

# An Empirical Assessment of Factors that Influence the Implementation of E-Procurement in Technical Universities in Ghana

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**Abstract** The main aim of this research was to assess factors that influence the implementation of e-procurement in Technical Universities in Ghana. This was necessary due to the important role that e-procurement plays in ensuring an effective and efficient procurement system, though it has not been adequately incorporated in many businesses in Ghana. The study employed the survey method in the collection of data and questionnaires were the main data collection instrument. One hundred (100) respondents were purposively chosen from the selected Technical Universities. Kaiser-Meyer-Olkin and Bartlett's test were used to test if the data obtained from the questionnaire administered was suitable for factor analysis. The factor analysis results gave a four (4) factor structure which explained 81.208% of the total variance. The factors and the rate at which they explained the total variance are as follows, ICT infrastructure (36.073%), public procurement regulations (20.141%), management commitment (16.156%) and staff competence (8.838%). The study found out that the ICT infrastructure in the Technical Universities was not adequate. The study made a recommendation that Technical Universities in Ghana should invest in their ICT infrastructure in order to derive the full benefits of e-procurements.

**Keywords** E-Procurement, Factor analysis, Technical Universities, Public procurement

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## 1. Introduction

Over the past decade, the internet has advanced from being a scientific network only, to a platform that is enabling a new generation of business (Jeyaraj, Rottman & Laicity, 2006). The internet is changing the way business is done in every industry. The World Wide Web has become a source of information, goods and services. E-procurement has emerged as one of the most discussed topics in procurement. Without doubt, it will dramatically change the way purchasing is done in the near future (Rankin, Chen & Christian, 2006). Governments of both developed and developing countries have embraced ICT to improve the quality of public service, increase public access to information and to energize more participation in civic affairs. As a result, most countries have recognized public participation in government tendering process by enhancing access to opportunities available in the government authorities such as procurement activity.

As a result of advancement made in ICT, governments across the globe are adopting e-procurement as a way to ease

access to the information. E-procurement is the application of internet technology in works, goods and service procurement. E-Procurement systems also allow the efficient integration of supply chains and provide better organization and tracking of transaction records for easier data acquisition (Ogot, 2009). E-Procurement is an online system by which institutions direct access to suppliers for the purpose of buying products and services at the lowest possible cost. E-Procurement essentially replaces its offline version, called tendering. The advantages and disadvantages of E-Procurement mostly parallel to the universal benefits and disadvantages of the internet. Bialy et al. (2008) opined that e-procurement is done with a software application that includes features for supplier management and complex auctions. The new generation of e-procurement is currently on demand or software as a service. The e-procurement value chain is made up of indent management, e-tendering, e-auctioning, vendor management, catalogue management and contract management. Indent management is the workflow involved in the preparation of tenders. This part of the value chain is optional, with each procuring department defining its indenting process. As concerns works procurement, administrative approvals and technical sanctions are obtained in electronic format. On the other hand, in goods procurement, indent generation activities are done online (Peter, 2012).

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Public sector institutions use e-procurement for contracts to achieve such benefits as increased efficiency and cost savings, faster and cheaper procurement and improved transparency, to reduce corruption in procurement services by eliminating interaction with suppliers. E-procurement in the public sector has seen rapid growth in recent years. Transactions can be standardized and all bids for products and services can be tracked more easily, allowing business owners to use such knowledge to obtain better pricing Acher (2005). Due to faster exchanges of information and delivery of goods and services, e-procurement also promotes shorter product- development cycles. According to Wilson (2002), e-procurement is the amalgamation of sales and purchasing business models and calls for differentiation based on application and functions. Therefore, suppliers form an integral part of the implementation process and their attitude, integrity; transparency, capacity and willingness to comply play a major role in the success of the process. These suppliers would also be using e-procurement systems for management of all processes relating to purchase. In Ghana, e-procurement is an emerging area of interest, though the concept is yet to be fully embraced by the government and institutions. The benefits that an institution derives from adopting and implementing e-procurement systems cannot be overemphasized, therefore this research seeks to assess factors that influence the implementation of e-procurement systems in Technical Universities in Ghana.

