



**INFLUENCE OF INFORMATION COMMUNICATION TECHNOLOGY ON THE
IMPLEMENTATION OF EFFECTIVE PROCUREMENT PRACTICES IN TERTIARY PUBLIC
TRAINING INSTITUTIONS IN KENYA**

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ABSTRACT

Information Technology (IT) is a technology that involves use of computers, software's and internet connections infrastructure for supporting information processing and communication functions (Crompton,2007). The use of information technology in public sector has not been effectively implemented since most of the procurement functions are subjected to manual procedures that are slow, inaccurate and infective. This has negative impact on procurement procedures since the public sector organizations cannot effectively monitor and coordinate procurement procedures of all road construction projects, there lacks computerized procurement procedures and this subjects much of procurement functions to manual operations which are slow and ineffective. The use of computerized procurement systems demonstrates effective use of information technology but in cases where the organization subjects all it's procurement functions to manual procedures, the benefits of information technology are not experienced and a high level of inefficiency is experienced during execution of procurement procedures. This study set out to establish the influence of information communication technology on implementation of effective procurement practices in tertiary public training institutions in Kenya. The study employed a descriptive survey research design. The study population comprised of a total of 320 procurement staff in procurement departments of all the 40 tertiary public training institutions in Kenya. A stratified random sampling technique was employed to select a sample size of 160 respondents. The main data collection instruments used included questionnaires containing open ended and closed ended questions with the quantitative section of the instrument utilizing both a nominal and a Likert-type scale format.

Key Words: *ICT, Effective Procurement Practices*

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INTRODUCTION

In Africa, many public sector organizations view effective procurement practices as an add-on or an approach that costs more. In truth, sustainable solutions can often cost less over the whole life of the purchase. Some key benefits include: value for money, protection and enhancement of the environment, more efficient use of resources, greater social inclusion, fair and ethical trade, support for innovation, better risk management, lower whole-life costs improved supplier relationships, a diverse and flexible supply chain and a competitive edge (Talluri, 2008). Efficient procurement policies and practices are critical for good public financial management and effective budget implementation (Zuzana, 2012). In many African countries, public procurement accounts for a substantial part of fiscal expenditures, making sound procurement methods central not only for sound public financial management but also for inclusive growth (Zuzana, 2012).

Tertiary Public training institutions in Kenya comprises of 40 technical training colleges (GOK, 2012). For the past ten years, many tertiary public training institutions have continued to enroll more students as a result of spontaneous response to the increasing demand for higher education necessitated by the increasing flow of students from schools (Benton, 2007).

Information Technology (IT) is a technology that involves use of computers, software's and internet connections infrastructure for supporting information processing and communication functions (Crompton, 2007). The use of information technology in public sector has not been effectively implemented since most of the procurement functions are subjected to manual procedures that are slow, inaccurate and inflexible. This has negative impact on procurement procedures since the public sector organizations cannot effectively monitor and coordinate procurement procedures of all road construction projects, there lacks computerized procurement procedures and this subjects much of procurement functions to manual operations which are slow and ineffective.

Increased cases of inefficiency and ineptness of the overall administration and management of procurement functions in many tertiary public training institutions contributes to loss of over Ksh 50 million annually. A study by Victor (2012) noted that procurement expenditure could be minimized through implementation of effective procurement practices. However, none of tertiary public training institutions have successfully embraced effective procurement practices and this has led to increased procurement expenditure and high institutions operational costs (John, 2012). A relatively well-developed body of research has explored implementation of effective procurement practices in public sector organizations in general hence creating a major knowledge gap on influence of information communication technology on implementation of effective procurement practices in tertiary public training institutions. It is hence against this background that this study was undertaken with a main purpose of establishing the influence of information communication technology on implementation of effective procurement practices in tertiary public training institutions in Kenya.

