo, eBay and Auctions.

With today business environment which focus mostly on efficiency and customer satisfaction, e-sourcing has played a major role in ensuring that organizations meet their business their objectives. Organizations that have embraced e-sourcing benefits in the following ways: cost saving enhanced by visibility on expenditures and economies of scale through bulk buying, promotion of communication among suppliers and developed long tern relationship to realizing mutual gains (Boer, Harink, & Heijboer, 2012).

2.4 Operational Performance

According to weele (2016) how effective and efficient the procurement process is determines the performance of the purchasing process. Performance of an organization entails actual results of the organization compared to the intended results (Richard et al., 2009). Operational performance has the following four performance features; quality, cost/productivity, flexibility of operations and time/speed (De Toni

& Tonchia, 2001). An organization is inclined to assess its performance based on its set goals and objectives.

The major challenge to the performance of an organization is the fact that all firms do their operations in some external dynamic environment. According to Rendon and Snider (2001), such challenges may include economic, political, socio-cultural, technological and environmental. Performance in the organization context is the way in which managers and the bodies governing the organization deploy systems and programmes that measure current performance of the organization and brainstorming of ideas for adjustment of infrastructure and the organizational behavior deployed to enhance higher output while incurring less inputs. This is done due to increase diversity in organization variety in service delivery and facilitate potential competitiveness for the organization (Gunasekaran, 2014).

Critically, the performance of the organization in operation management perspective take into account five elements that include: flexibility, speed, cost, dependability and quality. These elements are all critical but for this research the target is on cost reduction and service quality which are strategically important to public service sector (Slack et al., 2007).

2.5 Web-based Procurement Technology and Operations Performance

Implementation of web based procurement technology system has resulted to cutting down of costs involved in transactions especially for the business-to-business, improvement of efficient process of procuring, and promotes strategic relationship with the suppliers (Barbieri & Zanoni, 2005). Adoption of Web-based systems of procurement would result to strengthening the ability of searching, enhance faster and even increased accuracy of transmitting data, provision of plenty and quicker information, and cut down on the costs of coordination and communications. Therefore, Web-based procurement does influence four of the key business-to-business tasks of an organization: purchase processing, search, coordination as well as monitoring and control (Subramaniam & Shaw, 2012). To achieve the advantages of Web-based e-procurement, comprehension of factors that affect value forming is required in order to develop a solution so as to enhance web-based e-procurement system implementation (Subramaniam & Shaw, 2012).

According to Park and Kusiak (2005), strategic and operational advantages are the two main benefits coming from the implementation of Web-based e-procurement. Strategic advantages results from the positioning of the buyer organization good enough to take up opportunities resulting from the relationship. Operational advantages results from cutting down costs of transacting and increased transparency of information which consists of automation of the processes of purchasing, integration of amongst procurement and engineering processes and result to advantages for both players. Web-based e-procurement systems implementation focus on five performance results: buyer integrated process, partner relationship, buyer immediate measure, supplier performance and buyer organizational performance (Kakwezi & Nyeko , 2016).

2.6 Conceptual Framework

It gives a description of the relationship between dependent variables and independent variables through the use of diagrams. It is based on two independent variables which are web based ERP and e-sourcing on the other hand, operation performance is the dependent Variables whose indicators are cost and service quality as illustrated below

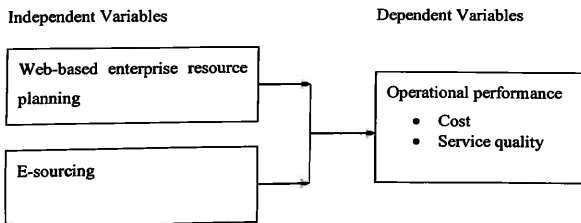


Figure 2.1 Conceptual Framework

Source: (Author, 2018)

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter highlights on the research design, study population, data sampling, collection of data collection and its analysis.

3.2 Research Design

This research employed descriptive research design and was conducted through a single study approach that is the County Government of Machakos which allowed for intensive and detailed analysis of an organization and brings an understanding of complex issue or element and can add strength on what has already been researched (Bryman ,2001). Machakos County has been ranked as the best performing County Government in Kenya (Infotrak limited survey,2016). Also the County is the hub of Konza techno city project where a lot of procurement in various sectors is currently being undertaken and this formed a basis for its selection. Since this study seeks to examine the web based procurement technology and operations performance of the County, a single unit study was chosen because it enables the research to have an empirical investigation on the current phenomena in its real context.