## 2. Literature Review

### 2.1. Background to E-Procurement

E-procurement as defined by the World Bank (2003), is the use of information and communication technology by governments in conducting their procurement relationship with suppliers for the acquisition of goods, works and consultancy services required by the public sector. E-Procurement started in the early part of the 80s with the development of electronic data interchange (EDI). This allowed customers and suppliers, most often in the fast moving consumer goods business (FMCG), to send and receive orders and invoices via secure store and call forward networks. These EDI systems allowed businesses to exchange and synchronise master data files on products, prices, specifications and information about each other's locations and trading practices (CIPS, 2013). In the 1990's internet software started to become available, and software companies began to develop buyer managed electronic catalogues for use by vendors. Sometimes these proved to be too unwieldy due to failures in communication between customers and suppliers, and software companies started to customise, maintain and host some catalogues, effectively becoming the intermediaries between the buyer hub and the vendor spokes and vice-versa. As the catalogues became outsourced, software companies started to offer the same catalogues to a number of buyers (CIPS, 2013). The impact

of the internet on the business world has occurred with astonishing speed. In a matter of years, the web has become a means of mass communication, a global sales channel, a platform for collaboration and a core feature of business strategy. The 'virtual organization' which sheds assets and uses technology to bind together a dispersed network of suppliers, manufacturers and distributors have become a reality (Kraemer & Dedrick, 1994). E-Procurement has changed the dynamics of the purchasing and supply chain management profession by placing a greater emphasis on knowledge management. It is suggested that e-Procurement will change the culture of purchasing and supply chain management in an organisation and may lead to a greater emphasis on cost and prices (CIPS, 2013).

### 2.2. Perspective of E-Procurement in Africa

An efficient and effective public procurement system is vital to the development of African countries economies and is a concrete expression of their national commitment to making the best possible use of public resources (Kabaj, 2008). Kakwezi and Nyeko (2010) argues that the procurement departments of public entities are faced with the problem of not having enough information about the procurement procedure, its inputs, outputs, resource consumption and results, and are therefore unable to determine their efficiency and effectiveness. This implies that such a problem requires establishment of clear procurement guidelines, procedures and performance standards.

Performance standards when adopted can provide the decision-makers in the procurement department with unbiased and objective information regarding the performance of the procurement function. In Ghana, procurement and disposal planning are central to proper procurement management. The Public Procurement Act (ACT 663) provides that a user department shall prepare a work plan for procurement based on the approved budget, which is then submitted to the procurement unit, department to facilitate an orderly execution of annual procurement plans.

Public sector management nowadays is faced with an increasing demand for transparency, efficiency and effectiveness in service quality (Ancarani, 2008). The emergence of the world wide web, the adoption and use of e-commerce and e-business models in the private sector are putting pressure the on the public sector to rethink their hierarchical and bureaucratic organizational models. Institutions are faced daily with new innovative e-business and e-commerce models being implemented by the private sector and made possible by ICT tools and applications, are requiring the same from Government entities. The introduction of Electronic Government (e-Government) is becoming increasingly popular in both the developed and developing countries to increase the efficiency and effectiveness of Government service delivery.

### 2.3. Nature of E-Procurement Systems in Ghana

According to UNEP (2012) sustainable public procurement is a tool which allows governments to leverage public spending between 15 to 25% of GDP in order to promote the country's social, environmental and economic policies. Procurement processes and procedures in Ghana have gone through a number of changes, with the main objective of reducing or at best eliminating corruption in public procurement, realizing value for money, efficiency in the procurement process among others. A major change was the passing of the Procurement Act, Act 663, in 2003. It is sincerely clear that Act 663 as introduced established a high level of sanity in the procurement environment, it is entirely manual base and has led to some procurement practitioners calling for the establishment of e-Procurement in the country (PPA Module, 2007). The rapid growth of internet usage in Ghana has driven the government to add electronic commerce component to their operation to gain competitive advantage. Ghana has implemented the e-Ghana project to enhance the use of technology in government's dealings with the public. It is therefore essential that e-Procurement is adopted as one of the applications of the e-Ghana projects in order to make the procurement process more efficient and effective.

