ENABLERS OF E-PROCUREMENT IMPLEMENTATION IN PROCURING ENTITIES IN KENYA

[1*] **Leonah Kemunto Nyamete**
leonahk@gmail.com

[2**] **Prof. G.S. Namusonge**
gsnamusonge@yahoo.com

[1, 2] *Department of Procurement and Logistics in the School of Entrepreneurship, Procurement and Management, Jomo Kenyatta University Of Agriculture And Technology*

Significance: The purpose of this study was to establish the enablers of e-Procurement implementation in procuring entities in Kenya. This is as a result of realization that e-Procurement has become a vital tool in improving business performance today, though its level of usage has not been adequately utilised in most businesses. In order to realize the purpose of the study, the reseacher had four specific objectives; employee competency, technical capacity, technological infrastructure and security of procurement data.

Literature reviewed: the study was guided by four theories; kirkpatrick model, knowledge based theory, technology acceptance theory and technology, organization, and environment model.

Research design: A descriptive research design was adopted and the target population comprised 66 procurement workers from KPLC. The study adopted a census technique since the population of 66 is small. This therefore ruled out application of specific sampling design and sampling technique. Questionnaires were used as the main data collection instrument and pretested using a pilot study for validity and reliability.

Findings: Descriptive and inferential statistics data analysis results revealed that employee competency, technical capacity, technological infrastructure, and security of procurement data are key success factors in the implementation of e-procurement in procuring entities in Kenya. The study recommendations include; improvement on employee competency through training, improving the technological infrastructure and effectively intergrating e-procurement systems with other departments and suppliers and finally, adopting strong security measures for procurement data and transactions.

Keywords: *e-procurement, procuring entities,*

I. INTRODUCTION

The success of any e-procurement application will depend on a variety of factors. Some organizations implement e-procurement technologies and they succeed whereas others fail in the same. This diverse nature of the outcomes in adoption of e-procurement systems has attracted a number of researchers who want to understand the reasons for this diversity (Caldwell, Roerich & Davies, 2009). David & Berry (2008) carried out a reseach on e-procurement adoption by European firms. They found out that there exists country differences with respect to e-procurement adoption, and that firms from countries with a low uncertainty avoidance such as Germany and the UK are

the early adopters of e-procurement, while countries that are less reluctant to change such as Spain and France have lower adoption rates.

Kenya takes great pride in being the first African country to automate end-to-end procurement and payment processes in a devolved government system (PSCU, 2014). The systems that are being used by public institutions in Kenya for e-procurement are Integrated Financial Management Information System (IFMIS) and SAP, which is an ERP system that integrates the key business functions of the organization. Institutions that are known to use SAP system include Ministry of Water (Kenya Water and Sewerage Reform Programme), Kenya Ports Authority, K.P.L.C and Kengen (Eim Solutions company profile, www.eimsolutions.co.ke). In Kenya, there are some organizations that have successfully embraced the use of e-procurement technology. For instance Nation Media group through their digital platform commonly known as N-Soko, enables their clients to purchase products online (Lyons, 2012).

According to Mitra et al (2000), the most common forms of e-commerce in Kenyan market are e-procurement, e-banking and m-banking. Of the three, e-procurement has generated a lot of interest due to its ability in improving efficiency and transparency, thereby reducing the cost of operation. According to Ongoro (2014), Public entities are beginning to recognize the huge potential offered by the internet in general and E-procurement systems in particular.

On 11th March, 2015 President of Republic of Kenya, Uhuru Muigai Kenyatta gave a one week ultimatum to officials in charge of public entities to adopt e-procurement in order to curb corruption and enhance transparency in how tenders are awarded. The head of state said the objective is to make government procurement processes be open to scrutiny by the public so that everyone can know how a tender is awarded. Procurement of goods and services constitute 50% of the government's annual budget and the E-procurement platform will save substantial financial resources and help installing confidence among tax payers that they are getting value for their money (Daily Nation, 2015).

Despite the benefits of e-procurement as such as better coordination with suppliers, quicker transaction times, higher flexibility, better supplier integration, and lower costs, it is clear that use of e-procurement is still subject to manual procedures which are slow and expensive (Njeru, 2015). The objective of this research therefore, was to find out the enablers of e-procurement implementation in procuring entities in Kenya taking into consideration four objectives including employee competency, technical capacity, technological infrastructure and security of procurement data.

Statement of the problem

There has been complaints regarding delayed consumer connection mainly caused by delayed delivery of material, material stock out, lack of qualified personnel in the procurement department and lack of embracing and adopting the modern technology, (Koria, 2017). Due to advancements in technology, e-procurement has been vouched for as a solution to ensuring better acquistion and payment of raw materials, (K'akumu 2015). There is therefore need to investigate the enablers of e-procurement implementation in procuring entities in Kenya to help organisations identify the key successs factors in implementing e-procurement, which has been deemed as a sure cost reducing solution to the expensive and slow manual procedures.

Objectives of the study

The general objective of this study was to determine the enablers of e-Procurement implementation in procuring entities in Kenya. The specific objectives were to;

1. To determine the effect of employee competency on e-procurement implementation in procuring entities in Kenya.

2. To determine the effect of technical capacity on e-procurement implementation in procuring entities in Kenya.

3. To determine the effect of technological infrastructure on e-procurement implementation in procuring entities in Kenya.

4. To determine the effect of security of procurement data on e-procurement implementation in procuring entities in Kenya.

Research Hypotheses

The research study tested the following research hypotheses:

1. H01: There is no significant relationship between Employee competence and effective e-procurement implementation in procuring entities in Kenya.

2. H02: There is no significant relationship between technical capacity and effective e-procurement implementation in procuring entities in Kenya.