3.3 Population of the Study

Kumar (2000) regards population as a whole group of events, things and people to whom the researcher is interested with in order to perform the research investigations. The population of the study comprised of procurement and finance department employees in the County Government of Machakos. The total number of 120 (MCPSB,2017)

3.4 Sampling

According to Cooper and Schindler (2008), the sampling frame refers to all the units of population used that the selection of the sample is carried out from. Both purposive sampling and simple random sampling were used to make a selection of the sample for the study. Oso and Onen (2005) noted purposive sampling begins with purpose in the mind, a sample is selected including those who are suitable for the study and leaving the rest. Saunders and Thornhill (2003) also posited that purposeful sampling

is useful when one want to access a particular subset of people. This method was therefore suitable in selecting employees in the procurement and finance department in the County who are involved in procurement processes.

The study randomly picked 33 employees out of 55 in the procurement department and 39 employees out of 65 in finance department making a sampling ratio of 60% in each strata and 72 respondents. Mugenda and Mugenda (2003) states that a response of 50% is adequate and above 60% is good enough for better reliability and generalization. In that regard, the choice of sample of 72 which represent 60% will yield good reliability and thus results can be generalized.

3.5 Data Collection

Donald (2016) suggests that two main sources of data deployed include primary as well as secondary data. The study used primary data. The key tool for data collection used was structured questionnaires which facilitated uniformity of the answers given by the respondents. Use of questionnaires is fast and comprehensive for data collection as far as other instruments are concerned (Gangrade, 2012). Closed ended questionnaires were deployed for conducting the study in order to standardize the responses. Structured type of questions was deployed for the questionnaires and was aligned to key objectives for this research. A five point likert scale ranging from 1 to 5 was employed.

3.6 Data Analysis

Kothari, (2004), indicates that data analysis is the entire process after collecting data and ends on interpretation and data processing. After gathering data, it was checked adequately for accuracy and its dependability levels. A quantitative method was deployed to examine and analyze the data using inferential and descriptive statistics.

The researcher then presented the analysis using descriptive methods which facilitated presentation of the research results through the use of relative and absolute (percentages) frequencies, dispersion and the measures of central tendency which consist of standard deviation and the mean. Presentation of data was done by use of graphs as well as tables. The data was presented in prose form involving statements. Karl Pearson's coefficient of correlation was deployed and measured the relationship

between the independent variables and the dependent variables. The regression equation used was:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \varepsilon$$

Whereby the variables are identified as follows: -

Dependable variable Y = Operations performance

Independent variable X_1 = Web-Based ERP

Independent variable X_2 = E-sourcing

While β_1 , and β_2 are coefficients of X_1 and X_2 and ε is the error term.

CHAPTER FOUR

DATA ANALYSIS, FINDINGS AND DISCUSSIONS

4.1 Introduction

The chapter presents the data analysis, findings and discussions of this study based on the objectives. The findings are presented in tables and figures.

4.2 Response Rate

The study targeted a sample size of 72 respondents from which 66 filled in and returned the questionnaires making a response rate of 91.7% as presented in table 4.1.

Table 4.1: Response Rate

	Questionnaires Administered	Questionnaires filled & Returned	Percentage
Respondents	72	66	91.7

Source: (Research Data, 2018)

The rate of response was enough to come up with conclusions since they were representative. To the Mugenda and Mugenda in 2003, a 50% rate of response is sufficient for doing the analysis as well as making the reports; a 60% rate of response is simply good and a 70% rate of response and above is excellent. With regard to the assertion, the rate of happened to be excellent.

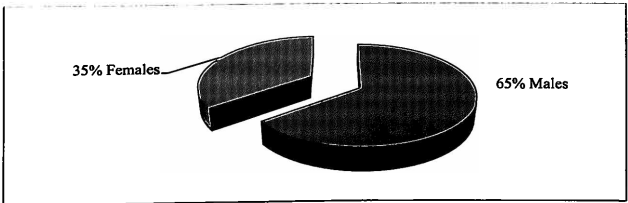
4.3 Demographic Information

The research aimed at to establishing the respondents' demographic data. This category consisted a category for gender, period of service, age group and educational qualifications.

4.3.1 Gender Category

Participants were required to give an indication of the gender they belonged to. This meant to ensure fair enjoyment of female and male respondent's. The findings on this assessment are presented below.