### 2.4. Empirical Review

Macmanus (2002) examined the rate of implementation in US the sector, remarking that motivation for implementation was based on expectations of lower purchase prices, reduced transaction and process costs, and increased transaction speed. She also noted that the implementation of e-procurement had led to increased debate about some of the fundamental principles behind public sector procurement, including 'lower bid wins'. Altayyar and Beaumont-Kerridge (2016) assessed external factors affecting the adoption of e-procurement in Saudi Arabian's SMEs using within case and cross case analysis techniques. The study found nine external factors relevant to the adoption of e-procurement adoption. The factors were government support, own postal addresses and delivery service, providing secure and trustworthy online payment options, low cost and high speed internet connection, IT-related educational programs, supplier's willingness and readiness to participate or exert pressure, competitor's pressure, policy and regulations and Business and national culture of the country. Mambo (2015) investigated factors influencing implementation of e-procurement in the national government in Kenya using the linear regression model. The study found out that staff training contributes the most to the implementation of e-procurement, followed by IT infrastructure then suppliers' capacity while top management commitment contributed the least to the implementation of e-procurement. Oketch and Moronge (2016) assessed the determinants of e-procurement implementation in Kenyan state corporations within the ministry of finance. The study concluded that lack of

employee competence hinders smooth adoption of e-procurement in the public sector and also, the inadequate legal framework was a challenge to e-procurement adoption. Chebii (2016) assessed the determinants of successful implementation of e-procurement in Kenya using the multiple regression technique. The study found out that technology, government support and supplier responsiveness have a positive significant effect on e-procurement implementation. Ghartey (2014) evaluated the capacities of Municipal assemblies in Ghana to adopt e-procurement. The study found out that none of the municipal assemblies as at that had the capacity to fully integrate internet tools and platforms to replace the traditional procurement processes. Owusu (2014) assessed the readiness of public procurement entities in Ghana for e-procurement. The study identified some challenges which hinder the smooth implementation of e-procurement in Ghana. Some of the challenges identified are as follows; end-user uptake and training, supplier adoption, lack of e-procurement implementation strategy, costly technical solutions and lack of management support.

### 2.5. Review of Variables

#### 2.5.1. ICT Infrastructure

Implementation of e-procurement usually involves using advanced communication technologies such as e-mail and the Internet. Having an online presence creates important new methods of procurement for public procuring entities. Procuring entities have the role to create e-procurement platforms in which stakeholder in the procurement department can sign in (Henriksen & Mahnke, 2005). Information Communication Technologies consists of a combination of hardware and software technologies. Hardware components are important for knowledge management system because they have the role of platform for the software and transfer of knowledge. The use of technology enhances access to and delivery of government services to benefit citizens, business partners and employees. Davis, (1989) developed technology acceptance model (TAM) based on the previous works by on Fishbein and Ajzens theory on reasons of actions (1975) to explain the intentions of use of IT and in organizations in the TAM model, ease of use and usefulness are two independent variables explaining attitude, behavioral intentions and actual use Taylor and Todd later showed that the TAM model is well suited to predict variation in adoption and use of ICT in organizations. Usefulness and ease of use are important factors in the use of information system.

#### 2.5.2. Employee Competence

The human ability in using Information Communication Technology (ICT) plays a vital role in the implementation of e-procurement in public procuring entities. Employees must understand how to use ICT and how it will change the way they do business. This obstacle is more prominent for advanced ICT such as e-commerce and procurement. A response from one of the managers in a study carried out by

Macmanus, (2002) indicated that, Lack of competences, need of training and absence of motivation in many public procurement officers, are some of the main reasons for which any new projects, new tools like e-Procurement, IFMIS or any change are hardly implemented and hence the need to improve the already existing bureaucratic standards in public institutions. A study conducted by (Priest, 2000) shows that information technology in its simplest and most complex forms are essentially specialized knowledge, skills and tools. Priest further adds that there is a general feeling of helplessness among many employees in procuring entities due to their inability to use appropriate technology to further the goals of their organizations and this makes majority of them shun away from implementing e-procurement due to the uncompetitive nature of procuring entities, employees may be reluctant to innovativeness that is usually witnessed in private institutions.