LITERATURE REVIEW

According to Bell (2007) information technology is a general term that describes any technology that helps to produce, manipulate, communicate or disseminate information. ICT merges computing with high-speed communications links carrying data, sound and videodisc can also be defined as an automatic acquisition, Storage, manipulation, movement, control, display, switching interchange, transmission or reception of data or information. The two important major components of ICT are computers and telecommunications. A computer is a programmable, multiple machine that accepts data, raw facts and figures and processes or manipulates it into information that is easy to understand which enhances speed processing of information leading to increased organization productivity (Compton, 2007).

Golder (2007) asserted that the organizations that fails to integrate procurement functions with information communication technology systems like electronic data interchange employs manual procurement procedures

that are inefficient and ineffective and leads this to wastage of procurement funds since the procurement processes are characterized by a low degree of transparency.

According to Ken (2007) IT has reached almost every aspect of procurement and may enhance and deepen the effort of procurement reform. Specifically, information technology (IT) promotes economy and efficiency, significant savings of public funds by increasing competition, transparency by making procurement information of all sorts such as bidding opportunities, bidding documents, notices, texts of applicable rules readily available and in diminishing the opportunities for discretion (and hence corruption), and public confidence in the integrity of government.

Chang (2008) affirmed that IT plays a great role towards supporting adoption of centralized procurement systems in public sector organizations. Centralized procurement system leads to a central procurement data base that creates a favorable environment for effective automation of procurement processes. Chopra (2008) affirmed that there are two primary types of procurement systems: electronic procurement and standard procurement. Both types of systems are widely available and are often included in an enterprise resource planning (ERP) or accounting software product.

Charles (2008) concurred that, as purchasing departments have become larger and more complex, most organizations have adopted IT based systems that have created a platform for installation of automated procurement systems. These procurement systems provide efficient and extensive cost savings and other business benefits by automating many of the purchasing processes.

According to Baily (2007) organization with effective IT infrastructure can easily automate its procurement functions by implementing an Enterprise Resource Planning (ERP) system. ERP is a system that integrates all organization functions into a single system in order to serve the needs of each different department within the enterprise. ERP is more of a methodology than a piece of software, although it does incorporate several software applications, brought together under a single, integrated interface.

According to Lambert (2004) Electronic Data Interchange (EDI) is a communication technology used to facilitate effective execution of procurement functions by most organizations. Michael, (2010) explained that Electronic Data Interchange refers to computer-to-computer exchange of business documents in a standard format. Chopra (2004) affirmed that EDI describe both the capability and practice of communicating information between two organizations electronically instead of traditional form of mail, courier, & fax. The benefits of EDI are; quick process to information, better customer service, reduced paper work, increased productivity, improved tracing and expediting, cost efficiency, competitive advantage and improved billing. Though the use of EDI, supply chain partners can overcome the distortions and exaggeration in supply and demand information by improving technologies to facilitate real time sharing of actual demand and supply information (Linda, 2003).

A study by Tanzi (2009) found out that in Canada, innovation in technology has played a major role in enhancing many organizations to adopt sustainable procurement practices. Tanzi (2009) study did not clearly elaborate how organizations should innovate technology to succeed in implementing sustainable procurement. A study by George (2008) found out that in Kenya many public institutions fails to succeed in embracing sustainable procurement practices due to lack of effective waste recycling technology and effective technology for utilizing renewable energy sources such as wind and solar energy. However George (2008) failed to explain the type of technology that should be embraced by government training institutions in order to effectively implement sustainable procurement practices.

The empirical review shows that the awareness and implementation of effective procurement practices is still comparatively low in most developing countries and no measures have been made to promote implementation of sustainable procurement practices in Kenyan government training organizations. Recognizing the important role that sustainable procurement can play in promoting realization of increased organization performance this

paper will address the major critical issues as an effort to promote implementation of effective procurement practices in government training institutions in Kenya.

