Original Research Article

IMPLEMENTATION OF AN E-PROCUREMENT SYSTEM IN VOLTA RIVER AUTHORITY

Abstract

Governments in both developed and developing nations have embraced the idea of using information communication technology to enable them enhance the quality of services offered by public sector institutions, increase access to information and public participation. The result of this is the emergence of e-procurement which has changed the way purchasing is done in the digital age. This paper therefore assesses the implementation of an e-procurement policy and emergent training needs of procurement practitioners - the case in Volta River Authority. The study adopted the descriptive research design and qualitative research approach. The purposive sampling strategy was used to sample 56 respondents from the population of 150 at VRA-NEDCO for the survey. Primary source of data was collected using semi-structured. Finding of the study revealed critical human resource and technical requirements for the implementation of e-procurement at VRA-NEDCO. Technically, quality IT infrastructure, standard data harmonization, adequate data management and messaging strategies were required while professionalism, high internal regards for procurement, adequate and skilled procurement specialists were the opportunities for the implementation of e-procurement in Volta River Authority. Also, VRA-NEDCO provides advanced computer literacy programs (Microsoft office, excel and notepad), advanced effective communication programs to create staff awareness of e-procurement, workshop on the public procurement Act of Ghana, Basic hardware training and Data management and supplier integration skills before the implementation of the Oracle e-procurement system. In examining the major challenges associated with the implementation of e-procurement, the study found the following as challenges VRA faces in the implementation of e-procurement; technology challenges such as data system hacking and cracking, unreliable internet and technology incompatibility and integration of external systems. Some process challenges also include; unwillingness to re-engineer process, challenge of supplier adoption and initial high cost of introducing e-procurement solution. The human resource challenges to e-procurement implementation at VRA include, issues of professionalism and training requirement, availability of e-procurement experts and resistance to change management.

Key Words

Electronic, Procurement, Procurement law, Procurement Act, Breach, Volta River Authority

Introduction

The advent of the internet and advancement information technology across the world is changing the way business activities are carried out in every aspect of business, including public sector activities. As a result governments in both developed and developing nations have embraced the idea of using information communication technology to enable them enhance the quality of services offered by public sector institutions, increase access to information and public participation (Henriksen & Mahnke, 2016). The result of this is the emergence of e-procurement which has changed the way purchasing is done in the digital age (Ateto et al., 2017). E-procurement permits the integration of supply chain process to better track and record transactions much more easier (Rotich, 2015). An e-procurement is an online system involving the use of internet and computer devices to carry out all manners of procurement activities between an institution and its suppliers (Henriksen & Mahnke, 2016). In public sector, government institutions using e-procurement will rely on information technology for the conduct of procurement activities in the acquisition of goods and services (Ateto et al., 2017). The adaptation of e-procurement as part of e-governance process is known to come with benefits such as encouraging accountability, transparency, and citizen participation in development. It also enhances privacy in the conduct of business, ubiquity and the interoperability of public sector organizations (Rahim, 2015).

E-procurement works with the aid of complex computer software's and applications that are configured to handle complex traditional procurement process in a more effective and efficient manner. This makes the implementation of an e-procurement policy program a challenging one. Besides the setting up of the IT system for the automation process, it equally requires change in the skills and behaviors of management and operational personnel (World Bank 2016). This involves the development of new skills, changes in legislations and policy guidelines for personnel. A mere change in the IT equipment and programs of a procurement system cannot drive the sort of change needed in public institutions without the corresponding manpower and skill needed to run the system. It requires creating awareness on the part of procurement officials and buyers through training programs, development of technology infrastructure to make the system sustainable. One of the greatest challenges but a success factor in the implementation face of an e-procurement policy is the ability to influence stakeholders to adapt to the new system (Shakya, 2015). Certify authorities, and operational personnel and other user communities will need an ongoing support training. This makes the training need of an e-procurement policy implementation an important component of the implementation process.

