Critical Factors for Successful Implementation of E-procurement in the Kenyan Public Sector

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

ABSTRACT

E-procurement can be defined as the usage of information and communication technology in performing all procurement process stages through the internet. It is aimed at ensuring transparency, efficiency as well as accountability in procurement. However, unlike the private sector, the Kenyan public sector has not been successful in implementing e-procurement. E-procurement has also not been able to decrease the corruption problem in Kenyan public sector procurement. This research was aimed at identifying critical factors which can ensure successful implementation of e-procurement in Kenyan public sector organisations. The study adopted the exploratory research approach. A stratified sampling method was used to select a population sample of 12 parastatals and 2 government ministries which had 140 respondents. 110 questionnaires were filled and returned – a 79% response which was adequate for data analysis and interpretation. Data analysis was conducted using frequencies, percentages and mean scores while multiple regression analysis obtained using SPSS was used in testing the hypothesis regarding the critical factors' influence on successful e-procurement implementation. The R square values were 0.828 for managerial factors, 0.878 for system factors and 0.930 for stakeholder factors. The three models reach statistical significance (p < 0.0005). In order to contribute the dependent variable (implementation level), the
beta values are 0.472 for managerial factors making them the strongest contributor followed by 0.375 for stakeholder factors and 0.230 for system factors. The research recommends Kenyan public organisations’ top management to support e-procurement implementation and provide adequate resources for successful e-procurement implementation. There should also be proper data encryption, training programs for supply chain personnel and proper IT infrastructure set up. Kenyan public organisations should have a perfect connection with their business partners and suppliers and have an appropriate e-procurement implementation strategy with proper mechanisms for measuring, evaluating and controlling e-procurement implementation. Organisational systems should be engineered to be highly compatible with current e-procurement systems while adequate resources should be availed by the Kenyan government and top management in Kenyan public organisations for effective e-procurement implementation.

Keywords: Critical success factors; information technology; e-procurement; successful implementation; public sector.

1. INTRODUCTION

Studies in e-procurement commenced in the late 1990s when research began to be conducted on the implication of internet and electronic commerce on supply chain management. E-procurement is the use of all technologies facilitating purchasing through the internet [1]. It comprises different e-procurement processes which include e-tendering, e-collaboration, enterprise resource planning, e-MRO (repair, maintenance and operating materials), e-reverse auctions, e-informing and e-sourcing [1]. Davila et al. [2] states that e-procurement is a supply chain management component which comprises of e-procurement software, purchasing consortia, business to business auctions and business to business market exchanges.

E-procurement comprises of third party internet sourcing, electronic ordering and tender submission, buyers-seller electronic mails and in contract management, researching the markets of suppliers as well as financial and inventory systems integration [3]. Koon et al. [4] on the other hand introduced three major e-procurement groups: online intermediaries, seller systems for e-procurement and buyer e-procurement systems. From the above definitions, e-procurement can generally be defined as carrying out procurement procedures through the internet.

There are four major e-procurement processes: electronic order fulfilment and catalogue management, electronic reverse auctions, order fulfilment and payment and settlement innovations [5]. E-procurement has several benefits as discussed in several works of literatures based on supply chain management and e-procurement. For instance, Edmiston [6] identified various key e-procurement benefits. This includes lower costs of supply, lower tender costs, savings on lead time, less paperwork and bureaucracy, standardised documentation with an increase in transparency in e-procurement processes, more compliance with procurement regulations and laws, fewer errors and easier information access.

Faster evolution in technology has resulted in new technology implementation like e-procurement a common practice [7]. However, not all sectors adopt these technologies. Such differences in adoption are influenced by national cultures. For instance, in a study conducted by Batenburg [8], firms from nations with a lower uncertainty avoidance like the United Kingdom and Germany were among the first in adopting e-procurement while nations less reluctant to change like France and Spain have lower adoption rates.

It is important to understand e-procurement readiness for the implementation of e-procurement to succeed [9]. Successful e-procurement implementation also depends on various factors. Critical success factors should get necessary attention as well as investments in the forms of time, efforts and finances. The term critical success factors have been used in many business activities especially in electronic commerce. They are used in facilitating and measuring the success of tactics and strategic approaches in project implementation and supporting the projects through proper limited resource allocation [10]. In the context of this research, critical factors are the underlying guiding principles in ensuring e-procurement implementation are successful. Since e-procurement is presently a major essential activity in the arena of e-business, firms of all
sizes and types need a guide on how to proceed with this technology [11].

Several researchers have performed studies in the field of e-procurement. For instance, Vaidya et al. [12] identified general critical success factors influencing the adoption of e-procurement in the public sector. They concluded that for e-procurement development initiatives across the information economy to succeed, more research, discussions and agreement on critical success factors should be done.

For institutions and organisations to remain competitive, there is a need for them to embrace information and communication technology. A major section of the information system enabled innovations that have a high likelihood of yielding significant benefits to organisations is e-procurement. E-procurement application success depends on various factors.

The major aim of government procurement is simple: purchasing the best product or service at the best price [13]. For this to happen successfully, the process would have to be transparent, objective and open. While the private sector has been successful in implementing e-procurement, the Kenyan public sector has not been successful in implementing e-procurement [14, 15, 16, 12]. E-procurement has also not been able to decrease the problem of corruption in Kenyan public procurement procedures [16, 17]. Atika [18] asserts that public procurement lacks sufficient accessibility and transparency which has reduced trust in the public market and thus the need for professionals in the field of procurement to come up with strategies to manage it. Nyambu [19] argues that the economic crisis necessitates the government to respond to financial problems preventing successful business operations. However, corruption in the public sector causes problems in procurement procedures like the poor professionalism of the bureaucracy, the absence of professionalism, poor auditing and political control and many more which results to financial losses [14].

E-procurement if successfully implemented can be used to overcome these shortcomings related to procurement especially in developing nations by enhancing good governance through control and monitoring of government employees and reduce the potential of corrupt procurement behaviours. Information and communications technology especially e-procurement, if properly implemented would increase efficiency and reduce corruption in procurement processes in the public sector [20].

This research aimed at identifying the critical factors for successful implementation of e-procurement in the Kenyan public sector.

Research questions which formed the research study guide were:

1. How do organisational managerial factors of top management support, resources, the e-procurement implementation strategy, measurement and control and process engineering influence successful e-procurement implementation in the Kenyan public sector?
2. How do organisational system factors of information security, IT infrastructure and system integration influence successful e-procurement implementation in the Kenyan public sector?
3. How do organisational stakeholder factors of supplier support and employee training and skills influence successful e-procurement implementation in the Kenyan public sector?

2. LITERATURE REVIEW

This section will evaluate the various models that have been developed for successful implementation, identify critical factors for successful implementation of e-procurement from past research, show the research gap and show the conceptual framework.

2.1 Models for Successful Implementation

Successful implementation is the most important component of leveraging information technology to facilitate change in organisations. Different models have been developed to facilitate the successful deployment of information systems.