METHODOLOGY

The study applied a descriptive research design. Both quantitative and qualitative data was collected to describe the nature and characteristics of factors influencing the implementation of effective procurement practices in tertiary public training institutions in Kenya. The study population comprised of a total of 320 procurement staff in procurement departments of all the 40 tertiary public training institutions in Kenya. The study applied a stratified random sampling technique to select a sample size of 160 respondents. The main data collection instruments used was questionnaire structured to provide for open ended and closed ended questions with the quantitative section utilizing both a nominal and a Likert-type scale format.

Descriptive statistics method was applied to analyze quantitative data. These data was scored by calculating the percentages, means, STD deviation and Variance. This was done with the aid of Statistical Package for Social Sciences (SPSS) computer software. Inferential statistics was applied through the use of multiple regression analysis to establish the nature of the existing relationship between the research variables.

The multiple regression model applied was if the form;

$$Y = B_0 + B_1 \cdot X_1 + e$$

Where:

Y = Effective procurement practices

X_1 = ICT

B_0 = constant of regression

B = slope (gradient) showing rate dependent variable is changing for each unit change of the independent variable.

RESULTS AND DISCUSSION

Information Communication Technology (IT) is a technology that involves use of computers, software's and internet connections infrastructure for supporting information processing and communication functions (Crompton, 2007). The use of information technology in public sector has not been effectively implemented since most of the procurement functions are subjected to manual procedures that are slow, inaccurate and infective. This has negative impact on procurement procedures since the public sector organizations cannot effectively monitor and coordinate procurement procedures of all road construction projects, there lacks computerized procurement procedures and this subjects much of procurement functions to manual operations which are slow and ineffective.

The use of computerized procurement systems demonstrates efficient use of information technology but in cases where the organization subjects all it's procurement functions to manual procedures, the benefits of information technology are not experienced and a high level of inefficiency is experienced during execution of procurement procedures. On the extent to which ICT affected the implementation of effective procurement practices in tertiary public training institutions in Kenya, respondents were asked to indicate the extent to which ICT factors hindered implementation of effective procurement practices in the institution. The study adopted a likert scale of 1-5 (1= not at all, 2 = small extent, 3 = moderate extent, 4 = large extent, 5 = very large extent). The key factors rated by the respondents were; e-procurement, level of automation, procurement systems, CT infrastructure and ICT skills.

Table 1: Information Communication Technology

	NOT AT ALL	SMALL EXTENT	MODERA TE EXTENT	LARGE EXTENT	VERY LARGE EXTENT	Total
	Row N	Row N	Row N	Row N	Row N	100
E-procurement	3.2%	3.2%	11.7%	26.6%	55.2%	100
Level of automation	.6%	6.5%	9.1%	34.4%	49.4%	100
Procurement systems	1.9%	4.5%	8.4%	37.0%	48.1%	100
ICT infrastructure	.6%	5.8%	7.8%	33.8%	51.9%	100
ICT skills	1.3%	5.2%	11.0%	31.8%	50.6%	100
Average	1.52%	5.04%	9.60%	32.72%	51.04%	100

Table 1 presents that majority 55.2 percent of the respondents felt that to a very large extent e-procurement affected implementation of effective procurement practices in tertiary public training institutions, 26.6 percent indicated to a large extent -procurement affected implementation of effective procurement practices in tertiary public training institutions, 11.7 percent indicated to a moderate extent e-procurement affected implementation of effective procurement practices in tertiary public training institutions, 1.3 percent indicated to a small extent e-procurement affected implementation of effective procurement practices in tertiary public training institutions and 0.6 percent indicated that e-procurement did not at all affect implementation of effective procurement practices in tertiary public training institutions.

On the effect of level of automation, majority 49.4 percent of the respondents felt that to a very large extent the level of automation affected implementation of effective procurement practices in tertiary public training institutions, 34.4 percent indicated to a large extent the level of automation affected implementation of effective procurement practices in tertiary public training institutions, 9.1 percent indicated to a moderate extent the level of automation affected implementation of effective procurement practices in tertiary public training institutions, 6.5 percent indicated to a small extent the level of automation affected implementation of effective procurement practices in tertiary public training institutions and 0.6 percent indicated that the level of automation did not at all affect implementation of effective procurement practices in tertiary public training institutions.