In Ghana, procurement activities of government agencies and state-owned entities is governed by the public procurement act 2003, act 663. The main aim of the public procurement enactment is to enable government obtain value for money in the procurement of goods and services by putting in place policies and measures that will deter and detect procurement related corrupt activities (Asah, 2014). Procurement procedures can be complex depending on the item or

services being procured. The activities of procurement can also be centralized or decentralized. In a centralized procurement the ministries department and agencies undertake the procurement of goods and services required by the various units within the agency for consumption, whereas in the case of a decentralized procurement, the metropolitan, municipal and district assemblies are given authority to carry out the procurement of goods and services for their own use, abiding by the public procurement regulations. The implementation of procurement policies among the various government agencies makes it a necessity to train personnel to be able to carry out procurement in line with its requirement of the regulations (Carayannis & Popescu, 2016).Training of personnel at the implementation phase of procurement policy has even become more important because government has in recent times undertaken to implement an automated system of procurement. The automation of procurement or simply e-procurement will rely mainly on current technology aimed at improving system efficiency. This will require a number of institutional reforms and infrastructure development by exploiting current technology and skills development of human resources to match (Angeles & Nath, 2018).

Objectives of the Study

The main objective of this study is to examine the implementation of an e-procurement policy and inherent training needs of procurement practitioners in VRA.

Specific Objectives

1. To identify the key Process requirements needed for the implementation of an E-procurement system at VRA
2. To assess the key human resources training received by implementers of an Oracle e-procurement software at VRA
3. To examine the major challenges, if any, faced by VRA in the implementation of an Oracle e-procurement policy.

Literature Review

E-Procurement and Information System

According to Mose et al. (2013), Private and public sector organizations have been utilizing Information Technology (IT) systems to streamline and automate their purchasing and other processes over the past years. It is only in the past decade that e-Procurement systems have attracted attention. While there is debate about how recently e-Procurement has emerged, (Kaliannan & Awang, 2014), there is no doubt that the use of the Internet in e- Procurement provides several advantages over earlier inter-organizational tools. For example, Electronic Data Interchange has been providing automated purchasing transactions between buyers and their suppliers since it was launched in the 1960s. Enterprise Resource Planning (ERP) followed in the 1970s, and then came the commercial use of the Internet in 1980s. It was only in the 1990s that the World Wide Web the multimedia capability of the Internet - became widely enabled and provided the essential resource for the automation of procurement.

Challenges of E-Procurement Implementation in Ghana

Even though e-procurement adoption is gaining attention among suppliers, available studies indicates that its implementation still face certain challenges (Mose et al., 2018). E-procurement is used with several benefits in mind, but its current low patronage among stakeholders is a challenge (Rotich, 2015). Even though a number of public sector institutions are adopting e-procurement seriously, but this is still being viewed a below expectation and pose a challenge for successful implementation. The implementation pace is reported as being slow, still many government agencies are reluctant to provide the true reflection of e-procurement activities in their undertaken (Ardita, 2018).

Inadequate Financial Resources is one of the challenges of e-procurement implementation. The funding requirement of an e-procurement system is a major determinant of its success. According to Ahmed & Mahmood, (2017), the high cost of technology is indeed a barrier to adoption of e-procurement. Effectiveness of the e-procurement system is dependent on availability of financial resources to meet the technological costs such as software and hardware. Other costs include the payments for the various services offered by suppliers and maintenance of the system (Kaliannan & Awang, 2014).

Another basic challenge is the inadequate human resource capacity. The Lack of e-procurement knowledge as reported by the Barahona et al., (2016), serves as a major obstacle to successful adoption and implementation of e-procurement.

Technology Adoptability

One of the determinants of e-procurement usage is the ease with which technology can be adopted by the implementation organizations and end-users (Angeles & Nath, 2018). The lack of technical expertise is seen as barrier to the adopting of e-procurement (Culture & Management, 2016). Technology is a constantly changing phenomenon and e-procurement implementers have to constantly go through the relevant training to stay relevant with changing times and trends (Henriksen & Mahnke, 2016). It also requires that the suppliers and others users' systems should be compatible with the overall procurement system.