2.1.1 DeLone and McLean model

DeLone and McLean reviewed researches during the 1981-1987 and based on the review, they developed a taxonomy for the successful deployment of information systems. In 1992, they identified 6 variables / components of successful deployment of information systems. These are the individual and organisational impact, use, user satisfaction, system quality as well as
information quality. In 2003 they updated the model and added service quality as another major important dimension as well as the use of intention as an alternative measurement since it is important to measure attitude as well. They then joined organisational and individual impact to a single dimension: net benefits [21].

The DeLone and McLean model have been used a lot in gauging success. It has also undergone suitable modifications in accordance with the requirements of various information systems. For instance, the model was successfully modified to be used in e-learning systems [22]. On the other hand, Wang et al. [23] successfully used the model in assessing the success and efficiency of e-learning systems in accordance with organisational employees. From the perspective of electronic commerce, the major users are providers and customers [21].

This model was used in establishing the critical factors which this research tested for successful implementation of e-procurement in the Kenyan public sector. System and information quality were used to establish the critical factors of information security, IT infrastructure and system integration while use and user satisfaction were used to establish the critical factors of top management support, resources, the e-procurement implementation strategy, measurement and control, process engineering, supplier support and employee training and skills which have an individual and organisational impact.

### 2.1.2 Computer usage model

Another model for information technology to be successfully implemented in enhancing organisational operations is the computer usage model. It is based on several theories: the technology acceptance model, theory of planned behaviour, social cognitive theory and the theory of reasoned action. This model extends the model of technology acceptance adding self-efficacy, organisational support and experience as factors affecting computer technology usage, perceived usefulness, perceived use ease and computer anxiety [24].

![Fig. 1. DeLone & McLean 2003 model [21]](image1)

![Fig. 2. The computer usage model [24]](image2)
Anxiety is general distress of emotions experienced by an individual [24]. Based on a survey involving top Finland companies with high net sales, Igbaria and Iivari [24] argued that anxiety and emotional arousal affects self-efficacy which implies that users who are less anxious tend to feel more effective. Self-efficacy beliefs determine behaviour and hence affect the usage of a computer and motivation. They observed that self-efficacy to computers have a crucial role in determining the decision of an individual to use computers [24]. The model was used to develop the critical success factors of supplier support and employee training and skills in this research.

2.1.3 Personal computing acceptance model

The personal computing acceptance model posits the acceptance of personal computing in small organisations as a function of perceived ease of use and perceived usefulness. The two factors have a direct effect on the internal and external organisational factors on personal computing acceptance [25]. It posits that internal and external factors of organisations indirectly affect the acceptance of personal computing since they influence perceived usefulness and ease. A survey of small organisations in New Zealand demonstrated that the perceived ease of use greatly explains system usage and perceived usefulness while perceived usefulness strongly affects the use of a system [25]. On the other hand, however, using the personal computing acceptance model, Papadakis et al. [26] performed a research on e-learning whereby they investigated the rate of frequency students used mobile phones in accessing various Moodle activities. The research study showed that Moodle is only used as a repository for electronic documents and not as an effective tool for learning mainly due to compatibility and usability problems. The students expressed the need for Moodle content to be organised in a better way and presented more clearly in mobile phones as it is accessed in desktop computers to enable faster more efficient information access. The students thus viewed the e-learning system as a formal class complement than a substitute. Similar to other major research study findings, the research showed that the perception of students to learning management systems is influenced by perceived use and perceived usefulness and by social influences. Papadakis et al. [26] identified the methods used by tutors and instructors in using a learning management system influences student's attitude and use of learning management systems. It thus concluded that learning management systems should deliver relevant, up-to-date, highly available content that is of high quality while instructors should be more interactive with students actively facilitating student tasks. The research, however, did not identify the presence of unnecessary information in learning management systems, unlike other research studies.

This research study on the other hand aimed at identifying the critical factors for successful implementation of e-procurement in the Kenyan public sector. The personal computing acceptance was used to develop the critical factors of supplier support and employee training and skills which this research tested for successful implementation of e-procurement in the Kenyan public sector.

![Fig. 3. The personal computing model [25]](image-url)
2.1.4 **Critical success factors theory**

Another model for successful information technology systems implementation is the critical success factors theory by Grunert and Ellegaard [27]. There are four aspects of the term key success factors. One, as a basic component of a management information system, as a description of major resources and skills needed for success in a particular market, as a unique company characteristic and as a heuristic tool used by managers in sharpening their thinking [27]. They adopted the second view that is as a description of key resources and skills needed for success in a particular market.

Grunert and Ellegaard [27] argued that the immediate success determinants in any given market are the costs relative to competitors and the perceived customer value in the products of a business. Based on this, they defined key success factor as a resource or skill which a business can put investments into, in which in the market in which the business is operating in, explained the main component of observable differences in relative costs and perceived value.

Major success factors are different in terms of changeability that is the extent to which competitors can emulate them and on whether they are compensatory or conjunctive [27]. While compensatory key success factors bring about choice in the areas of excellence and hence strategic group formation, conjunctive key success factors are the necessary conditions for superior performance.

Grunert and Ellegaard [27] developed the deductive and inductive modes of investigating critical success factors shown in Fig. 4. The deductive mode of investigating the critical factors necessary for the successful implementation of an information technology system begins by the researchers developing a hypothesis on major and key success factors, selecting a market based on the critical factors after which an assessment should be made on the actual key success factors.

Unlike in the deductive mode, use of the inductive mode commences with the researcher assessing perceived market key success factors and then assessing actual key success factors in the market, developing hypotheses on major and key critical success factors and then investigating the next market.

The researcher used the critical success factors theory model to investigate the critical factors necessary for successful implementation of e-procurement in the Kenyan public sector. Grunert and Ellegaard [27] argued that there are four aspects of the term key success factors. One, as a basic component of a management information system, as a description of major resources and skills needed for success in a particular market, as a unique company characteristic and as a heuristic tool used by managers in sharpening their thinking. As a key success factor is a basic component of a management information system, the researchers developed the critical success factors of IT infrastructure, system integration and information security regarding

**Fig. 4. Deductive mode of investigating critical success factors [27]**

**Fig. 5. Inductive mode of investigating critical success factors [27]**
past research in the field of e-commerce. As a description of major resources and skills required in facilitating success in a specific market, the researcher developed the critical success factors of resources, e-procurement strategy and employee training and skills regarding past research in e-commerce. As a unique company characteristic, the researcher developed the critical success factors of top management support, e-procurement implementation strategy and process engineering. As a heuristic tool used by managers in sharpening their thinking, the researcher developed the critical success factors of mechanisms for measuring and controlling e-procurement implementation process and supplier support.

The researcher applied the deductive mode of investigating in assessing the critical factors necessary for successful implementation of e-procurement in the Kenyan public sector. The researcher first developed a hypothesis on key critical success factors, selected the Kenyan public sector to research on after which an assessment was made on the actual critical success factors.