### 2.5.3. Public Procurement Regulations

At the international level, public procurement rules depend on the country's legal setting and on purchase players (Government, public agency among others). International agreements on public tendering and procurement aim to regulate goods, services and trade opportunities between public procurement and private organizations across different countries. In Ghana, the processes of procurement are controlled by Public Procurement Authority (PPA). The PPA is mandated with the responsibility of ensuring that procurement procedures established under the Act are complied with, monitoring the procurement system and reporting on its overall functioning. Initiating public procurement policy, Assisting in the implementation and operation of the public procurement system by:- preparing and distributing manuals and standard tender documents, providing advice and assistance to procuring entities and develop, promote and support training and professional development of staff involved in procurement contends.

The regulations for public procurement are contained in the Public Procurement Act 2003, the Act ensures that public organization maximize economy and efficiency, promote competition and ensure that competitors are treated fairly, promote the integrity and fairness of those procedures, increase transparency and accountability in those procedures, increase public confidence in those procedures and facilitate promotion of local industry and economic development The public procurement Act (663) has indicated guidelines under which public procuring entities should undertake their tendering process and the whole procurement process. According to Williams (2003), the current legal framework in public procurement provides for a fully decentralized procurement process, leaving the full responsibility of undertaking procurements to the tender committee and procurement unit at the level of the individual entity. This decentralization of decision making authority represents a milestone in the implementation of e-procurement.

### 2.5.4. Managerial Commitment towards the Implementation of E-Procurement

Like any other technological change, e-procurement brings change in an organization that requires organizational managers to adopt change management strategies towards making the transformation process success procurement. One way in which managers in organizations can reveal commitment to change is to have change management team structures that identify who was doing the change management work (Yildirim & Soner., 2000). Change management structures outline the relationship between the project team and the change management team. E-procurement initiatives are driven by top management. It is not unusual for a Chief Executive Officers (CEO) to be directly involved in the early stages of the process. One often unexpected demand of implementing an e-procurement strategy is the requirement for new management techniques and specialized skills among the organization's management team as (Thomas et al., 2008) argues. Managerial commitment towards e-procurement implementation has also been discussed by scholars concerning the style of leadership adopted by many managers. According to Kippis (2007) cited by Kahiu (2015), almost all managers of African organizations, perhaps because of societal norms and expectations emphasize bureaucratic practices with total reliance on rules and regulations that workers obey without questioning or offering constructive criticism (Alpar & Olbrich, 2005). Managers patronizing attitude towards employees may hinder them from being innovative or adopt to a change idea such as shifting from manual procurement to e-procurement that could be of benefit to the entire organization.

## 3. Methodology

The main objective of this study is to assess the factors that influence e-procurement implementation in Technical universities in Ghana There are eight (6) Technical Universities in Ghana as at September 2017. In line with the objective of this study, four (4) Technical Universities were selected. A total number of hundred (100) respondents were purposively chosen from the selected Technical Universities. The respondents were selected due to their involvement in the procurement activities of their various institutions. Questionnaires were the main data collection instrument and the survey method was employed in the data collection.

The questionnaires used in the study consisted of two main parts. The first part consisted of the demographics. The second part was made up of 25 items seeking to find factors that influence e-procurement implementation in Technical Universities in Ghana. A five (5) – point Likert scale was adopted in the designing of the questionnaire. The factors that influence the implementation of E-procurement criteria part in the questionnaire was prepared in line with the objective of the study and made use of the commonly used

e-procurement implementation variables as a result of the related literature reviewed. These criteria were: ICT infrastructure, staff competence, management commitment, and Public Procurement Regulations. The questionnaires developed from these criteria were hand-delivered to the respondents by the authors. The 5- point Likert scale used in the study were: (1) strongly disagree, (2) disagree, (3) undecided, (4) agree and (5) strongly agree.