Resistance to the Adoption Process

This is one of the issues encountered in the implementation of e-procurement. It is a conventional attitude displayed mostly by the procurement officials by showing resistance to change from the old system to the new system (Radianto et al., 2020). The implementation of an e-procurement system therefore faces a major stumbling block because personnel have become so accustomed to the old system and will resist changing to the automated system (Mose et al., 2018). Those involved may therefore fight the adoption of the new system to prevent its successful implementation.

E-procurement in Ghana

Wu et al., (2017) defined Electronic procurement as the sourcing of goods or services via electronic means, usually through the internet. It entails use of electronic means to buy products and services over the internet and involves electronic ordering, bidding and rendering via portals, extranets, private platforms, marketplaces and/or electronic data interchange (Stephens & Valverde, 2018).

Egbu et al., (2019) defined e-procurement as the process of electronically purchasing the goods and services which are needed for an organization's operation. It provides significant opportunity to reduce cost, increase organization effectiveness, and improve services (Ahmed & Mahmood, 2017; Ardita, 2018). It gives promise that public contract's winner is the one who offers best value for money. As documented by Afolabi et al., (2019), e-procurement is the electronic acquisition of goods and services including all processes from the identification of a need to purchase of products, to the payment for these purchases, including post-contract/ payment activities such as contract management, supplier management and development. Egbu et al., (2019) stated that e-procurement is the procurement of goods/ services conducted by using information technology and electronic transaction based on regulation. An e-procurement technology is defined as technology designed to facilitate acquisition of goods by a private or public organization over the internet (Croom et al., 2017). It focuses on automating workflows, consolidating and leveraging organizational spending power, and identifying new sourcing opportunities through the internet (Lecturer et al., 2015).

Factors Contributing to Successful Implementation of E-Procurement System

Factors such as government policy and legal framework, capacity building, technology, change management, and technology are necessary for successful implementation of an e-procurement system (Kishor Vaidya, 2018).Several studies have been sighted given more light on the success factors in the implementation of an e-procurement. Padhi & Mohapatra, (2016) explained that many studies show that for a faster adoption of e-procurement, there is the needed to address issues with regard to political and legal factors that are specific to the given policy. It therefore needs political will power to address administrative and legal convents of the policy (Osei-tutu et al., 2019).

Research studies indicate that various factors contribute either directly or indirectly to successful implementation of e-procurement. According to Khanapuri et al., (2019), such factors may include the availability of supplier's adoption system, system integration, reengineering the system of procurement, performance measurement, ensuring security in the automation process, support from top management and change management (Wu et al., 2017). Parida et al., (2015) proposed that in order to successfully implement e-procurement, there is need for strong organizational leadership, improved IT skills of procurement personnel and training of the end users.

Methodology

This study used a descriptive research design. A descriptive research design offers a valuable means to assess by seeking new insights, asking questions and assess a situation in a new light (Robson 2002). It offers clarity and understanding of a situation to be solved. The use of descriptive research design can add quality to study's outcome by allowing the researcher to adopt a multi-approach to gain better insight into the subject matter using discussion, survey, observation, focus group discussion and other qualitative data techniques.

In this study a quantitative research approach was adopted to address the research questions raised. This approach uses tools such as semi-structured or unstructured questionnaire, in-depth interview or focus group discussion to obtain data for the study. Qualitative research method is linked to assessing social phenomena and enable the researcher to portray peoples feeling, motives and desire (Kothari, 2004). The use of qualitative studies in this study will help the researcher to explain the training need of procurement officials from the view point of experts in the center of e-procurement implementation.

This study adopted a purposive sampling method to select 56 respondents for the study. A purposive sampling is a non-probability sampling method where the researchers use their own judgment to choose respondents based on the nature and demand of the study. This is why it is also known as 'judgmental sampling'. Saunder et al. (2011) clarifies that purposive sampling allows the researcher to select cases to respond to questions that permit the research to meet research objectives.

This study used both primary and secondary data. The secondary data was obtained from internet publication, and journals and policy documents regarding public procurement, e-procurement, e-governance and e-commerce implementation need in the public sector. Hanson-Hansen-Thompson (2007) posits that the use of secondary data offers a good basis for comparison and help in identifying main issues to be addressed by the primary data obtained. The primary data used for the study was obtained from the target institution; VRA. The primary data was collected from the target population represented by a sample of individuals from the procurement function of the institution and their suppliers who the researcher deemed appropriate to respond to the set of questions presented.