2.2 Successful E-procurement Implementation Critical Success Factors

There are ten major critical factors needed for e-procurement implementation to succeed. These factors can be categorised as: Managerial factors which are: top management support, resources, the e-procurement strategy, measurement and control and process engineering; system factors which are information security, IT infrastructure and system integration and stakeholder factors which are: supplier support and employee training and skills [28,29,11,30].

2.2.1 Managerial factors

Critical managerial factors for successful implementation of e-procurement are top management support, resources for e-procurement implementation, strategy, measurement and control and process engineering.

2.2.1.1 Top management support

Teo et al. [30] identified top management support as one major critical factor for implementation of e-procurement to succeed. This means involving top-level managers in implementing e-procurement. Many firms rely on the commitment and motivation of the top management which is vital in developing and implementing e-procurement [11]. Without support from the top level management, the implementation of a new information system or technology would be hard. The top management is involved in formulating the organisational vision and mission. They are also involved in the mobilisation of resources for e-procurement success. Project outcome success largely relies on the commitment of the top management. For instance, the political will and push of the top managers in the Indian states of Andhra and Chhattisgarh were an essential factor in the successful implementation of e-procurement [31]. Top management has a significant role to play in milestone set up, resource commitment and mandating e-procurement usage. There is a need for a bureaucratic shakeup and the need for facilitating coordination between departments in the implementation of e-procurement.

2.2.1.2 Resources

Resources are another critical factor for successful implementation of e-procurement. This is especially so with financial resources which are essential for implementing e-procurement. The financial resources allocated to implement e-procurement should relate to the market share and size of the firm [29]. Resources are important in the acquisition of proper information and communication technology suitable for e-procurement systems and for getting proper professional advice and help from consultants and experts which would enable and enhance successful implementation of e-procurement.

2.2.1.3 E-procurement implementation strategy

The strategy for e-procurement implementation is another critical factor essential in determining the success of an e-procurement system. For successful e-procurement implementation, there should be a proper implementation strategy which should be aligned to the general organisational strategy [11]. E-procurement implementation planning should be done by the organisation on the way ahead of symbiotic relationships and opportunities. Main benefits are most likely to be realised to the government from aggregating departmental demands. This would facilitate cost optimisation resulting from bulk procurement. This would help the government in leveraging its purchasing power with prospective
suppliers. However, demand aggregation remains a major concern due to the perceived loss of authority, vested departmental interests and efforts needed in its achievement [31].

2.2.1.4 Process engineering

Process engineering is essential to resolve the relevant barriers and challenges present in organisational structures to e-procurement compatibility and processes which include reporting relations and hierarchy [11]. Manual procedures implementation in systems of e-procurement often causes inefficient and unmanageable system flow. It is therefore essential for organisations to embrace a new look at all procurement processes and functions. Inefficient processes and those that don’t add value should be eliminated while optimising mandatory processes for e-usage. Business processes re-engineering was also identified by [31] as essential for successful e-procurement implementation in India.

2.2.1.5 Measurement and control of the implementation process

Measurement and control are also very important for successful e-procurement implementation. The focus of this factor is the measurement of e-procurement processes and using e-procurement effects to facilitate the performance of an organisation. Measuring the process of implementing e-procurement would help in controlling and enabling an organisation to obtain feedback on the process of implementation [29].

Successful initiation and subsequently the progress of an e-procurement project necessitate a strong case favouring procurement process migration to the internet [31]. The resistance of officers and people involved in procurement processes can only be broken through the construction of a strong case which necessitates business drivers’ identification, system benefits versus project implementation cost. Proving system efficacy through pilot projects would prevent counter arguments and reduce fears by potential challenges of the e-procurement system. Business / change management risks and implementation of plans for risk mitigation is very essential in dealing with temporary challenges facing organisations [31]. The objectives of the e-procurement system should be spelt out clearly to help in yielding the intended outcomes. Accomplishments should also be measured to facilitate appropriate corrections.

2.2.2 System factors

2.2.2.1 Information security

Information security is also another critical factor for successful e-procurement implementation. It has to do with ensuring suppliers security of their information. It is important for the integrity of communications and relationships to be considered by an organisation for the organisation to build online trust [29]. If the security, confidentiality and reliability of financial data such as the amount of bid are not safeguarded, the system of e-procurement may actually facilitate corruption unlike its major aim [31]. It is therefore important for the system and information contained in it be protected through proper information security hardware such as systems for intrusion detection, antiviruses, central logging, and detective and preventive software solutions. Appropriate security controls selection and employment have major effects on organisational assets and activities. Information security involves technical, management and operational safeguards and countermeasures for information systems necessary in protecting the availability, integrity and confidentiality of the system with its information.

2.2.2.2 IT infrastructure

IT infrastructure is also a major critical success factor for implementation of e-procurement. The focus of this factor is the availability of IT devices and systems necessary for using e-procurement in organisations [28]. IT Infrastructure is vital for e-procurement success in running organisational business activities.

2.2.2.3 System integration

Another important critical factor for successful implementation of e-procurement is system integration. For successful e-procurement implementation, it is important for technological resource integration with the e-procurement system. Such technological resources include data warehouse management, software selection and configuration and internet facilities [28]. As shown by Panda and Sahu [31], since an e-procurement system would need to undergo horizontal and vertical integration across enterprises and systems, it is imperative for the system should be built around well-accepted procedures, processes, content and technical standards. The system should also meet compliance with administrative and legal
frameworks which are in the country. The system development should be done around open source standards and technologies. The optimisation of hardware such as load balancers, active failover, and proper server sizing and set up disaster recovery should be planned and implemented. Interface design should be done in such a way that it is easily usable, intuitive and has proper upward and downward navigations. Information access should be done with limited mouse clicks and system interface should be optimised for enabling faster access even in slow internet speeds. For a system of e-procurement to succeed, it is essential that the system is properly integrated with existing IT systems especially finance systems. Information should be shareable in real time across all systems in an accurate and reliable manner. Stakeholder data access should also be controlled in the e-procurement system.

2.2.3 Stakeholder factors

2.2.3.1 Employee training and skills

The training and skills of employees also determine the e-procurement system success. Skills can be enhanced to employees through training programs. Training programs would make employees more familiar with e-procurement concepts [11]. The stakeholders of the previous manual system should be trained to facilitate technology absorption. New system change over and stakeholder adoption depend on user training [31]. The organisational environment should also be supportive to address problems effectively.

2.2.3.2 Supplier support

The support of suppliers is another major critical success factor for the implementation of e-procurement. For e-procurement to be successfully implemented, it is very essential for an organisation to have a perfect connection with its business partners and suppliers. The commitment and support of suppliers are very important since without their support, implementing e-procurement would be very difficult [30]. Stakeholders such as vendors and internal departmental users should be trained and supported to enhance effective implementation and use of e-procurement systems [31]. Getting feedback from stakeholders is necessary to successfully roll out the system. It is therefore important to set up a call centre or help desk system, contextual help or some online help in the online e-procurement portal. The suppliers are the most important stakeholders in ensuring e-procurement system success. They should therefore, be involved in all stages of the system implementation. It should be easy for suppliers to use the system.