Figure 4.1: Distribution of respondents by gender



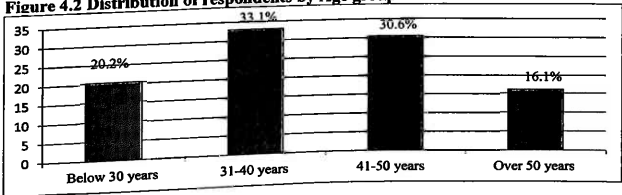
Source: (Research Data, 2018)

Big number of respondents (65%) represented males, and 35% represented females. That implies that this study was dominated by males however the findings also show substantial representation of female gender therefore there was no biasness in terms of gender for this study.

4.3.2 Age bracket

Respondents got requested to give an indication of the age group they belonged to. This was sought in view of capturing distribution held by participants from different age sets as presented below.

Figure 4.2 Distribution of respondents by Age group



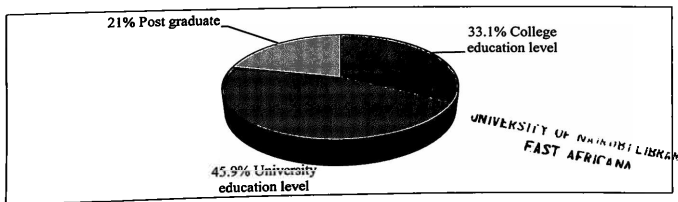
Source: (Research Data, 2018)

The findings shows that a big number (33.1%) had ages ranging from 31- 40 years, 30.6% had ages ranging from 41- 50 years, 20.2% had ages below 30 years and 16.1% had 50 years and above. This meant that there was fair representation of age groups and thus the outcomes did not encounter biasness in terms of age.

4.3.3 Highest level of education

Respondents got requested to give an indication of the highest educational qualifications they had; outcomes are presented below

Figure 4.3: Highest level of education



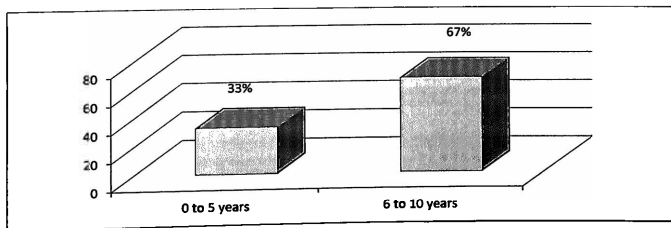
Source: (Research Data, 2018)

Results in the above figure shows that most of the respondent's (45.9%) held bachelors education level, 33.1% held college diploma certificates whereas 21% held college diploma post graduate education. This implies that all of the respondents were well educated and therefore they were in a position to articulate the required information with ease.

4.3.4 Period of service with the County Government

Participants were then again supposed to give an indication of the duration they did work with the County Government for. Results are shown below.

Figure 4.4: Period of service with the current organization



Source: (Research Data, 2018)

The outcomes presented in the above figure show that, 67% had worked with the County Government for a period of 6-10 years, whereas 33% had worked with the current organization for less than 5 years. This means the respondents are well experienced hence gave relevant and viable information.

The research aimed at establishing how much the County Government had incorporated the web-based procurement technology.

Table 4.2: Extent in adoption of web-based procurement technology

	Frequency	Percentage
Very Great Extent	20	30.3
Great Extent	31	47.0
Moderate Extent	15	22.7
Total	66	100

Source: (Research Data, 2018)

According to the outcomes, a big number of respondents (47.0%) were in agreement that that County Government had adopted the web-based procurement technology to a great extent, 30.3% gave an indication to a very great extent while 22.7% gave an indication to a moderate extent. This means that Machakos County Government had adopted the web-based procurement technology to a great extent.

4.4 Role of web based procurement technology on operational performance

Respondents Got requested to give an indication of how much they agreed with the statements below concerning the role of web based procurement technology on operational performance.

Table 4.3: Role of web based enterprise resource planning on operation performance

Statements	Mean	Std Dev
Systems in the County Government allows flexibility of operations	3.77	0.14
Systems in the County allows increased sharing of the information to facilitate better decision-making at all levels of the County operations	4.20	0.18
Systems that are in place helps the County to modify its main business processes to those of the suppliers needs and customers	3.93	0.20
Systems in the County make deliveries at the specified time and to the right persons	4.22	0.14
Systems in the County helps in performance improvement of the supply chain network through reduction of cycle times	3.75	0.32
Systems in the County has become a significant tool for the County Government for enhancing greater potentials	4.25	0.19
Systems in the County has helped the County Government to improve on performance	3.95	0.22

Source: (Researcher, 2018)

The outcomes from the table above shows that a big number of respondents agreed that systems in the County has become a significant tool in the County Government for enhancing greater potentials ($M= 4.25$, $SD =0.19$), systems in the County make deliveries at the specified time and to the right persons ($M= 4.22$, $SD = 0.14$) and that systems in the County allows increased sharing of the information to facilitate better decision-making at all levels of the County operations ($M= 4.20$, $SD =0.18$).