On rating procurement systems, majority 48.1 percent of the respondents felt that to a very large extent procurement systems affected implementation of effective procurement practices in tertiary public training institutions, 37.0 percent indicated to a large extent procurement systems affected implementation of effective procurement practices in tertiary public training institutions, 8.5 percent indicated to a moderate extent procurement systems affected implementation of effective procurement practices in tertiary public training institutions, 4.5 percent indicated to a small extent procurement systems affected implementation of effective procurement practices in tertiary public training institutions and 1.9 percent indicated that procurement systems did not at all affect implementation of effective procurement practices in tertiary public training institutions.

On the effect of ICT infrastructure, majority 51.9 percent of the respondents felt that to a very large extent ICT infrastructure affected implementation of effective procurement practices in tertiary public training institutions, 33.8 percent indicated to a large extent ICT infrastructure affected implementation of effective procurement practices in tertiary public training institutions, 7.8 percent indicated that to a moderate extent ICT infrastructure affected implementation of effective procurement practices in tertiary public training institutions, 5.8 percent indicated to a small extent ICT infrastructure affected implementation of effective

procurement practices in tertiary public training institutions and 0.6 percent indicated that ICT infrastructure did not at all affect implementation of effective procurement practices in tertiary public training institutions.

On rating ICT skills, majority 50.6 percent of the respondents felt that to a very large extent ICT skills affected implementation of effective procurement practices in tertiary public training institutions, 31.8 percent indicated to a large extent ICT skills affected implementation of effective procurement practices in tertiary public training institutions, 11.0 percent indicated to a moderate extent ICT skills affected implementation of effective procurement practices in tertiary public training institutions, 5.2 percent indicated to a small extent ICT skills affected implementation of effective procurement practices in tertiary public training institutions and 1.3 percent indicated that ICT skills did not at all affect implementation of effective procurement practices in tertiary public training institutions.

On average, results presents that majority 51.04 percent of the respondents agreed that to a very large extent all the ICT factors affected implementation of effective procurement practices in tertiary public training institutions, 32.72 percent indicated to a large extent, 9.60 percent indicated to a moderate extent, 5.04 percent indicated to a small extent and 1.52 percent not at all.

Information Communication Technology Correlation Analysis Results

Table 2 indicates that the Pearson correlation coefficient of ICT was 0.537 and this demonstrates that ICT has a positive correlation with implementation of effective procurement practices.

Table 2: Information Communication Technology Correlations Analysis Results

		Effective Procurement Practices	Information Communication Technology
Effective Procurement Practices	Pearson Correlation	1	.537**
	Sig. (2-tailed)		.006
	N	25	25
Information Communication Technology	Pearson Correlation	.537**	1
	Sig. (2-tailed)	.006	
	N	25	25

****.** Correlation is significant at the 0.01 level (2-tailed).

Regression Analysis on ICT Vs Effective Procurement Practices

Regression analysis was further carried out to establish the significance of the relationship between ICT and implementation of effective procurement practices. The results were presented in table 3 where it can be observed that all the plots in the diagram are in the first quadrante and the line of best of fit indicates an estimate line that is increasingly positively upwards. This therefore demonstrates that there is a positive linear relationship between ICT and implementation of effective procurement practices.

Regression Model on ICT Vs Effective Procurement Practices

Further, regression model on ICT versus implementation of effective procurement practices was presented in table 4. As can be observed from the table 4.29, the coefficient of determination R square is 0.288 and R is 0.537 at 0.05 significance level. The coefficient of determination thus indicates that 53.7% of the variation on the implementation of effective practices is influenced by ICT. This indicates that there exists a strong positive relationship between ICT and the implementation of effective procurement practices.