2.3 Literature Critique and Research Gap

Even though a lot of research has been performed in the area of critical success factors identification in e-procurement, little study has been performed in the Kenyan public sector. On the other hand past research in this field has had a limited scope since they were conducted in different national cultures.

There exists a gap on the factors influencing the implementation of e-procurement in the Kenyan public sector. Many developing nations on the other hand lag behind in technology [17]. It was therefore prudent to identify the critical factors influencing successful e-procurement implementation in the Kenyan public sector.

2.4 Conceptual Framework

The conceptual framework elaborates how the study’s dependent and the independent variables relate. E-procurement implementation success is the dependent variable. The researcher considers it a dependent variable because e-procurement system success relies on the outcomes of many factors. A number of singular factors individually acting have a collective effect on e-procurement system implementation success. The research study’s independent variables are the factors leading to the success of e-procurement systems.

There are ten major critical factors necessary for successful e-procurement implementation. These factors can be categorised as: Managerial factors which are: top management support, resources, the e-procurement strategy, measurement and control and process engineering; System factors which are information security, IT infrastructure, and system integration and Stakeholder factors which are: supplier support and employee training and skills [28, 29, 11, 30]. These factors are the independent variables which collectively lead to e-procurement implementation success.
3. RESEARCH METHODOLOGY

3.1 Research Philosophy

The philosophy of research for this study was pragmatism. Pragmatism is a philosophy which holds that a proposition or ideology is true if it satisfactorily works. It holds that understanding a concept fruitfully requires considering the concept objects' practical effects. It means that propositions are to be found in the practical consequences of accepting them while rejecting unpractical ideas [32]. The meaning of a concept is framed in tests which are conceivable. This research analysed whether the major critical factors identified in the past for successful implementation of e-procurement are applicable to the Kenyan public sector i.e. whether they can enhance successful implementation of e-procurement in Kenyan public organisations practically.

3.2 Research Hypothesis

H_01: The managerial factors of top management support, resources, the e-procurement strategy, measurement and control and process engineering do not influence successful e-procurement implementation in the Kenyan public sector.

H_02: The system factors of information security, IT infrastructure and system integration do not influence successful e-procurement implementation in the Kenyan public sector.

H_03: The stakeholder factors of supplier support and employee training and skills
do not influence successful e-procurement implementation in the Kenyan public sector.

3.3 Research Design

While the private sector has been successful in implementing e-procurement, the Kenyan public sector has not been successful in implementing e-procurement [14, 15, 16, 12]. E-procurement has also not been able to decrease the problem of corruption in Kenyan public procurement procedures [16,17]. Corruption in the public sector causes problems in procurement procedures like the poor professionalism of the bureaucracy, the absence of professionalism, poor auditing and political control and many more.

Exploratory research is used in understanding a research problem. The exploratory research approach involves seeking new insight into phenomena and identifying patterns [33]. It is aimed at identifying what is happening. The research involved a cross-sectional survey of Kenyan public sector organisations. The exploratory approach was used by the researcher in establishing critical factors for successful e-procurement projects implementation in the Kenyan public sector. The research involved finding out how critical e-procurement success factors identified in the past influence successful e-procurement implementation in the Kenyan public sector. The researcher selected the exploratory approach because it was helpful in enabling him to study the research elements without it being necessary to manipulate them since they were in their natural environment. The respondents were encouraged to give answers to questions to the best of their knowledge without guesswork.

3.4 Population Sample

There are 20 government ministries and a total of 119 government parastatals [34,35]. A stratified sampling method by Cooper and Schindler [36] was used to establish the size of the sample. Since the Kenyan public sector population is considered heterogeneous using a simple random sample would not have been representative. The representation of each segment of the Kenyan public sector was ensured through stratified random sampling.

As argued by Cooper and Schindler [36], all samples should possess a non-zero selection probability of 0.101. Using the 0.101 nonzero selection probability, the sample size was:

$$0.101 = \frac{\text{Sample size}}{119}; \quad 0.101 = \frac{\text{Sample size}}{20}$$

The population sample thus consisted of 12 parastatals and 2 government ministries. Purposive sampling method described by Palys [37] was used by the researcher to represent the diverse public sector. The researcher categorised public sector organisations and selected procurement intensive organisations from each category to proportionally survey the public sector.

The organisations selected were: Bomas of Kenya board, national cereals and produce board, postal corporation of Kenya, exports processing zones authority, Kenya Utalii College council, Kenya meat commission, Kenya pipeline company, Kenyatta national hospital board, Kenya ports authority, Kenya railways corporation board, Kenya forest services, National development fund for persons with disabilities, ministry of information and communications technology and the ministry of energy and petroleum to represent the different sectors of the Kenyan public sector. The sample was also selected in segments of the public sector which are procurement intensive.

3.5 Data Collection

Data were directly collected from managers of supply chains or equivalent personnel using close-ended questionnaires. Questionnaires had several advantages. One, a lot of information was collected from many respondents in a relatively short time. Secondly, the research involved many respondents with minimal effect on its reliability and validity. Questionnaire results were quantified easily and quickly by the researcher using SPSS software package and were more objectively and scientifically analysed unlike in other research forms. On the other hand, it was easier to compare and contrast this research with other researches since the data was quantified.

The questionnaires had three parts. The questionnaires were administered using a drop and pick method. Out of 140 questionnaires distributed to 140 respondents, 110 questionnaires were filled and returned which is a 79% response rate.
The e-procurement system adoption level was determined by assessing the level of automation of major procurement activities in procurement units. The respondents indicated the level which their organisations had adopted e-procurement on a five Likert scale of (1= Very small extent; 2 = Small extent; 3 = Moderate extent; 4= Great extent 5= Very great extent). The respondents were then required to indicate the extent to which they agree that the various factors contributed to e-procurement implementation success in the Kenyan public sector using a similar five Likert scale.

3.6 Data Analysis

A quantitative data analysis was performed on the collected data in the study. To determine the extent the Kenyan public sector had adopted e-procurement, an analysis was conducted using frequencies and percentages obtained from Statistical packages for social sciences. To determine the critical factors which can ensure successful implementation of e-procurement in the Kenyan public sector, multiple regression was conducted to analyse the influence of the critical factors on successful e-procurement implementation in the Kenyan public sector thus testing the hypothesis. Further analysis was conducted using mean scores, frequencies and percentages to determine the extent to which the various critical factors determine successful e-procurement implementation.

3.7 Research Variables Operationalisation

Table 1 shows how the research was undertaken in testing the research hypothesis. It shows how the dependent variable of e-procurement implementation relies on the independent variables which comprise of the critical factors necessary for successful implementation of e-procurement.