Further, the study revealed that systems in the County has helped the County Government to improve on performance ($M=3.95$, $SD =0.22$), systems that are in place helps the County to modify its main business processes to those of the suppliers needs and customers ($M= 3.93$, $SD = 0.20$), systems in the County Government allows flexibility of operations ($M=3.77,SD = 0.14$), systems in the County helps in performance improvement of the supply chain network through reduction of cycle times ($M=3.75$ $SD =0.32$).

Table 4.4: Role of E-sourcing on operational performance

Statements	Mean	Std Dev
Procurement systems in place helps the County Government to reduce costs	4.00	0.30
The systems have tremendously reduced the time take from identifying the supplier, negotiation and contract signing	3.75	0.18
Procurement system has created a collaborative environment for the County Government and suppliers by providing a centralized portal	4.09	0.25
The centralized portal in the procurement has helped the Government and suppliers to share information effectively	3.84	0.82
Procurement system has helped in the online auctioneering that has brought about reduced prices due to the resultant competition	4.28	0.47
Procurement system has enhanced visibility on expenditures and economies of scale through bulk buying	3.95	0.14
Procurement system has facilitated the interaction of the Government and suppliers through reverse auction	4.12	0.27

Source: (Research Data, 2018)

Outcomes presented above in table 4.4 shows that a big number of respondents were in agreement that procurement system has helped in the online auctioneering that has brought about reduced prices due to the resultant competition ($M= 4.28$, $SD =0.47$), procurement system has facilitated the interaction of the Government and suppliers through reverse auction ($M=4.12$, $SD = 0.27$), procurement system has created a

collaborative environment for the County Government and suppliers by providing a centralized portal ($M= 4.09, SD=0.25$), procurement systems in place helps the County Government to reduce costs ($M= 4.00, SD = 0.30$)

Further, this research revealed that procurement system has enhanced visibility on expenditures and economies of scale through bulk buying ($M= 3.95, SD = 0.14$) the centralized portal in the procurement has helped the Government and suppliers to share information effectively ($M= 3.84, SD =0.82$) and that the systems have tremendously reduced the time take from identifying the supplier, negotiation and contract signing ($M= 3.75 ,SD =0.18$).

4.5 Operational Performance

Respondents were supposed to give an indication of how much they agreed with the statements below concerning operational performance.

Table 4.5: Assessment of operational performance

Statements	Mean	Std Dev
The procurement process is effective and efficient	4.11	0.14
The time taken during the procurement process has greatly improved	3.90	0.38
The procurement technology has greatly improved the quality of services	4.07	0.41
The costs incurred during the procurement process has greatly reduced while increasing the productivity	3.88	0.85
The technology has helped increase collaboration with suppliers	4.25	0.74

Source: (Research Data, 2018)

The Outcomes presented in the table above shows that a big number of respondents were in agreement that technology has helped increase collaboration with suppliers ($M= 4.25, SD = 0.74$), the procurement process is effective and efficient ($M= 4.11, SD = 0.14$), the procurement technology has greatly improved the quality of services ($M= 4.07, SD=0.41$). The time taken during the procurement process has greatly improved ($M= 3.90 ,SD=0.38$) and that the costs incurred during the procurement process has

greatly reduced while increasing the productivity ($M= 3.88,SD=0.85$). These findings concurs with the study findings by Gunasekaran, (2014) that alludes, adoption of Web-based systems of procurement would result to effective processes of operation of the buying company as well as enhancing efficiency in the process of having orders fulfilled.

4.6 Relationship between the web based procurement technology and operational performance

Table 4.6: Model Summary

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.847 ^a	.717	.712	.223

- a. Predictors: (Constant), Web-based enterprise resource planning, E-sourcing
 b. Dependent Variable: Operational Performance

Source: (Research Data, 2018)

Given in the table above, R squared adjusted is the coefficient of determination that gives us the variation of the variable that is dependent as a result of the variable that is independent. According to the outcomes R squared adjusted value became 0.721 meaning a 72.1% variation of operational performance, as a result of Web-Based ERP and E-sourcing at a level of confidence of 95%. This means, 72.1% variations in County operations performance can be explained by Web-Based ERP and E-sourcing. There exists a strong positive relationship between the research variables as given by the value 0.847.