Factor analysis was used to assess the structural validity of the 5- Point Likert scale used. Factor analysis is a technique used to find out and explore few unrelated and conceptually significant new variables (factors) by bringing together related variables. Before factor analysis method can be employed, Kaiser-Meyer- Oklin (KMO) test should be conducted to test the sufficiency and adequacy of the data obtained and Barlett test should be conducted to test the normality of the distribution in the population (Pallant, 2005). The KMO tests whether partial correlations are small and whether the distribution is sufficient for factor analysis. The KMO value ranges from 0-1, it is interpreted as normal between 0.5 and 0.7, as good between 0.7 and 0.8, as very good between 0.8 and 0.9 and as perfect when it is over 0.9 (Field, 2005).

## 4. Results and Discussion

### 4.1. Profile of Respondents

Gender, age, highest level of education, and years of working experience were the demographic characteristics the study examined. These characteristics will give the general view of the respondents in relation to the main research objective. The results presented in Table 1 below shows the frequency distribution for each demographic variable. A majority of the respondents representing 57% were males and 43% were females. This confirms previous studies which came out with findings that the public sector in Ghana is dominated by males. 17% of the respondents were below the ages of 30, 47% were between the ages 30-40 years, 26% were between the ages of 41-50 years and 10% were between ages of 51-60 years. None of the respondents were above the age of 60 years, this is a reflection of the statutory retirement age of public sector employees in Ghana. 13% of the respondents had diploma certificates, 42% of the respondents which constituted the majority had bachelor degree certificates, 27% had master degree certificates, 7% of the respondents were Ph.D. holder and 11% had obtained professional certificates. This is an indication that the respondents are all well educated, thus, they can read and understand the questionnaire items, therefore the responses they provide are going to be reliable and valid. 77% of the respondents have worked in their various intuitions for at least more than 3 years, hence, they are knowledgeable about the procurement activities (e-procurement) activities of their various institutions.

**Table 1.** Profile of Respondents

Variable		Frequency	Percentage (%)
Gender	Male	57	57
	Female	43	43
	<b>Total</b>	<b>100</b>	<b>100</b>
Age	Below 30 years	17	17
	30-40 years	47	47
	41-50	26	26
	51-60	10	10
	<b>Total</b>	<b>100</b>	<b>100</b>
Level of Education	Diploma	13	13
	Bachelor Degree	42	42
	Master Degree	27	27
	PhD	7	7
	Professional	11	11
	<b>Total</b>	<b>100</b>	<b>100</b>
Years of Working Experience	Below 3 years	23	23
	3-6 years	43	43
	Above 6 years	34	34
	<b>Total</b>	<b>100</b>	<b>100</b>

### 4.2. Factor Analysis

A Factor analysis was conducted using the 25 expressions to find the factors that influenced the implementation of e-procurement implementation in the various technical universities. In the first factor analysis, the number of factors was not limited and 10 factors were found with an eigenvalue of bigger than 1.00. Due to the results produced by the factor analysis, 3 items which gave high load values in more than one factor were not considered in the scale and the analysis was done again. In this study, a factor loading cut-off value was accepted as 0.30. While there are different techniques that can be used to find out factor structures, Principal Component Analysis is the most frequently used in literature (Klainbaum, et al., 1987; Ozturk, 2017).

KMO and Bartlett test results show that the sample size and the data obtained are suitable and sufficient for the factor analysis (Table 2).