3.8 Tests Done to Assess Suitability of Data for Multiple Regression

To verify the suitability of the data for multiple regression data analysis, the researcher performed the following tests:

3.8.1 Multicollinearity and singularity

Some relationship should exist between the dependent variable and independent variables (a correlation of at least .3). However, multicollinearity should not occur whereby the independent variables are related highly with a correlation of 0.7 or above [38]. Tabachnick and Fidell [38] suggested combining such highly related independent variables. On the other hand, singularity happens if independent variables are actually combinations of other independent variables.

The correlation between all the independent variables and the dependent variable of implementation level is greater than 0.3 except for the correlation between the independent variable of information storage and the dependent variable implementation level which is 0.285 which is quite close to 0.3 and the correlation between the dependent variable resource mobilisation and implementation level which is 0.187 which is less than 0.3. Multicollinearity does not occur since there was no correlation between independent variables equal to or greater than 0.7. Tolerance values indicate the amount of variability of the independent variable not explained by other independent variables. There was no tolerance value less than 0.10 which demonstrates that the multiple correlations between the independent variables are low. All the variance inflation factor values were also below 10 which indicate that there was no multicollinearity in the data [38]. Singularity does not also occur in this research data since no independent variable is a combination of other independent variables. This shows that multiple regression is suitable for the data analysis since this tests are largely satisfied.

3.8.2 Outliers, homoscedasticity, residuals independence, linearity and normality

These refer to score distributions and variable relationships nature and aspects. Multiple regression is highly sensitive to outliers which are caused by very low or high scores. The cook’s distance is used to identify whether there are strange cases which negatively influence model results. Tabachnick and Fidell [38] asserted that cases with values greater than 1 are potential problems. The maximum Cook’s distance value is 0.971 (as shown in Table 2) which is less than 1 which means there are no undue influences on the model.

A straight line relationship was observed between the dependent variable scores and the independent variable scores. There was a normal distribution of residuals about the dependent variable scores as shown in Fig. 7.
### Table 1. Operationalisation of the research variables

<table>
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<tr>
<th>Construct</th>
<th>Explanation</th>
<th>Operational Definition</th>
<th>Data collection method</th>
<th>Method of Analysis</th>
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<tr>
<td><strong>Managerial Factors</strong></td>
<td>- Managerial factors are among the independent variables which collectively determine the level of success in e-procurement implementation which is the dependent variable.</td>
<td>- The involvement of the top management in formulating the future mission, vision and future of the organisation and top management allocation of adequate resources is essential for successful e-procurement.</td>
<td>- Survey using questionnaires</td>
<td>- Quantitative using mean scores, percentages and multiple regression analysis.</td>
</tr>
<tr>
<td>- Top management support</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Resources</td>
<td></td>
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</tr>
<tr>
<td>- Strategy</td>
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<tr>
<td>- Measurement and control</td>
<td></td>
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<tr>
<td>- Process engineering</td>
<td></td>
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<tr>
<td><strong>System Factors</strong></td>
<td>- System factors are among the independent variables which collectively determine the level of success in e-procurement implementation which is the dependent variable.</td>
<td>- Suppliers need to be assured of the security of their information and have efficient system access for successful e-procurement.</td>
<td>- Survey using questionnaires</td>
<td>- Quantitative using mean scores, percentages and multiple regression analysis.</td>
</tr>
<tr>
<td>- Information security</td>
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<tr>
<td>- IT infrastructure</td>
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<tr>
<td>- System integration</td>
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</tr>
<tr>
<td><strong>Stakeholder Factors</strong></td>
<td>- Stakeholder factors are among the independent variables which collectively determine the level of success in e-procurement implementation which is the dependent variable.</td>
<td>- The training and skills of employees also determine the level of e-procurement system success. Skills can be enhanced to employees through the training program. Successful e-procurement implementation requires organisations to have perfect connections with their business partners and suppliers.</td>
<td>- Survey using questionnaires</td>
<td>- Quantitative using mean scores, percentages and multiple regression analysis.</td>
</tr>
<tr>
<td>- Supplier support</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Employee training and skills</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
thus satisfying homoscedasticity. The Durbin-Watson statistic was 1.826 which is close to 2 which means the residual values are independent [38].

4. RESULTS AND DISCUSSION

This research assessed the influence of the various critical success factors on the successful implementation of e-procurement in the Kenyan public sector. The critical success factors are the independent variables while successful implementation of e-procurement is the dependent variable.

4.1 Demographics

The study revealed that 110 respondents had worked in the public entities for 1-20 years. Most respondents had worked for 11-15 years represented by 39.1% (n= 43) while the least had worked for 1-5 years represented by 9.9% (n= 11) 0. 29% (n= 32) had worked between 6-10 years while 22% (n= 24) had worked 16-20 years. This means that most of the organisations have been using e-procurement for quite some time.
Around 59.1% of the respondents asserted that their public organisations had implemented e-procurement to a great extent at (n= 65). Several reasons were given for this. They included: increased ethical behaviour among procurement staff, the establishment of marketing and customer service, proper management of logistics and facilities as well as financial resources. According to the study findings, those who thought that e-procurement was implemented in their organisations to a moderate extent were 37.3% (n= 41). They asserted that human resource had been developed well, information and communication technology was well utilised in the systems, research and business development in terms of quality goods and better services. About 2.7% (n= 3) of the respondents were of the view that their organisations had implemented e-procurement to a very great extent while 0.9% (n= 1) to a small extent.

4.2 Critical Success Factors for Successful E-procurement Implementation in the Kenyan Public Sector

Similar to the views of Teo et al[30], a majority of 53.6% (n= 59) of the respondents were of the view that the involvement of top management in the formulation of the mission, vision and future of the organisation contributes to a great extent successful e-procurement implementation. About 46.4% (n= 51) viewed it at a moderate extent on the same. No respondent had views at the very small extent, small extent and very great extent. Majority of the respondents felt that it led to a great extent successful e-procurement implementation because the employees under the organisations’ management made requisitions online and they were satisfied with the process of e-procurement implementation. Research findings also showed that customers got quality products when they need them and their orders processed and delivered promptly. These findings are similar with Kahi [39] whereby she identified public organisational managers as essential in facilitating strategies used in change management.

Around 35.5% (n= 39) of the respondents viewed that the allocation of resources by the top management led to successful e-procurement implementation to a great extent and 10% (n= 11) to a very great extent. This was due to less paperwork and bureaucracy, standardised documentation and processes and there were more clear and transparent processes done. This is similar to the view of Mohammadi [11] that the commitment and motivation of the top management are vital in e-procurement development and implementation as shown in the literature review. Top management is also necessary in resource mobilisation for e-procurement implementation to succeed in the Kenyan public sector.