Table 4.7: Analysis of Variance**ANOVA^a**

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	3.444	2	1.722	4.071	.001b
Residual	26.649	63	0.423		
Total	30.093	65			

a. Dependent Variable: Operational Performance

b. Predictors: (Constant), Web-based enterprise resource planning, E-sourcing

Critical value =1.96

Source: (Research Data, 2018)

According to the statistics obtained from the ANOVA, this research determined a level of significance of 0.01 for the said model. The value was below 0.05 showing its significance in estimating how web based enterprises resource planning and E-sourcing affect operations performance of County Government of Machakos. The calculated value was greater than the critical value ($4.071 > 1.96$) meaning that Web-Based ERP and E-sourcing are all efficient in operations performance of that County.

Table 4.8: Regression Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	-.343	0.063		-5.444	.000
Web-based ERP	.441	.142	0.443	3.106	.012
E-sourcing	.436	.097	0.317	4.495	.001

a. Dependent Variable: Operational Performance

b. Predictors: (Constant), Web-based enterprise resource planning, E-sourcing

Source: (Research Data, 2018)

From the data in the table 4.8 above the determined regression equation was:

$$Y = 0.343 + 0.441X_1 + 0.436X_2$$

With regard to the regression equation determined, considering all factors, whereby the variables include web based ERP and E-sourcing at constant zero, the level of staff retention in efficiency of the process of procurement would lie at -0.343, an additional unit in Web-Based procurement technology would enhance efficiency in operations by 0.441, an additional unit in E-sourcing would enhance efficiency in operations by 0.436, the significance value of all the variables ranged below 0.05 and therefore all variables were considered significant.

4.7 Discussion of the Findings

From the findings it was revealed that incorporation of Web-Based ERP plays a key function in improving County operational performance, test regression statistics also show that web Based ERP systems in the County has become a significant tool for enhancing greater potentials, promote flexibility of operations, reduce cycle times and increase sharing of the information to facilitate better decision-making at all levels of the County operations. These findings do agree with Albores et al, (2012) who alluded that Implementing internet based ERP can better the production, facilitate efficiency, smoothen processes and cut down costs.

Further, this study revealed that E-sourcing system has helped in the online auctioneering that has brought about reduced prices due to the resultant competition, facilitated the interaction of the Government and suppliers through reverse auction and created a collaborative purchasing environment. These outcomes agree with Engelbrecht-Wiggans & Katok, (2006) who stated that E-sourcing gives an esteemed way of leveraging new technology that will help one to work with an esteemed buyer later in the life of the business. Say, the e-sourcing platform does go past RFP or e-auction straight to sectors of the supplier on board, performance of the supplier and management of a contract.

From the regression analysis it was revealed that there existed a significant relationship between web based procurement technology and operations performance of the County Government. These outcomes agree with Gunasekaran,

(2014) who states that Adoption of Web-based systems of procurement would result to effective processes of operation of the buying company as well as enhancing efficiency in the process of having orders fulfilled.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This research intended to assess web-based procurement technology and operations performance of County Government of Machakos. The chapter discusses a summary regarding the findings, conclusions and recommendations.

5.2 Summary of the findings

From the analysis, the study revealed that web based ERP allows increased sharing of information to facilitate better decision-making at all levels of the County operations, promote cutting down of the procurement cycle and lead times, allows flexibility of operations and help employees manage their organization with one system that integrate the core business process as well as reduce costs of operations. Test regression statistics also show that web-based ERP systems have become a significant tool in the County Government for enhancing greater potentials. These findings are in support of the findings by Bozarth et al, (2014) that prostrated that ERP solution avoid work repetitiveness, embrace paperless system as compared to traditional manual one resulting to streamlined business operations.

This study revealed that E-sourcing help reduce purchase prices, facilitated the interaction of the Government and suppliers through reverse auction, e-sourcing streamline the bidding process and has created a collaborative environment for the County Government and suppliers. These findings are in support of the findings by Boer, Harink, & Heijboer, (2012) that states that Participating in e-sourcing gives a way of better comprehension of market competition as well as increasing intelligence necessary for competition for the firm that either won or happened not to win the business.