3. H03: There is no significant relationship between technological infrastructure and effective e-procurement implementation in procuring entities in Kenya.

4. H04: There is no significant relationship between security of procurement data and effective e-procurement implementation in procuring entities in Kenya.

II. RESEARCH FINDINGS AND DISCUSSION

Employee Competency

Table 1 shows that the Cronbach's alpha result of employee competency factors was 0.830 and the factor loadings results were above 0.7. This implies that all the factors were retained for further analysis. According to Tathan, Anderson and Black (1998) factors with factor loadings of above 0.7 are excellent and should be retained for further data analysis. The Cronbach alpha above 0.80 corroborated with Zinbarg (2005) that an alpha coefficient of 0.80 or higher indicates that the gathered data are reliable as it has a relatively high internal consistency and can be generalized to reflect opinions of all respondents in the target population about the study problem. The study hence deduced that all the employee competency factors to be reliable in determining the enablers of e-procurement implementation in procuring entities in Kenya. All the employee competency factors notably, employee attitude, employee skills and training were later used for further analysis.

Table 1: Employee Competency Reliability And Factor Analysis Results

Indicators	Factors loadings	Cronbach's Alpha
The employee attitude makes e-procurement implementation a success	0.801	0.83
The staff should have ICT skills to deal with the e-procurement system	0.758	
The procurement staffs are sponsored for IT courses	0.759	

Technical Capacity

As can be observed in table 2, the variable technical capacity had aCronbach's alpha value of 0.848 and factor loadings values above 0.7. The study,therefore, retained all the technical capacity factors. According to Tathan,Anderson and Black (1998) factors with factor loadings of above 0.7 are excellentand should be retained for further data analysis.

The Cronbach alpha above 0.80 corroborated with Zinbarg (2005) that an alpha coefficient of 0.80 or higherindicates that the gathered data are reliable as it has a relatively high internalconsistency and can be generalized to reflect opinions of all respondents in thetarget population about the study problem. The study therefore, drew conclusionsthat system integration, system incompatibility and system complexity are reliable factors that help in determining the enablers of e-procurement implementation in procuring entities in Kenya.

Table 2: Technical Capacity Reliability and Factor Analysis Results

Indicators	Factors loadings	Cronbach's Alpha
Good system integration with other departments makes e-procurement implementation a success	0.811	0.848
System compatibility with suppliers encourages the use of e-procurement system	0.807	
System user friendliness motivates staff to use it	0.793	

Technological Infrastructure

Table 3 presents that technological infrastructurehad a Cronbach alpha value of 0.835. This concurs with Zinbarg (2005) that an alpha coefficient of 0.80 andabove indicates that the gathered data are reliable and can be generalized to reflectopinions of all respondents in the target population about the study problem. Allthe indicators had factor loadings above 0.7. This, therefore, ruled out eliminationof any technological infrastructurefactor, none of the factors had a factor loading of lessthan 0.7. Tathan, Anderson and Black (1998) factors with factor loadings ofabove 0.7 are excellent and should be retained for further data analysis. The study,therefore, retained all the three factors and hence network reliability, changing technology and suppliers lack websiteswereconsidered as reliable factors for determining the enablers of e-procurement implementation in procuring entities in Kenya.

Table 3: Technological Infrastructure Reliability and Factor Analysis Results

Indicators	Factors loadings	Cronbach's Alpha
The network must be reliable for e-procurement operations.	0.747	0.835
The technology used should not change frequently to save upgrading costs	0.875	
Suppliers should have accurate information in their websites for precise procurements tenders	0.796	

Security of Procurement Data

As indicated in table 4, security of procurement data had a Cronbach's alpha value of 0.831 and factor loadings above 0.7 for all the indicators. The study, therefore, retained allthe three factors in accordance to (Tabachnick & Fidell 2007) who recommendthat using factor loading of 0.7 and above is excellent in determining the factorsto be retained.

Zinbarg (2005) argues that Cronbach alphavalue of 0.80 or higher indicates that the gathered data are reliable and can begeneralized to reflect opinions of all respondents in the target population about thestudy problem. The study, therefore, retained all the three factors notablyauthentication issues, lack of confidentiality , unauthorized disclosure of data as reliable factors for determining how security of procurement data affects e-procurement implementation in procuring entities in Kenya.

Table 4: Security of Procurement Data and Factor Analysis Results

Indicators	Factors loadings	Cronbach's Alpha
There must be authenticity to all data sources to safeguard against malicious attacks or impersonification	0.808	0.831
Confidentiality of sensitive procurement data should be highly established	0.796	
Authorization rights to specific employees to ensure data is safe and not tampered with.	0.72	

Enablers of e-procurement implementation in procuring entities

Table 5 indicates that the variable enablers of e-procurement implementation in procuring entities had a Cronbach's alpha value of 0.895 and factor loadings values of above 0.7 for all the indicators. Zinbarg (2005) states that an alpha coefficient of 0.80 or higher indicates that the gathered data are reliable as they have a relativelyhigh internal consistency and can be generalized to reflect opinions of allrespondents in the target population about the study problem.

The study was also in accordance to Tabachnick and Fidell (2007) who recommend that using factor loading of 0.7 and above is excellent in determining the factors to be retained. Thestudy hence deduced that efficiency, cost reduction, price accuracy, enhanced security, reliability, global

market, accessibility and employees produce quality procurement recordsas the most reliable factors in determining the enablers of e-procurement implementation in procuring entities in Kenya.