A majority 45.5% (n= 50) of the respondents thought that the availability of resources contributed to successful e-procurement implementation to a great extent. This was because there were enhanced interfaces with internal systems, improved and streamlined user training and due to the availability of resources, there was better procurement management based on category and portfolio management concepts. A minority of the respondents 7.3% (n= 8) were of the view that the availability of resources contributed to successful e-procurement implementation to a very small extent. This was because efforts were needed to motivate end users to adopt new technologies and internal process re-engineering leading with cross- company cultural differences. A major portion of the respondents 50.9% (n= 56) felt that the mobilisation of resources contributed to successful e-procurement implementation to a great extent and 28.2% (n= 31) to a very great extent. They said that resource mobilisation streamlined catalogue management processes and supported the development of procurement standards management while reducing development costs. This supports the argument of Huber et al. [29] who asserted that resources are essential in acquiring proper ICT technologies suitable for e-procurement systems.

Majority of respondents 56.4% (n= 62) had the opinion that e-procurement strategies contributed to successful e-procurement implementation to a great extent. They cited cost optimisation being felt due to bulk procurement. This is in line with Mohammadi [11] who suggested that aggregating departmental demands in e-procurement implementation strategy optimises costs. Respondents were of the opinion that the government should leverage its purchasing power with prospective suppliers. Other respondents 33.6% (n= 37) perceived that e-procurement strategies contributed to successful e-procurement implementation to a moderate extent. They said that departmental interests and efforts are required in the implementing e-procurement. A number of respondents 10%
n=11) were of the view that e-procurement strategies contributed to successful e-procurement implementation to a very great extent. They said that availability of proper e-procurement strategies helped a lot in ensuring successful e-procurement implementation and this helped in streamlining catalogue management process, enhanced interfaces with internal systems, supported electronic invoicing and payment processing and also streamlined user training.

Huber et al. [29] suggested that e-procurement implementation measurement facilitates implementation to control and facilitates feedback on e-procurement implementation process. Many respondents felt that the availability of mechanisms for measuring, controlling and evaluating e-procurement implementation contributed to successful implementation to a moderate extent: 31.8% (n= 35) and 30.9% (n= 34) to a great extent. They gave their reasons as improvement in paying terms with suppliers, improvement in accounting processes, procurement policy promotion and practice of system documentation across agencies.

Majority of the respondents 27.3% (n= 30) were of the opinion that the degree to which policymakers contributed to smooth process re-engineering led to successful e-procurement implementation to a great extent, 26.4% (n= 29) to a moderate extent, 13.6% (n= 15) to a very great extent. This was so because there was legal harmonisation, employment of digital signatures, availability of managerial and technical competencies and process re-engineering. This is similar to the observation of Panda and Sahu [31] that the re-engineering of processes was essential for successful implementation of e-procurement in India. However, 18.2% (n= 20) of the respondents had the opinion that the degree to which policy makers contribute to smooth process re-engineering only enhances successful e-procurement implementation to a small extent and 14.5% (n= 16) to a very small extent. This was because they believed policymakers did not contribute so much to smooth process re-engineering towards successful e-procurement implementation. This was brought by leadership being poor in delivering e-procurement vision, consistency promotion in procurement policies, practices, documentation and systems across agencies and sectors was not enough for smooth re-engineering process, leadership and coordination was not provided in promoting cooperation within agencies and across all sectors of the economy. This is different from the views of Panda and Sahu [31] and Mohammadi [11] that process engineering is essential in resolving various challenges and barriers in organisational structures to e-procurement implementation such as reporting hierarchies and relations.

Approximately 44.5% (n= 49) of the respondents were of the view that storage and encryption of data contributed to successful e-procurement implementation to a great extent since the quality information was not tampered with and e-procurement management was enhanced. About 2.7% (n= 3) were of the view that storage and encryption of data contributed to successful e-procurement implementation to a very small extent. They were of the view that a lot of data was not stored or encrypted hence success in e-procurement implementation was not assured. This is similar to observation of Panda and Sahu [31] that if the security, confidentiality and reliability of financial data such as bid amounts are not safeguarded, an e-procurement system may facilitate corruption, unlike its major objective.

A majority of the respondents 46.4% (n= 51) were also of the view that the availability of IT infrastructure contributed to successful e-procurement implementation to a great extent. This was due to several factors that included e-procurement software making loads of tasks easier while internet market exchanges through a central virtual market make goods and services rendered faster. This supports the argument of Carayannis, E and Popescu [28] that IT infrastructure is essential for the success of e-procurement in running organisational activities. Similarly, Kahiu [39] recommended that public procurement entities should invest in ICT infrastructure to enable e-procurement platforms to link procurement stakeholders efficiently. Some respondents, however, said that IT infrastructure contributed to a small extent to successful e-procurement implementation 10.9% (n= 12) because IT infrastructure was not enough to support and lead to successful e-procurement implementation. They said that inadequate IT infrastructure could lead to failure in systems of supply chain management and ERP in addressing non-production related procurement and indifference to the problem on part of IT infrastructure.
A majority of the respondents - 53.6% (n= 59) were of the view that compatibility of current systems with e-procurement contributed to successful e-procurement implementation to a great extent and 30.9% (n= 34) to a moderate extent. They argued that mandatory processes optimised e-procurement usage but non-value adding, and inefficient processes should be eliminated. They also argued that incompatible systems sometimes led to inefficient and unmanageable system flow. This is similar to the research by Papadakis et al. [26] who showed that learning management systems should be optimised for access on mobile phones. Minority 15.5% (n=17) of the respondents said that the compatibility of current systems led to successful e-procurement implementation to a very great extent. This was evidenced by efficiency in reporting relations and hierarchy, reduced purchasing cycles, time and costs, enhancement of brand whereby it becomes more rapid and faster response to market needs. This is in line with Carayannis and Popescu [28] argument that technological resource integration with e-procurement such as software selection, configuration and data warehouse management is important for the implementation of e-procurement.

Papadakis et al. [26] showed that social influence, the perceived usefulness and ease of use affects learning management system perception and usage. Similarly, a majority of the respondents 52.7% (n=58) were of the opinion that the level of employee awareness on technology use contributes to a great extent successful e-procurement implementation. This was because competency was felt in the working environment by the top management whereby ICT experts were readily available just in case the servers had problems and ICT was well used by the employees. Likewise Kahu [39] identified that e-procurement personnel have an essential role in implementation of e-procurement. The public organisational employee should be highly efficient in using e-procurement for successful implementation. Panda and Sahu [31] on the other hand showed that new systems change over as well adoption of e-procurement by stakeholders depends on user training. Kahu [39] argued that the absence of competent e-procurement users as a result of low motivation and awareness on e-procurement causes its implementation to fail such as the Kenyan government procurement system IFMIS. One respondent 0.9% (n= 1) had the opinion that the level of employee awareness on technology use led to a small extent successful e-procurement implementation and commented that some of the employees were not aware of the technologies used in e-procurement implementation and they did not have adequate training and skills to implement the same. The extent at which the availability of training programmes for employees contributed to successful e-procurement implementation was moderate according to 40% (n= 44) respondents and 38.2% (n= 42) to a great extent. This meant that there were so many strategic benefits which included: better procurement, purchase and supply prices control as well as inventory policy emanating from centralised purchasing function adoption, better coordination between purchasers and users and better control over supply sources. There was also an easier management of suppliers.