Assessment on operational performance revealed that procurement technology has helped increase collaboration with suppliers, the procurement process is effective and efficient, and the procurement technology has greatly improved the quality of services. The time taken during the procurement process has greatly improved and that the costs incurred during the procurement process has greatly reduced while increasing the productivity. These outcomes agrees with Gunasekaran, (2014) who

revealed that Adoption of web-based systems of procurement would result to effective processes of operation of the buying company as well as enhancing efficiency in the process of having orders fulfilled.

5.3 Conclusions

The study concludes that web based enterprise resource planning (ERP) software standardizes, streamlines, allows flexibility and integrates business processes across all the departments, eliminates overlapping or conflicting jobs or duties and provide integrated solutions to organization information system needs. The study also concludes that E-sourcing platform help County Government to reduce costs, improve procurement cycle time, create a collaborative environment through centralized portal, help in online reverse auction and hence ensuring efficiency of procurement systems that results to improved operations performance at County level. The correlation and regression analysis show a significant and positive relationship between the web based procurement technology and operation performance of the County Government of Machakos.

5.4 Recommendations

With regard to outcomes of the research, a recommendation is made that study recommends that web based procurement technology should be adopted and that County management should invest in information sharing and organization IT systems in order to derive the full benefits on the web based technologies. Government should come up with holistic system integration and technological standards that support web based procurement.

The study established that web based procurement technology was adopted few years ago by the County Government, the study therefore recommend for continuous training and sensitization on the procurement information systems to all the stakeholders to keep up with the dynamism witnessed in technological advancement.

5.5 Recommendations for Further Research

The research aimed to examine the web-based procurement technology and operations performance of the County Government. The study gives a recommendation that another research be conducted on the impact of internet based technologies on public procurement laws in Kenya. A comparative study is recommended for a private sector

to find out if same results would be achieved and finally it will be important to carry out a study on the effects of procurement ethics and procurement strategy in Machakos County Government.

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APPENDICES

Appendix I: Questionnaire

Introduction

The questionnaire is designed to collect data to examine the web- based procurement technology and operations performance in the County Government of Machakos. Kindly answer all the questions as best as you can. The provided information shall be private and strictly for academic purposes only

Part A: Background of the Study

1. Gender

Male []

Female []

2. Age :

Below 30 []

31-40 []

41-50 []

Over 50 []

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3. Highest education level

Primary []

Secondary []

College []

University []

Post graduate []

4. Number of years you have worked in this County?

1- 5 []

6 - 10 []

11- 15 []

Above 16 []

7 To what extent has the County Government adopted the web-based procurement technology?

To a very low extent [] To a low extent []

To a moderate extent [] To a great extent []

To a very great extent []

Part B: Web-Based Procurement Technology

Kindly show how much you are in agreement with this statements below relating to the Web-Based procurement technology. Using the scale of 1-5, where 1- Strongly disagree, 2- Disagree, 3- Neutral, 4- Agree, 5- Strongly agree.

Statements	1	2	3	4	5
Web-Based ERP (Enterprise Resource Planning)					
Systems in the County Government allows flexibility of operations					
Systems in the County allows increased sharing of the information to facilitate better decision-making at all levels of the County operations					
Systems that are in place helps the County to modify its main business processes to those of the suppliers needs and customers					
Systems in the County make deliveries at the specified time and to the right persons					
Systems in the County helps in performance improvement of the supply chain network through reduction of cycle times					
Systems in the County has become a significant tool for the County Government for enhancing greater potentials					
Systems in the County has helped the County Government to improve on performance					

Statements	1	2	3	4	5
E-sourcing					
Procurement systems in place helps the County Government to reduce costs					
The systems have tremendously reduced the time take from identifying the supplier, negotiation and contract signing					
Procurement system has created a collaborative environment for the County Government and suppliers by providing a centralized portal					
The centralized portal in the procurement has helped the Government and suppliers to share information effectively					
Procurement system has helped in the online auctioneering that has brought about reduced prices due to the resultant competition					
Procurement system has enhanced visibility on expenditures and economies of scale through bulk buying					
Procurement system has facilitated the interaction of the Government and suppliers through reverse auction					

Part C: Operational Performance

- 8 Kindly indicate how much you agree with the listed statements in regard to operational performance. Using the scale of 1-5, where 1- Strongly disagree, 2- Disagree, 3- Neutral, 4- Agree, 5- Strongly agree.

Statements	1	2	3	4	5
The procurement process is effective and efficient					
The time taken during the procurement process has greatly improved					
The procurement technology has greatly improved the quality of services					
The costs incurred during the procurement process has greatly reduced while increasing the productivity					
The technology has helped increase collaboration with suppliers					

Thank you for your participation