Table 5: Enablers of e-procurement implementation in procuring entities Reliability and Factor Analysis Results

Indicators	Factors loadings	Cronbach's Alpha
The e-procurement require adequate features for efficient operations	0.849	0.895
The cost of maintaining the e-procurement system should be low	0.844	
Supplier websites should be accurate and reliable	0.769	
Adequate security and authentication must be upheld at all times	0.794	
Global market place is accessible by a stable network connection	0.754	
Employees require ICT skills to proficiently handle e-procurement transactions	0.831	

Descriptive Statistics

Rating Employee Competency

Frequency Distributions for Employee Competency

The study sought to assess the influence of employee competency as a key enabler in e-procurement implementation in procuring entities in Kenya as shown in Table 6 below:

Table 6: Rating Employee Competency

Statement	SA		A		N		D		SD		Total	
	F	%	F	%	F	%	F	%	F	%	F	%
The employee attitude makes e-procurement implementation a success	31	51.7	10	16.7	9	15	10	16.7	0	0	60	100
The staff should have ICT skills to deal with the e-procurement system	10	16.7	30	50	20	33.3	0	0	0	0	60	100
The procurement staffs are sponsored for IT courses	9	15	21	35	2	3.3	20	33.3	8	13.3	60	100

Key- SA: Strongly Agree; A: Agree; N: Neutral; D: Disagree; SD: Strongly Disagree**.**

Respondents majorly felt that the attitude of employees towards using e-procurement system makes e-procurement implementation a success given that 51.7% strongly agreed and 16.7% agreed. Contrary 16.7% of respondents disagreed while 15% of them remained neutral. As for the statement that the staff should have ICT skills to deal with the system in place, a large number of respondents, 50% agreed; 15% strongly agreed; and 33.3% disagreed. Finally, more respondents,

35% agreed that the procurement staff are sponsored for IT courses, with 15% strongly agreeing. 33.3% disagreed while 13.3% strongly disagreed and 3.3% remained neutral.

Means and Standard Deviations for Employee Competency

The first objective of this study was to establish how employee competence affects e-procurement implementation in procuring entities in Kenya. All the metrics for the employee competency were analyzed using the mean score. The purpose of calculation of the mean was to find the average opinion of the respondents in respect to the stated employee competency aspects. The standard deviation was calculated to determine the average variance of the responses from the mean and hence determine the consensus levels amongst the respondents in respect to a given metric in a Likert scale. Employee competence results are summarized in Table 7 below:

Table 7: Means and Standard Deviations for Employee Competence

Statement	N	Mean	Std. Deviation
The employee attitude makes e-procurement implementation a success	60	3.53	0.838
The staff should have ICT skills to deal with the e-procurement system	60	2.59	0.671
The procurement staffs are sponsored for IT courses	60	2.57	0.519

The means of the three employee competence measuring factors indicated that, the attitude of employees makes successful e-procurement implementation had a mean of 3.53; The staff who adequately skilled in ICT had a mean of 2.59. Finally, the procurement staffs to be sponsored for IT courses had a mean of 2.57. Keller, (2014) argues that means that fall between 3.5 to 4.49 should be interpreted as the respondents on average tended to agree that the stated Likert scale metric positively influenced the dependent variable. In a 5 point likert scale, ranging from; 1 = strongly agree to 5 = strongly disagree. The closer the mean score on each score was to 5, the stronger the agreement was to the statement posed, a score around 2.5 would indicate uncertainty while scores significantly below 2.5 would suggest strong disagreement with the posited statements. The means of the employee competence constraints fell above 2.5, leading to a conclusion that on average the respondents agreed that employee competence influence e-procurement implementation.

The standard deviation of the three components of employee competence were calculated and the results revealed that the attitude of employees makes successful e-procurement implementation had a standard deviation of 0.838; that staff are adequately skilled in ICT to deal with the system in place had a standard deviation of 0.671 and finally, that procurement staff are sponsored for IT courses had a standard deviation of 0.519. In a five point Likert scale (1=Strongly Agree and 5= Strongly Disagree), Keller, (2014) argues that standard deviations that fall between 0.5 and 1 indicate an average variation of responses relative to the mean hence leading to a conclusion of moderate consensus with the given metric. All the metrics for the employee competence fall between this range with the least standard deviation being 0.519 and the highest being 0.838. A

conclusion was therefore reached that there was a moderate consensus amongst the respondents in respect to the influence of the employee competence aspects on e-procurement implementation.

Rating Technical Capacity

Frequency Distributions for Technical Capacity

The study sought to assess the influence of technical capacity as a key enabler in e- procurement implementation in procuring entities in Kenya as shown in Table 8 below:

Table 8: Rating on Technical Capacity

Statement	SA		A		N		D		SD		Total	
	F	%	F	%	F	%	F	%	F	%	F	%
Good system integration with other departments makes e-procurement implementation a success	35	58.3	20	33.3	0	0	5	8.3	0	0	60	100
System compatibility with suppliers encourages the use of e-procurement system	40	66.7	19	31.7	0	0	0	0	1	1.7	60	100
System user friendliness motivates staff to use it	39	65	2	3.3	3	5	8	13	8	13.3	60	100

Key- SA: Strongly Agree; A: Agree; N: Neutral; D: Disagree; SD: Strongly Disagree.

Majorly respondents strongly agreed that good system integration with other departments makes e-procurement implementation a success, at 58.3% while 33.3% agreed and 8.3% disagreed. 66.7% of respondents strongly agreed and 31.7% agreed that system compatibility with suppliers encourages the use of e-procurement system. 1.7% strongly disagreed. As concerns the statement that the system user friendliness motivates staff to use it, a large number or 65% of respondents strongly agreed, 3.3% agreed, 5% remained neutral, 13% disagreed and 13.3% strongly disagreed.