According to Teo et al. [30] for an organisation to implement e-procurement successfully, the organisation should have a perfect connection with its suppliers and business partner. This is similar to research findings by Papadakis et al. [26] whose research findings emphasised the need to encourage students to extensively use learning management systems with tutors and instructors more interactively responding to the activities of students. The extent to which suppliers' views contributes to successful e-procurement implementation was to a great extent according to 38.2% (n= 42) respondents. The chain of supply was reduced, and it increased in visibility, procurement cycles became shorter with the decreased transaction and administrative costs as well as improved decision making with better efficiency and effectiveness. They also asserted that trading communities were able to reach expansion levels for successful e-procurement process with no limitation of choices to only one number of prequalified suppliers. This enhanced the quality of products and services. Other respondents 11.8% (n= 13) asserted that suppliers' previous experience contributed to successful e-procurement implementation to a small extent and 6.4% (n= 7) to a very small extent. This was due to the problem of trading communities not being able to reach expansion levels for successful e-procurement process and choice limitation to only one number of prequalified suppliers which enhanced quality.

4.3 Research Hypothesis Testing

Based on the correlation, multiple regression facilitates a more elaborate analysis of the
relationship between variable sets. It is used in addressing various research questions. The sets of variables in this research are managerial factors, system and stakeholder factors which this research aimed at exploring their relationship with the dependent variable which is successful e-procurement implementation. The three major types of multiple regression analyses are simultaneous or standard multiple regression analyses, sequential also known as hierarchical and stepwise regression analysis. The researcher used hierarchical multiple regression to sequentially analyse the variables based on the theoretical category basis that the variables were categorised into. The sets of variables: managerial factors, system factors and stakeholder factors were entered into the equation in that order, and their relationship to the dependent variable of successful e-procurement implementation analysed using SPSS. The variable sets were analysed to assess what they add to the prediction of the dependent variable of successful e-procurement implementation.

**H₀₁:** The managerial factors of top management support, resources, the e-procurement strategy, measurement and control and process engineering do not influence successful e-procurement implementation.

As can be observed in the model summary Table 3, the managerial factors of top management support, resources, the e-procurement strategy, measurement and control and employee training and skills do not influence successful e-procurement implementation.

**H₀₂:** The system factors of information security, IT infrastructure and system integration do not influence successful e-procurement implementation.

As can be observed in the model summary Table 3, the system factors of information security, IT infrastructure and system integration have an R square value of 0.878 which implies that the system factors explain 87.8% of the variance in successful e-procurement implementation. This means that the system factors greatly influence successful implementation of e-procurement in the Kenyan public sector and thus the null hypothesis H₀₂ is rejected. The adjusted R corrects this value to provide a better estimate which is 0.865. This model reaches statistical significance (p < 0.0005).

**H₀₃:** The stakeholder factors of supplier support and employee training and skills do not influence successful e-procurement implementation.

As can be observed in the model summary Table 3, the stakeholder factors of supplier support, resource availability, top management vision, systems contribution, information storage, IT infrastructure and system integration have an R square value of 0.828 which implies that the managerial factors explain 82.8% of the variance in successful e-procurement implementation. This means that managerial factors greatly influence successful implementation of e-procurement in the Kenyan public sector and thus the null hypothesis H₀₃ is rejected. The adjusted R corrects this value to provide a better estimate which is 0.817. This model reaches statistical significance (p < 0.0005).

### Table 3. Multiple regression analysis

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R square</th>
<th>Adjusted R Square</th>
<th>Std. error of the estimate</th>
<th>R square change</th>
<th>F change</th>
<th>df1</th>
<th>df2</th>
<th>Sig. F change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.910a</td>
<td>.828</td>
<td>.817</td>
<td>.237</td>
<td>.828</td>
<td>70.360</td>
<td>7</td>
<td>102</td>
<td>.000</td>
</tr>
<tr>
<td>2</td>
<td>.937b</td>
<td>.878</td>
<td>.865</td>
<td>.203</td>
<td>.049</td>
<td>13.342</td>
<td>3</td>
<td>99</td>
<td>.000</td>
</tr>
<tr>
<td>3</td>
<td>.964c</td>
<td>.930</td>
<td>.920</td>
<td>.157</td>
<td>.052</td>
<td>17.847</td>
<td>4</td>
<td>95</td>
<td>.000</td>
</tr>
</tbody>
</table>

*a. Predictors: (Constant), resource mobilisation, top management resource allocation, measure and control, process re-engineering, strategy, resource availability, top management vision*

*b. Predictors: (Constant), resource mobilisation, top management resource allocation, measure and control, process re-engineering, strategy, resource availability, top management vision, systems contribution, information storage, IT infrastructure*

*c. Predictors: (Constant), resource mobilisation, top management resource allocation, measure and control, process re-engineering, strategy, resource availability, top management vision, systems contribution, information storage, IT infrastructure, employee training programs, supplier views, supplier previous experience, employee awareness*

*d. Dependent Variable: implementation level*

The research had a null hypothesis which was tested using multiple regression. The independent variables were tested how they influence successful e-procurement implementation by testing the variance they cause to successful e-procurement implementation.
As can be observed in the model summary table 3, the stakeholder factors of supplier support and employee training and skills have an R square value of 0.930 which implies that the stakeholder factors explain 93% of the variance in successful e-procurement implementation. This means that the stakeholder factors greatly influence successful implementation of e-procurement in the Kenyan public sector and thus the null hypothesis $H_0$ is rejected. The adjusted $R^2$ corrects this value to provide a better estimate which is 0.920. This model reaches statistical significance ($p < 0.0005$).

Table 4 shows how well all the variables contribute to the equation. A scan through the Sig. column shows that all the variables have statistically significant contributions to the successful implementation of e-procurement (0.000 which is less than 0.05). In order of contribution to the dependent variable (implementation level), the beta values are 0.472 for managerial factors making them the strongest contributor followed by 0.375 for stakeholder factors and 0.230 for system factors.

### 4.4 Descriptive Statistics on e-Procurement

Descriptive statistics were used to test the significance of critical factors for successful e-procurement implementation in the Kenyan public sector. The most significant critical factor for successful e-procurement implementation in the Kenyan public sector is the resources available for e-procurement implementation with a mean of 3.94 out of 5. This means that it leads to successful e-procurement implementation to a great extent. The second most significant factor for successful e-procurement implementation is information security with a mean of 3.26 making it the eighth most significant factor for successful implementation of e-procurement in an organisation. Supplier support is the fifth most significant factor for successful e-procurement implementation with a mean of 3.48. It leads to successful e-procurement implementation to a moderate extent. Employee training and skills determine successful implementation of e-procurement to a moderate extent at a mean of 3.29. This means that it leads to successful e-procurement implementation to a moderate extent. Information security had a mean of 3.26 making it the eighth most significant factor for successful implementation of e-procurement in the Kenyan public sector. It leads to successful e-procurement implementation to a moderate extent. Measurement and control had a mean of 3.14 making it the ninth most significant factor while process engineering is the tenth most significant factor for successful implementation of e-procurement in the Kenyan public sector with a mean of 3.07. Both lead to successful e-procurement implementation to a great extent.