Results and discussions

E-procurement Process Requirement

Table 1: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Transparency and accountability	56	1.00	5.00	4.4286	.41238
Reduce procurement cycle/efficiency	56	1.00	5.00	4.1429	.47005
Minimization of procurement cost	56	1.00	5.00	4.7712	.41238
Valid N (listwise)	56				

Source: Field study, 2021

Table 1 presents descriptive analysis of process requirement for the implementation of e-procurement at Volta River Authority using a Likert scale of 1- strongly disagree,2- disagree, 3-neutral, 4-agree and 5- strongly agree.

From the analysis, the statement that transparency and accountability as process requirement for implementation of e-procurement recorded a mean of 4.4286 and standard deviation of 41.2%, the result of the analysis indicates that majority of the respondent agree that transparency and accountability is a process requirement for implementation of e-procurement and the standard deviation show a moderate variation in the response. The statement that reducing procurement cycle recorded a mean of 4.143 and standard deviation of 47%, the result of the mean show majority of the respondents agree with the statement and standard deviation show moderate variation in the responses. The statement of minimization of procurement cost recorded a mean of 4.77 and standard deviation of 41.2%, the result of the mean shows that majority of the respondent agree with the statement and the standard deviation show moderate level of variation in the set of responses.

Table 2: Human Resource Requirement

Descriptive Statistics

Requirement	N	Minimum	Maximum	Mean	Std. Deviation
Professionalism	56	1.00	5.00	4.2811	.54831
Internal Support	56	1.00	5.00	4.5714	.51186
Available specialist/experts	56	1.00	5.00	4.9781	.51762
Valid N (listwise)	56				

Source: Field study, 2021

Table 2 the descriptive analysis of the human resource requirement for the implementation of e-procurement at VRA NEDCO. The result of the analysis shows that professionalism recorded a mean of 4.28 and standard deviation of 54.8%. The result of the mean indicates that majority of the respondent agree that profession is a human resource requirement for the implementation of e-procurement. Also, majority of the respondent strongly agree that higher internal regards for procurement by organizational staff is a human resource requirement for the implementation of e-procurement with mean of 4.57 and standard deviation of 51.1%, the result of the standard deviation shows a higher level of variation in the responses. The statement of adequate and skilled procurement specialist recorded a mean of 4.97 and standard deviation of 51.7%, the result of the mean indicates that majority of the respondents strongly agree and the standard deviation shows high variation in the responses. The result of the analysis make meaning in that an organization that need change or implementation of a new system will need internal support from management and expert to be able to execute that effectively and efficiently.

Major Training Programs Undertaken By VRA during the Implementation of Oracle E-Procurement System

The findings from the study indicate that the following training programs were undertaken during the implementation on the e-procurement.

1. Advance computer literacy program(Microsoft office, excel and notepad)
2. Advance effective communication programs to create staff awareness of e-procurement
3. Workshop on the public procurement Act of Ghana
4. Basic software and hardware training with Oracle e-procurement
5. Data management and supplier integration training for data protection, processing and management

Major Challenges faced by the VRA in the Implementation of an Oracle E-Procurement Policy

Table 3. 1 Challenges faced by the VRA in the Implementation of an Oracle E-Procurement Policy

Descriptive Statistics

Challenges	N	Minimum	Maximum	Mean	Std. Deviation
Technology Challenges					
Data system hacking and cracking	56	1.00	2.00	4.62163	1.29935
Unreliable energy supply	56	1.00	2.00	1.2857	.45584
Unreliable internet services/internet jam	56	1.00	2.00	4.8852	1.32684
Technology incompatibility/Integration to external resource	56	1.00	2.00	4.8133	1.31783
Process Challenges					
Unwillingness to re-engineer processes	56	1.00	2.00	4.2857	1.17562
Challenges of supplier adoption	56	1.00	2.00	4.9362	.43750
Initial high cost of introducing e-procurement solutions	56	1.00	2.00	4.5722	1.24790
Issues of procurement transparency and accountability	56	1.00	2.00	1.4286	.19935
Human Resource Challenges					
Training requirements	56	1.00	2.00	4.7287	1.16713
Availability of e-procurement experts	56	1.00	2.00	4.8242	.36172
Resistance to change/ Change management	56	1.00	2.00	4.9427	.15318
Compliance Challenges					
Constraining legal and regulatory control	56	1.00	2.00	1.1429	.35309
Negative impact of public policy	56	1.00	2.00	3.2857	.41840
Procurement planning	56	1.00	2.00	4.5361	1.17890
Government interference	56	1.00	2.00	4.7842	1.45584
Valid N (listwise)	0				