Means and Standard Deviations for Technical Capacity

The second objective of this study was to establish how technical capacity affects e-procurement implementation in procuring entities in Kenya. All the metrics for the technical capacity were analyzed using the mean score. The purpose of calculation of the mean was to find the average opinion of the respondents in respect to the stated technical capacity aspects. The standard deviation was calculated to determine the average variance of the responses from the mean and hence determine the consensus levels amongst the respondents in respect to a given metric in a Likert scale. Technical capacity results are summarized in Table 9 next page.

Table 9: Means and Standard Deviations for Technical Capacity

Statement	N	Mean	Std. Deviation
Good system integration with other departments makes e-procurement implementation a success	60	3.98	0.713
System compatibility with suppliers encourages the use of e-procurement system	60	2.69	0.662
System user friendliness motivates staff to use it	60	3.57	0.669

The means of the three technical capacity measuring factors indicated that, good system integration with other departments had a mean of 3.98; system compatibilities with suppliers had a mean of 2.69. Finally, the system is user friendly had a mean of 2.57. Keller, (2014) argues that means that fall between 3.5 to 4.49 should be interpreted as the respondents on average tended to agree that the stated Likert scale metric positively influenced the dependent variable. In a 5 point likert scale, ranging from; 1 = strongly agree to 5 = strongly disagree.

A score around 2.5 would indicate uncertainty while scores significantly below 2.5 would suggest strong disagreement with the posited statements. The means of technical capacity constraints fell above 2.5, therefore leading to a conclusion that on average the respondents agreed that the level of technical capacity influence e-procurement implementation. The standard deviation of the three components of technical capacity were calculated and the results revealed that good system integration with other departments had a standard deviation of 0.713; that system compatibilities had a standard deviation of 0.662 and finally, that the system is user friendly had a standard deviation of 0.669. In a five point Likert scale (1=Strongly Agree and 5= Strongly Disagree), Keller, (2014) argues that standard deviations that fall between 0.5 and 1 indicate an average variation of responses relative to the mean hence leading to a conclusion of moderate consensus with the given metric. All the metrics for the employee competence fall between this range with the least standard deviation being 0.662 and the highest being 0.713. A conclusion was therefore reached that there was a moderate consensus amongst the respondents in respect to the influence of the employee competence aspects on e-procurement implementation.

Rating on Technological Infrastructure

Frequency Distributions for Technological Infrastructure

The study sought to assess the influence of technological infrastructure as a key enabler in e-procurement implementation in procuring entities in Kenya as shown in Table 10 below:

Table 10: Rating on Technological Infrastructure

Statement	SA		A		N		D		SD		Total	
	F	%	F	%	F	%	F	%	F	%	F	%
The network must be reliable for e-procurement operations.	25	41.7	35	58.3	0	0	0	0	0	0	60	100

	SA		A		N		D		SD			
The technology used should not change frequently to save upgrading costs	15	25	41	68.3	1	1.7	3	5	0	0	60	100
Suppliers should have accurate information in their websites for precise procurements tenders	10	16.7	40	66.7	0	0	10	16.7	0	0	60	100

Key- SA: Strongly Agree; A: Agree; N: Neutral; D: Disagree; SD: Strongly Disagree.

All respondents agreed that the network must be reliable for e-procurement operations; 58.3% strongly agreed and 41.7% agreed. The technology used keeps changing was supported by 25% of respondents who strongly agreed and 68.3% who agreed. Otherwise, 5% of respondents disagreed and 1.7% decided to be neutral. Majority of respondents or 66.6% agreed that suppliers lack websites with 16.7% of them strongly agreeing. Also, 16.7% of the respondents disagreed.

Means and Standard Deviations for Technological Infrastructure

The third objective of this study was to establish how technological infrastructure affects e-procurement implementation in procuring entities in Kenya. All the metrics for the technological infrastructure were analyzed using the mean score. The purpose of calculation of the mean was to find the average opinion of the respondents in respect to the stated technological infrastructure aspects. The standard deviation was calculated to determine the average variance of the responses from the mean and hence determine the consensus levels amongst the respondents in respect to a given metric in a Likert scale. Technological infrastructure results are summarized in Table 12 below:

Table 12: Means and Standard Deviations for Technological Infrastructure

Statement	N	Mean	Std. Deviation
The network must be reliable for e-procurement operations.	60	2.48	0.599
The technology used should not change frequently to save upgrading costs	60	2.63	0.614
Suppliers should have accurate information in their websites for precise procurements tenders	60	2.52	0.512

The means of the three technological infrastructure measuring factors indicated that, network reliability had a mean of 2.48; stability against technological change had a mean of 2.63 and finally, if suppliers websites have accurate information had a mean of 2.52. Keller, (2014) argues that means that fall between 3.5 to 4.49 should be interpreted as the respondents on average tended to agree that the stated Likert scale metric positively influenced the dependent variable. In a 5 point likert scale, ranging from; 1 = strongly agree to 5 = strongly disagree. The closer the mean score on each score was to 5, the stronger the agreement was to the statement posed.

A score around 2.5 would indicate uncertainty while scores significantly below 2.5 would suggest strong disagreement with the posited statements. The means of technological infrastructure constraints fell above 2.5, therefore leading to a conclusion that on average the respondents agreed that technological infrastructure influence e-procurement implementation. The standard deviation of the three components of technological infrastructure were calculated and the results revealed that network reliability had a standard deviation of 0.599; stability against technological change had a standard deviation of 0.614 and finally, if suppliers websites were accurate had a standard deviation of 0.512. In a five point likert scale (1=Strongly Agree and 5= Strongly Disagree), Keller, (2014) argues that standard deviations that fall between 0.5 and 1 indicate an average variation of responses relative to the mean hence leading to a conclusion of moderate consensus with the given metric. All the metrics for technological infrastructure fall between this range with the least standard deviation being 0.512 and the highest being 0.614. A conclusion was therefore reached that there was a moderate consensus amongst the respondents in respect to the influence of technological infrastructure aspects on e-procurement implementation.