Most of the data were negatively skewed (skewed left) meaning most of the data were clustered at the right side of the distribution with the peak being toward the right and the left tail longer. Since most of the skewness values were between -0.5 and 0 meaning the distribution of data is approximately symmetric. All the kurtosis values were less than 3 means the data was approximately normal. Since the skewness and kurtosis values were not significant they were not corrected.

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardised Coefficients</th>
<th>Standardised Coefficients</th>
<th>T</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
</tr>
<tr>
<td>1 (Constant)</td>
<td>.063</td>
<td>.141</td>
<td>.447</td>
<td>.655</td>
</tr>
<tr>
<td>Managerial factors</td>
<td>.480</td>
<td>.050</td>
<td>.472</td>
<td>9.634</td>
</tr>
<tr>
<td>System factors</td>
<td>.248</td>
<td>.053</td>
<td>.230</td>
<td>4.670</td>
</tr>
<tr>
<td>Stakeholder factors</td>
<td>.293</td>
<td>.035</td>
<td>.375</td>
<td>8.301</td>
</tr>
</tbody>
</table>

a. Dependent Variable: implementation level
platykurtic meaning there were less extreme outliers which implies that the data had a uniform distribution. Since all the mean values were greater than 50%, this shows that all the critical factors determine successful implementation of e-procurement in the Kenyan public sector [40].

5. CONCLUSION, RECOMMENDATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

5.1 Conclusion

This research study sought to establish the critical factors for successful e-procurement implementation in the Kenyan public sector. The research study revealed that the 110 respondents had worked in the entities for 1-20 years. Most respondents had worked for 11-15 years represented by 39.1% while the least had worked for 1-5 years represented by 9.9%. 29% had worked between 6-10 years while 22% had worked 16-20 years. The most significant critical factor for successful e-procurement implementation in the Kenyan public sector is the resources available for e-procurement implementation with a mean of 3.94 out of 5. This means that it leads to successful e-procurement implementation to a great extent. The second most significant factor for successful e-procurement implementation is systems integration that is the integration of the e-procurement system with present organisational information systems. It had a mean of 3.85 which means that it leads to successful e-procurement implementation to a great extent. The strategy used for e-procurement implementation with a mean of 3.76 is the third most significant factor for successful implementation of e-procurement. This means that it leads to successful e-procurement implementation to a great extent. The fourth most significant factor for successful e-procurement implementation in an organisation is IT infrastructure available in an organisation. It had a mean of 3.66. It leads to successful e-procurement implementation to a great extent. Supplier support is the fifth most significant factor for successful e-procurement implementation with a mean of 3.48. It leads to successful e-procurement implementation to a moderate extent. Employee training and skills determine successful implementation of e-procurement to a moderate extent at a mean of 3.42 making it the sixth most significant factor for successful implementation of e-procurement. The seventh most significant factor for successful e-procurement implementation in a Kenyan public organisation is the support of the top management with a mean of 3.29. This means that it leads to successful e-procurement implementation to a moderate extent. Information security had a mean of 3.26 making it the eighth most significant factor for successful implementation of e-procurement in the Kenyan public sector. It leads to successful e-procurement implementation to a moderate extent. Measurement and control had a mean of 3.14 making it the ninth most significant factor while process engineering is the tenth most significant factor for successful implementation of e-procurement in the Kenyan public sector with a mean of 3.07. Both lead to successful e-procurement implementation to a great extent.

The managerial factors had an R square value of .828 which implies that the managerial factors explain 82.8 % of the variance in successful e-procurement implementation. This model reaches statistical significance (p < 0.0005). This means that the managerial factors of top management support, resources, the e-procurement strategy, measurement and control and process engineering greatly influence successful implementation of e-procurement in the Kenyan public sector.

The system factors of information security, IT infrastructure and system integration have an R square value of 0.878 which implies that the system factors explain 87.8 % of the variance in successful e-procurement implementation. This model reaches statistical significance (p < 0.0005). This means that the system factors of information security, IT infrastructure and system integration greatly influence successful implementation of e-procurement in the Kenyan public sector.

The stakeholder factors of supplier support and employee training and skills have an R square value of 0.930 which implies that the stakeholder factors explain 93 % of the variance in successful e-procurement implementation. This model reaches statistical significance (p < 0.0005). This means that the stakeholder factors of supplier support and employee training and skills greatly influence successful implementation of e-procurement in the Kenyan public sector.

These research study findings will help policymakers to devise e-procurement policies and strategies that will enhance successful implementation of e-procurement in Kenya public
organisations. It will help the Kenyan public sector identify how they can successfully implement e-procurement since it analyses and shows the critical factors which can ensure that the implementation of e-procurement is successful in the Kenyan public sector. Successful implementation of e-procurement will help in reducing the problem of corruption in the Kenyan public sector by increasing efficiency and transparency in public procurement processes. This research will also be useful to researchers in e-procurement. It forms a basis and point of reference for research in e-procurement related areas.

5.2 Recommendations

These are the recommendations based on the research study:

1. The top management of Kenyan public organisations should be highly involved in formulating the future mission, vision and future of the public organisation and support e-procurement implementation by providing adequate resources for successful e-procurement implementation.
2. E-procurement data and information should be encrypted, safeguarded and stored in a proper manner.
3. Kenyan public organisation supply chain and e-procurement employees should be educated and trained properly on e-procurement systems. Proper training programs should be established and implemented effectively.
4. IT infrastructure should be properly put in place for e-procurement systems to run efficiently.
5. There should be proper process engineering to resolve the relevant barriers and challenges to e-procurement implementation. Policy makers should be available and highly committed to ensuring e-procurement implementation.
6. For successful e-procurement implementation in Kenyan public sector organisations, it is also very essential for Kenyan public organisations to have a perfect connection with their business partners and suppliers. The views of suppliers towards e-procurement as well as the previous supplier experience in using e-procurement systems should be considered when implementing e-procurement projects.
7. There should also be an appropriate e-procurement implementation strategy which should be aligned to the general strategy of the public organisation.
8. There should be proper mechanisms for measuring, evaluating and controlling e-procurement implementation in Kenyan public sector organisations.
9. Organisational systems should be engineered to be highly compatible with current e-procurement systems.
10. Adequate resources should be availed by the Kenyan government and top management in Kenyan public organisations for effective e-procurement implementation.

5.3 Suggestions for Further Research

This research study established the critical factors for successful e-procurement implementation in the Kenyan public sector. However, it is necessary for more research to be performed to establish exactly how these critical factors should be applied at all stages of e-procurement project implementation in order to ensure successful implementation. Further research should also be performed to determine the critical factors for successful implementation of e-procurement in the Kenyan private sector to ensure more effective and successful e-procurement implementation too.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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