Source: Field study, 2021

Table 3 shows the result of the analysis of the challenges in the adoption and implementation of e-procurement at VRA-NEDCO using a likert scale using a likert scale of 1- strongly disagree,2-disagree, 3-neutral, 4-agree and 5- strongly agree. The analysis present the challenge from the perspective of technology, process, human resource and compliance

Technology challenges

From the analysis, Data system hacking and cracking as a challenge of e-procurement recorded a mean of 4.62 and standard deviation of 129%, the result of the mean indicates that majority of the respondent strongly agree that Data system hacking and cracking is a challenge in the implementation of e-procurement and the standard deviation shows high variation in the responses. The mean result of unreliable energy supply as a challenge in the implementation of e-procurement was 1.28 and standard deviation of 45.5%, the result of the mean indicates that majority of the respondent strongly disagree to this statement and the standard deviation show low variation in the responses. The mean result of Unreliable internet services/internet jam was 4.81 and standard deviation of 132%, the result of the mean shows that majority of the respondent strongly agree with unreliable internet supply a challenge in the implementation of e-procurement and the standard deviation shows a high variation in the responses. The challenge of technology incompatibility/integration to external source recorded a mean of 4.88 and standard deviation of 131%, the result of the mean show that majority of the respondent strongly agree that technology incompatibility is a challenge in the implementation of e-procurement. The finding from the study makes meaning in that an organization always face problem with integrating their –procurement software to that of their suppliers due to high risk and date theft on the part of their external suppliers.

Process challenges

The analysis of the process challenges in the implementation of e-procurement show that Unwillingness to re-engineer processes recorded a mean of 4.2 and standard deviation of 117%, the mean result indicates that majority of the respondent agree that unwillingness to re-engineer process was a challenge in the implementation of e-procurement at VRA-NEDCO and the standard deviation show high variation in the responses. The challenges of supplier adoption recorded a mean of 4.93 and standard deviation of 43.7%, the result of the mean shows that majority of the respondent strongly agree to the challenge of supplier adoption as a challenge in the implementation of e-procurement and the standard deviation shows high variation in the responses. The challenge of high cost of introducing e-procurement solutions recorded a mean of 4.57 and standard deviation of 124%, the result of the mean shows that majority of the respondent strongly agree that the initial high implementation cost is a challenge in the implementation of e-procurement and the standard deviation show high variation in the responses. The issue of procurement transparency and accountability recorded a mean of 1.42

and standard deviation of 19.9%, the result of the mean shows that majority of the respondent strongly disagree that the issue of procurement transparency and accountability is a process challenge in the implementation of e-procurement at VRA-NEDCO

Human Resource challenges

The analysis of the human resource challenges in the implementation of e-procurement shows that issues of professionalism and training requirements recorded a mean of 4.72 and standard deviation of 116%, the result of the mean indicates that majority of the respondent agree that the issue of professionalism and training requirement was a challenge in the adoption of e-procurement at VRA-NEDCO and the standard deviation shows high variation in the responses. Thechallenge of availability of e-procurement experts in the implementation of e-procurement recorded a mean of 4.82 and standard deviation of 36.2%, the result of the mean indicates that the availability of expert was a challenge in the implementation of e-procurement at VRA-NEDCO and the standard deviation shows moderate variation in the responses. The challenge of resistance to change/change management recorded a mean of 4.92 and standard deviation of 15.13%, the result of the mean shows that majority of the respondent strongly agree that the resistant of workers and management to change was a human resource challenge in the implementation of e-procurement at VRA-NEDCO and the standard deviation show a very low variation in the responses.