Rating on Security of Procurement Data

Frequency Distributions for Security of Procurement Data

The study sought to assess the influence of technological infrastructure as a key enabler in e-procurement implementation in procuring entities in Kenya as shown in Table 13 below:

Table 13: Rating on Security of Procurement Data

Statement	SA		A		N		D		SD		Total	
	F	%	F	%	F	%	F	%	F	%	F	%
There must be authenticity to all data sources to safeguard against malicious attacks or impersonification	40	66.7	17	28.3	3	5	0	0	0	0	60	100
Confidentiality of procurement data should be highly established	30	50	25	41.7	0	0	5	8.3	0	0	60	100
Authorization rights to specific employees to ensure data is safe and not tampered with.	50	83.4	5	8.3	0	0	5	8.3	0	0	60	100

Key- SA: Strongly Agree; A: Agree; N: Neutral; D: Disagree; SD: Strongly Disagree.

Table 13 shows that most respondents, 66.7% strongly agreed that authenticity of all data sources safeguards against malicious attacks or impersonification; 28.3% agreed and 5% chose to be neutral. Concerning confidentiality of procurement data, 50% ofrespondents strongly agreed and 41.7% agreed. Otherwise, 8.3% of respondents disagreed. Majority of respondents or 83.4% strongly agreed that there should be authorization rights to specific employees to ensure data is safe and not tampered with, while 8.3% of them agreed. Equally, 8.3% of the respondents disagreed.

Means and Standard Deviations for Security of Procurement Data

The next objective of this study was to establish whether security of procurement data affects e-procurement implementation in procuring entities in Kenya. All the metrics for the security of procurement data were analyzed using the mean score. The purpose of calculation of the mean was to find the average opinion of the respondents in respect to the stated security of procurement data aspects. The standard deviation was calculated to determine the average variance of the responses from the mean and hence determine the consensus levels amongst the respondents in respect to a given metric in a Likert scale. Security of procurement data results are summarized in Table 14 below:

Table 14: Means and Standard Deviations for Security of Procurement Data

Statement	N	Mean	Std. Deviation
There must be authenticity to all data sources to safeguard against malicious attacks or impersonification	60	3.18	0.581
Confidentiality of procurement data should be highly established	60	3.03	0.778
Authorization rights to specific employees to ensure data is safe and not tampered with.	60	2.59	0.612

The means of the three security of procurement data measuring factors indicated that, authenticity of a data source had a mean of 3.18; confidentiality of procurement data had a mean of 3.03 and finally, unauthorized data disclosure had a mean of 2.59. Keller, (2014) argues that means that fall between 3.5 to 4.49 should be interpreted as the respondents on average tended to agree that the stated Likert scale metric positively influenced the dependent variable.

In a 5 point likert scale, ranging from; 1 = strongly agree to 5 = strongly disagree. The closer the mean score on each score was to 5, the stronger the agreement was to the statement posed. A score around 2.5 would indicate uncertainty while scores significantly below 2.5 would suggest strong disagreement with the posited statements. The means of security of procurement data constraints fell above 2.5, therefore leading to a conclusion that on average the respondents agreed that security of procurement data influence e-procurement implementation. The standard deviation of the three components of technological infrastructure were calculated and the results revealed that authenticity of a data source had had a standard deviation of 0.581; confidentiality of transaction data had a standard deviation of 0.778 and finally, risk of unauthorized data disclosure had a standard deviation of 0.612.

In a five point likert scale (1=Strongly Agree and 5= Strongly Disagree), Keller, (2014) argues that standard deviations that fall between 0.5 and 1 indicate an average variation of responses relative to the mean hence leading to a conclusion of moderate consensus with the given metric. All the metrics for technological infrastructure fall between this range with the least standard deviation being 0.581 and the highest being 0.778. A conclusion was therefore reached that there was a

moderate consensus amongst the respondents in respect to the influence of the security of procurement data aspects on e-procurement implementation.

Rating on Enablers of E-Procurement implementation in Procuring Entities in Kenya

Frequency Distributions for Enablers of E-Procurement implementation in Procuring Entities in Kenya

The study analysed whether the respondents' perceptions on the enablers of e-procurement implementation in procuring entities in Kenya are determined by employee competency, technical capacity, technological infrastructure and security of procurement data. In this context, the following was examined e-procurement system features, cost of maintaining the system, accuracy of prices in supplier websites, data security and authentication, accessibility of global market and employee proficiency . The results are summarized in Table 15 below:

Table 15: Rating on Enablers of E-Procurement implementation in Procuring Entities

Statement	SA		A		N		D		SD		Total	
	F	%	F	%	F	%	F	%	F	%	F	%
The e-procurement system require adequate features for efficient operations	28	13.3	12	20	10	16.7	13	21.7	17	28.3	60	100
The cost of maintaining the e-procurement system should be low	38	63.3	12	20	0	0	10	16.7	0	0	60	100
Supplier websites should be accurate for reliable tendering process	2	3.3	7	11.7	0	0	39	65	12	20	60	100
Adequate security and authentication must be upheld at all times	21	35	19	31.7	15	25	5	8	0	0	60	100
Global market place is accessible by a stable network connection	30	50	29	48.3	1	1.7	0	0	0	0	60	100
Employees require ICT skills to proficiently handle e-procurement transactions	30	50	29	48.3	1	1.7	0	0	0	0	60	100

Key- SA: Strongly Agree; A: Agree; N: Neutral; D: Disagree; SD: Strongly Disagree.