Table 4: Model Summary

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.537 ^a	.288	.257	1.42647

a. Predictors: (Constant), Information Communication Technology

The study further used Analysis of Variance (ANOVA) in order to test the significance of ICT on implementation of effective procurement practices. The ANOVA results in table 5 indicates that the significance of the F is 0.006 which is less than 0.05 and this is a clear indication that there is a positive significant relationship between ICT and implementation of effective procurement practices. The higher value of F (9.297) is also large and this is also a clear indication of existence of strong positive significance between ICT and implementation of effective procurement practices.

Table 5: ANOVA

ANOVA ^b						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	18.917	1	18.917	9.297	.006 ^a
	Residual	46.801	23	2.035		
	Total	65.717	24			

a. Predictors: (Constant), Information Communication Technology

b. Dependent Variable: Effective Procurement Practices

Further, regression analysis was carried out to determine the beta coefficients of ICT versus implementation of effective procurement practices. Table 6 presents that there is a positive significant relationship between ICT and implementation of effective procurement practices is positive. This is expressed by the coefficient of ICT is 0.402 which is significantly greater than zero. The t statics is 3.049 which is also greater than zero. This implies that ICT has a positive influence on implementation of effective procurement practices

Table 6: Coefficients

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.972	1.626		3.058	.006
	INFORMATION COMMUNICATION TECHNOLOGY	.402	.132	.537	3.049	.006

a. Dependent Variable: Effective Procurement Practices

CONCLUSIONS AND RECOMMNDATIONS

The study further revealed that the level of ICT application in the execution of procurement functions in many tertiary public training institutions was very low since the employed procurement practices were characterized by use of manual procedures which were slow and ineffective. It was noted that many institutions did not employ e-procurement methods, lacked automated procurement systems, lacked supportive ICT infrastructure for encouraging adoption of ICT based procurement systems and most procurement staff lacked ICT skills. On average, majority 51.04 percent of the respondents agreed that to a very large extent all the ICT factors affected implementation of effective procurement practices in tertiary public training institutions, 32.72 percent indicated to a large extent, 9.60 percent indicated to a moderate extent, 5.04 percent indicated to a small extent and 1.52 percent not at all. These findings echoed findings by Sanjeeve (2009) implementation of

ICT based procurement methods in many public institutions is hindered by lack of e-procurement methods, lack of automated procurement systems, lack of supportive ICT infrastructure and absence of ICT skills amongst procurement staff. The study hence deduced that lack of e-procurement methods, lack of automated procurement systems, lack of supportive ICT infrastructure and absence of ICT skills amongst procurement staff greatly affects the implementation of effective procurement practices in tertiary public training institutions in Kenya.

The use of information technology in tertiary public training institutions has not been effectively implemented since most of the procurement functions are subjected to manual procedures that are slow, inaccurate and infective. This has negative impact on procurement procedures since the public sector organizations cannot effectively monitor and coordinate procurement procedures of all road construction projects, there lacks computerized procurement procedures and this subjects much of procurement functions to manual operations which are slow and ineffective. The use of computerized procurement systems demonstrates efficient use of information technology but in cases where the organization subjects all its procurement functions to manual procedures, the benefits of information technology are not experienced and a high level of inefficiency is experienced during execution of procurement procedures. ICT factors such as lack of e-procurement methods, lack of automated procurement systems, lack of supportive ICT infrastructure and absence of ICT skills amongst procurement staff greatly affects the implementation of effective procurement practices in tertiary public training institutions in Kenya. The study revealed that lack of e-procurement methods, lack of automated procurement systems, lack of supportive ICT infrastructure and absence of ICT skills amongst procurement staff greatly affects the implementation of effective procurement practices in tertiary public training institutions in Kenya. The study therefore recommended that the management of tertiary public training institutions should effectively integrate procurement functions with ICT based systems through application of e-procurement methods, use of automated procurement systems; implementation of supportive ICT infrastructure for encouraging adoption of ICT based procurement systems and training of procurement staff on ICT skills.

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