The Challenge of Compliance Requirement

The analysis of challenges of compliance requirement show that constraining legal and regulatory control recorded a mean of 1.14 and standard deviation of 35%, the result of the mean indicates that majority of the respondent strong disagree to this as challenge in the implementation of e-procurement and the standard deviation show moderate variation in the responses. Negative impact of public policy recorded a mean of 3.28 and standard deviation of 41.8%, the result of the mean indicates that majority of the respondent are neutral to this statement as a compliance challenge in the implementation of e-procurement and the standard deviation shows moderate variation in the responses. The challenge of procurement planning recorded a mean of 4.53 and standard deviation of 117%, the result of the mean indicates that majority of the respondent strongly agree to the statement and the standard deviation show high variation in the responses. The challenge of government interference recorded a mean of 4.78 and standard deviation of 145%, the result of the mean indicates that majority of the respondent strongly agree to this challenge in the implementation of e-procurement whiles the standard deviation shows high variation in the responses.

Table 4 Conditions in VRA that affect E-Procurement Implementation

	Agree	Disagree
Auditable spend data	85.70%	14.30%

Has adequate IT infrastructure	96.40%	3.60%
Effective payment and invoice settlement	67.20%	32.80%
Adequate and qualified procurement professionals	98.30%	1.70%
Supplier integration	77.20%	22.80%
There exist legal and regulatory framework	100.00%	0.00%
Centralize control of procurement	23.60%	76.40%

Source: Field Study, 2021

Table 4 shows the analysis of the existence of various conditions in the organization, the result of the analysis indicates that 85.7% of the respondent agree that the organization has auditable spend data whiles 14.3% disagree that the organization does not have auditable spend data. Also, on the existence of having adequate IT infrastructure 96.4% of the respondents agree that there is exist an adequate IT infrastructure at VRA-NEDCO whiles 3.6% of the respondent disagree that their adequate IT infrastructure exist VRA-NEDCO. The assessment of whether there is effective payment and invoice settlement in the organization show that 67.2% of the respondent agree to this statement whiles 32.8% disagree that there exist effective payment and invoice settlement at VRA-NEDCO. 98.3% of the respondent agree that there exist adequate and qualified procurement professionals at VRA-NEDCO whiles 1.7% of the respondent disagree to the statement. Also, 77.2% of the respondents agree that there is adequate supplier integration at VRA-NEDCO whiles 22.8% disagree that there exists adequate supplier integration in the organization. 100% of the respondent agree that there exist legal and regulatory framework at VRA-NEDCO,23.6% of the respondent agree that there is centralize control of procurement at VRA-NEDDCO whiles 76% of the respondent disagree to the existence of centralize procurement in the organization.

Conclusion

We can conclude from the study that for an organization to adopt and implement e-procurement, it needs some technical and human resource requirements. The technical requirements include; quality IT infrastructure, standard data harmonization, adequate data management, and adequate messaging strategies. The human resource requirements include; professionalism, high internal regard for procurement, and adequate and skilled procurement specialists. The study also concluded that advancing computer literacy for organization staff is the training requirement for the implementation of e-procurement. Finally, the study concludes that the key challenges in e-procurement implementation include; technology challenges such as data system hacking and cracking, unreliable internet, technology incompatibility and integration with external systems, process challenges such as unwillingness to re-engineer processes, supplier adoption challenges, and the initial high cost of introducing an e-procurement solution. The human resource challenges deal with issues of professionalism and training requirements, the availability of e-

procurement experts and resistance to change management. The compliance challenges are procurement planning and government interference.

Recommendation

The study recommends that the managements of both public organizations and private organizations in developing strategies to ensure the efficient utilization of resources should consider the adoption of e-procurement since it helps reduce procurement lead times and eliminate inefficiencies in the procurement process. Also, the advantages of e-procurement outweigh those of the traditional procurement system. Organizations adopting e-procurement need to access pre-technical and human resource requirements for its implementation to help develop a robust e-procurement system that can easily be adapted by their staff.

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