Respondents largely strongly disagreed that the e-procurement system require adequate features for efficient operations, at 28.3% while 21.7% disagreed, as well. Twelve percent agreed, while 13.3% strongly agreed with 16.7% choosing to remain neutral. 63.3% of the respondents strongly agreed and 20% agreed that the cost of maintaining the e-procurement system should be low while 16.7% disagreed. Majority of respondents, 65% disagreed and 20% strongly disagreed that supplier

websites should be accurate for reliable tendering process. In contrary, 3.3% strongly agreedand 7% agreed. On the issue adequate security and authentication, most of the respondents agreed, 31.7% and 35% strongly agreed that security must be upheld at all times. 25% remained neutral. As concerns the statement that global market place accessibility by a reliable network, a large number or 50% of respondents strongly agreed, 48.3% agreed and 1.7% remained neutral. Finally the respondents agreed to the statement that eemployees require ICT skills to proficiently handle e-procurement transactions with 50% strongly agreeing and 48.3% agreeing. 1.7% remained neutral.

Means and Standard Deviations for Enablers of E-Procurement implementation in Procuring Entities

The means and standard deviations of enablers of e-procurement implementation were examined and the results presented in Table 16 below. The purpose of calculating the mean was to find the average opinion of the respondents in respect to the determining aspects in a Likert scale. The standard deviation was calculated to determine the average variance of the responses from the mean and hence determine the consensus levels amongst the respondents in a Likert scale.

Table 16: Means and Standard Deviations for Enablers of E-Procurement Implementation in Procuring Entities in Kenya

Statement	N	Mean	Std. Deviation
The e-procurement system require adequate features for efficient operations	60	3.92	0.98
The cost of maintaining the e-procurement system should be low	60	4.05	0.88
Supplier websites should be accurate for reliable tendering process	60	4.23	0.79
Adequate security and authentication must be upheld at all times	60	3.99	0.99
Global market place is accessible by a stable network connection	60	4.11	0.81
Employees require ICT skills to proficiently handle e-procurement transactions	60	4.26	0.83

The means of the enablers of e-Procurement implementation in procuring entities in Kenya indicated that the means of the metrics, e-procurement system features, cost of maintenance, supplier websites accuracy, security and authentication, accessibility of global market place and employee proficiency were 3.92, 4.05, 4.23, 3.99, 4.11 and 4.26 respectively. These findings disagreed with Othman (2015) that most of the organizations recruit unqualified employees. Normally, these employees lack familiarity, have insufficient training or lack of attention in their job (Marigat, 2018). Keller, (2014) argues that means that fall between 3.5 to 4.49 should be interpreted as the respondents on average tended to agree that the stated Likert scale metric positively influenced the dependent variable. The means enablers of e-procurement implementation in procuring entities in Kenya constraints fell between this level, therefore leading to a conclusion that on average the respondents agreed to the stated metrics on e-procurement implementation.

In the context of the standard deviations, the study revealed that the standard deviations for e-procurement system features, cost of maintaining the system, accuracy supplier websites, data security and authentication, accessibility of global market and employee proficiency were 0.98,

0.88, 0.79, 0.99, 0.81 and 0.83 respectively. In a five point Likert scale (1=Strongly Disagree and 5= Strongly Agree),Keller, (2014) argues that standard deviations that fall between 0.5 and 1 indicate an average variation of responses relative to the mean hence leading to a conclusion of moderate consensus with the given metric. All the enablers of e-procurement implementation fell between this range with the least standard deviation being 0.79 and the highest being 0.99. A conclusion was therefore reached that there was a moderate consensus amongst the respondents in respect to the metrics of e-procurement implementation.

Regression Analysis

The study carried out regression analysis to establish the statistical significance relationship between the independent variables notably, employee competency, technical capacity, technological infrastructure and secutity of procurement data on the dependent variable i.e. e-procurement implementation. According to Green and Salkind (2003), regression analysis is a statistics process of estimating the relationship between variables. As shown in Table 4.20, the linear regression correlation R of 0.681 indicated a strong positive correlation between the four independent variables and the dependent variable to the tune of 0.681. The R square that is the coefficient of determination of 0.536 indicated that the four independent variables accounted for 65.3% of the variation in the dependent variable. This indicated that 34.7% of the variation in the independent variable was attributed to other factors not in this model.

Table 17: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.681[a]	. 653	.569	.22461

a .Predictors: (Constant), Employee Competency, Technical Capacity, Technological Infrastructure, Security of Procurement Data

The ANOVA was calculated with a view of determining on whether the regression model was good fit for data at 0.05 significance level. Since the p value of the ANOVA was at 0.000, as in Table 18 which is below 0.05 level of significance, a conclusion was made that the regression model was good fit for data and thus the regression analysis was undertaken

Table 18: ANOVA [a]

Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	3.464	4	1.149	22.744	.000[b]
1	Residual	2.168	56	.050		
	Total	5.632	60			

a. Dependent Variable: E-Procurement Implementation
b. Predictors: (Constant), Employee Competency, Technical Capacity, Technological Infrastructure, Security of Procurement Data

Table 18 below presents the regression coefficients for the independent variables to be used in the substitution in the regression model. The results revealed that the regression coefficient for employee competence, technical capacity, technological infrastructure and security of procurement data was 0.157, 0.094, 0.149 and 0.311 respectively. This led to the substitution to the regression

model as follows; $Y = 0.850 + 0.157 (X_1) + 0.094 (X_2) + 0.149 (X_3) 0.311 (X_4)$ where Y is e-procurement implementation, X_1 is Employee Competency, X_2 is Technical Capacity, X_3 isTechnological Infrastructure, and X_4 is Security of Procurement Data.

Table 18: Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.850	.225		1.935	.041
Employee Competence	.157	.092	.234	2.329	.018
Technical Capacity	.094	.136	.416	1.256	.025
Technological Infrastructure	.149	.124	.076	1.069	.431
Security of Procurement Data	.311	.132	.562	3.203	.000

a. Dependent Variable: E-procurement Implementation

The regression coefficients of the independent variables revealed that a unit increase in any of the independent variable would lead to an increase in e-procurement implementation with the other independent variables kept constant due to the regression coefficients being positive. In this context, the regression coefficient of employee competence was 0.157 implying that a unit increase in employee competency would lead to a 0.157 increase in e-procurement implementation with the other independent variables kept constant. Also, a unit increase in technical capacity will lead to a 0.094 increase in e-procurement implementation with the other independent variables kept constant. On the other hand, a unit increase in technological Infrastructure would lead to a 0.149 increase in e-procurement implementation with the other independent variables kept constant. Similarly, a unit increase in security of procurement data will lead to a 0.311 increase in e-procurement implementation with the other independent variables kept constant.

The t statistics and the p values indicated in Table 18 above were used in the hypothesis testing aspects of the study.

H01: There is no significant relationship between Employee competence and effective e-procurement implementation in procuring entities in Kenya.

The results in Table 18 revealed that the computed t statistic was 2.329 and a p value of 0.18 which was below the 0.05 level of significance leading to a conclusion to reject null hypothesis (H_{01}).

H02: There is no significant relationship between technical capacity and effective e-procurement implementation in procuring entities in Kenya.

The results in Table 18 revealed that the computed t statistic was 1.256 and a p value of 0.025 which exceeded the 0.05 level of significance leading to a conclusion to reject null hypothesis (H_{02}).

H03: There is no significant relationship between technological infrastructure and effective e-procurement implementation in procuring entities in Kenya.

The results in Table 18 revealed that the computed t statistic was 1.069 and a p value of 0.431 which was below the 0.05 level of significance leading to a conclusion to reject null hypothesis (H_{03}).

H_{04}: There is no significant relationship between security of procurement data and effective e-procurement implementation in procuring entities in Kenya.

The results in Table 18 revealed that the computed t statistic was 3.203 and a p value of 0.000 which was below the 0.05 level of significance leading to a conclusion to reject null hypothesis (H_{04}).

III. SUMMARY

The general research objective was to establish the enablers of e-procurement implementation in procuring entities in Kenya. The response rate was 91% which was viewed as sufficient to conduct the study. The study established the respondents' highest academic level was mainly degree and that majority of the respondents had stayed in in procurement process for a period of 5-10 years.This demonstrated that most of the employees were qualified professionals with technical knowledge and skills and also the extent to which they were involved in the execution of procurement functions was long enough to understand the study problem and thus provided the study with reliable information on the enablers of e-procurement implementation in procuring entities in Kenya. The major findings summarized from the four specific objectives, namely, employee competency, technical capacity, technological infrastructure and security of procurement data; are as follows:

In the first objective, the study sought to determine the effect of employee competency on e-Procurement implementation in procuring entities in Kenya. The employee competency factors were; employee attitude, employee skills and training. The means of the employee competence constraints fell above 2.5, leading to a conclusion that on average the respondents agreed that employee competence influence e-procurement implementation.The standard deviations of the metrics of employee competence fall between 0.5 and 1 with the least standard deviation being 0.519 and the highest being 0.838. A conclusion was therefore reached that there was a moderate consensus amongst the respondents in respect to the employee competence aspects.

The second objective of the study aimed to find out the effect of technical capacity on e-procurement implementation in procuring entities in Kenya. The technical capacity factors were; system intergration with other departments, compatibility and user friendly. The means of the technical capacity constraints fell above 2.5, leading to a conclusion that on average the respondents agreed that technical capacity influence e-procurement implementation.The standard deviations of the metrics of technical capacity were calculated and all fall between 0.5 and 1 with the least standard deviation being 0.662 and the highest being 0.713. A conclusion was therefore reached that there was a moderate consensus amongst the respondents in respect to the technical capacity aspects.

In objective three, the study sought to investigate how technological infrastructure affects e-procurement implementation in procuring entities. The technological infrastructure factors were; network reliability, stable technology and supplier website reliability. The means of the technological infrastructure constraints fell above 2.5, leading to a conclusion that on average the respondents agreed that technological infrastructure influence e-procurement implementation. The standard deviations of the metrics of technological infrastructure were calculated and all fall between 0.5 and 1 with the least standard deviation being 0.512 and the highest being

0.614. A conclusion was therefore reached that there was a moderate consensus amongst the respondents in respect to the technological infrastructure aspects.

The last objective of the study evaluated the effect of security of procurement data on e-procurement implementation in procuring entities in Kenya. The security of procurement data factors majorly were authenticity and confidentiality of procurement transctions and data. The means of the security of procurement data constraints fell above 2.5, leading to a conclusion that on average the respondents agreed that security of procurement data influence e-procurement implementation. The standard deviations of the metrics of security of procurement data were calculated and all fall between 0.5 and 1 with the least standard deviation being 0.581 and the highest being 0.778. A conclusion was therefore reached that there was a moderate consensus amongst the respondents in respect to the security of procurement data aspects.

Lastly the study examined the regression coefficients of the independent variables, namely employee competence, technical capacity, technological infrastructure and security of procurement data against the dependent varible; e-procurement implementation. The study revelead that a unit increase in any of the independent variable would lead to an increase in e-procurement implementation with the other independent variables kept constant due to the regression coefficients being positive. The regression coefficient of employee competence was 0.157 implying that a unit increase in employee competency would lead to a 0.157 increase in e-procurement implementation with the other independent variables kept constant. Also, a unit increase in technical capacity will lead to a 0.094 increase in e-procurement implementation with the other independent variables kept constant. On the other hand, a unit increase in technological Infrastructure would lead to a 0.149 increase in e-procurement implementation with the other independent variables kept constant. Similarly, a unit increase in security of procurement data will lead to a 0.311 increase in e-procurement implementation with the other independent variables kept constant.

From the study findings, the regression model was retained given that the variables had a positive and strong correlation R= 681. All the hypotheses (H01 H02, H03 and H04) were rejected, also the study found out that all the variables influenced the effective e-procurement implementation in procuring entities in Kenya with an indication that they accounted for 65.3% (R^2 =0.653) of the variation in the dependent variable.

IV. CONCLUSIONS

Based on the study findings, technological infrastructure is an important factor that enables e-procurement implementation in procuring entities. Technological infrastructure factors such as network reliability, technology not changing frequently, and accuracy of suppliers' websites are key in effective e-procurement implementation in procuring entities in kenya. Employee competency greatly boosts e-procurement implementation in procuring entities. According to the study findings, employee competency factors such as employee attitude, employee skills and training to a large extent affected effective e-procurement implementation in procuring entities in kenya.

Technical capacity is a key determinant to e-procurement implementation in procuring entities. Technical capacity factors such as system integration with other departments, system compatibility and user friendliness enable effective e-procurement implementation in procuring entities in kenya. Finally the study concludes that security of procurement data also determines greatly the effective e-procurement implementation in procuring entities. Security of procurement data factors such as authentication, confidentiality and authorized disclosure of data are key factors in effective e-procurement implementation in procuring entities in Kenya.

V. RECOMMENDATIONS

Based on the establishment of the enablers of e-procurement implementation in procuring entities in Kenya, the researcher came up with the following recommendations; Employee competency to a large extent affects effective e-procurement implementation in procuring entities in Kenya. Therefore, training is compulsory and should be done regularly for the incoming staff due to employee turnover and to improve employee skills to farmiliarise the staff with the system and technology used. The management should demonstrate the positive impact of the system to the procurement staff and technical team to avoid cases of negativity towards the system.

Technological infrastructure greatly affects effective e-procurement implementation in procuring entities in Kenya due to unreliable network, changing technology and suppliers' lack of websites. The researcher recommends that there should be conscious efforts by procuring institutions to integrate their system and those of the suppliers and installing linkages between all departments in the organisation to mitigate technical capacity barriers like poor system integration and compatibility issues.

Security of procurement data, largely hinder effective e-procurement implementation in procuring entities in Kenya. Factors such as authentication issues, lack of confidentiality and unauthorized disclosure of procurement data is a major concern due to the sensitivity of the procurement data and the legal nature of orders and payments. The researcher recommends that, since the security of data is critical, e-procurement system must have mechanisms for identifying and authenticating the user who places an order so that it is safe to fulfill it.

Areas for further research

This study was limited to Kenya Power and Lighting Company a large public procuring entitiy in Kenya that has embraced e-procurement. The researcher proposes that similar studies be conducted in other major public and private organisations/procuring entities in the entire country to ascertain the enablers e-procurement implementation in Kenya.

VI. REFERENCES

Archer, N. (2005). An Overview of the Change Management Process in e-Government. International Journal of Electronic Business, 3, 1, 68-87.

BuyIT (2002). A BuyIT e-Procurement Best Practice Guideline, Measuring the Benefits: What to Measure and How to Measure It. BuyIT Best Practice Network, March.

Daniel Kariuki Kamotho. (2014): E-Procurement and Procurement performance Among State Corporations In Kenya

Elijah Oginda. (2013): Challenges of Implementing Procurement Strategy at the Kenya Power and Lighting Company Limited

Eunice Waruguru, & Sophia Nduta Kiruri. (2015): Factors Affecting Effectiveness of E-Procurement in Business Organizations, a Survey of Safaricom Dealers in Nakuru CBD-Kenya. International Journal of Economics, Finance and Management Sciences. Vol. 3, No. 3, 2015, pp. 303-310. doi: 10.11648/j.ijefm.20150303.27

Hall, J. (2009). Environmental supply chain dynamics. Journal of Production and operation management. Vol.44, No.9. pp. 143-147.

Mauti.J.M. (2013):The critical success factors and challenges in e-procurement adoption among large scale manufacturing firms in Nairobi, Kenya. European Scientific Journal Vol.9(13),1-2

Njeru Elphas Silas (2015). Factors affecting effective implementation of Procurement Practices in tertiary public training institutions in Kenya.

OECD (2002). Public procurement practices in developing countries. Journal of supply chain Management. Vol.31, No.11. pp. 136-144.

Sammy Kibet Koech, Isack R. Ayoyi & Frida Mugambi. (2016): Factors Influencing Adoption of E-Procurement in Kenya's Public Sector. European Journal of Logistics, Purchasing and Supply Chain Management Vol.4, No.4, pp.19-25, August 2016 (www.eajournals.org)

Sekeran, U. (2010). Research methods for business: A skill building approach. 4th Ed. Sheel Print-N-Pack, Noida, India

Wamego, J. (2005). Tackling graft in public procurement. Adili, Transparency International News Service Publication. Nairobi

William Mwangi. (2015): Factors Affecting Adaptation of Information Technology in Purchasing and Supplies Function: (A Study of Kenya Power and Lighting Company). Science Journal of Business and Management. Vol.3, No.6, 2015, pp. 242-250.