**Table 2.** KMO and Bartlett's Test Values

Kaiser- Meyer- Oklin Measure of Sampling Adequacy.		0.791
Bartlett's Test of Sphericity	Approx. Chi-Square	708.209
	Df	231
	Sig.	0.000

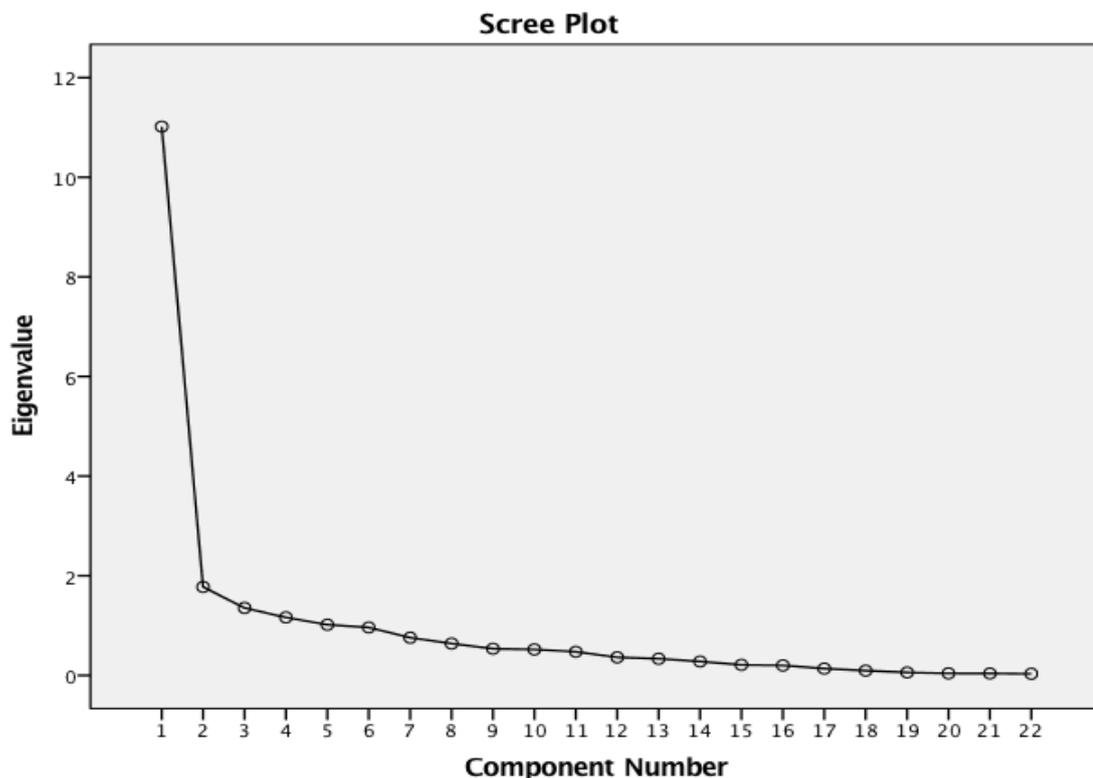
The rotation method used was Oblimin with Kaiser Normalization and the rotation converged in 21 iterations. The number of factors used was 4 and 22 sub-components were obtained.

The four factors (ICT infrastructure, public procurement regulations, managerial commitment and staff competence) explained 81.208% of the total variation. The first of these

factors was 'ICT infrastructure' which explained 36.07% of the total variance. The subcomponents and factor loading of the ICT infrastructure were determined as sufficient budget allocation for ICT infrastructure (0.996), availability of ICT equipment which facilitates e-procurement process (0.957), reliable internet supply to all departments (0.944), adequacy of existing software and hardware which enhances the e-procurement process (0.873) and the sufficiency of ICT infrastructure was (0.870). The second factor was 'public procurement regulation' and the results indicate that it explained 19.07% of the total variance. The subcomponents and factor loadings of public procurement regulation were determined as tendering process affects e-procurement positively (0.981), public procurement has adequate regulations (0.971), budget allocation determines technology (0.815), Well laid down procurement policies (0.883) and Government promotes the implementation of e-procurement (0.815). The third factor was 'management commitment to e-procurement' which explained 15.66% of the total variance. The subcomponents and factor loadings of the management commitment to e-procurement were determined as managerial policies favour implementation of e-procurement (0.921), Managers are committed to e-procurement implementation (0.901), employees are trained in e-procurement skills (0.891), management style

promote change implementation (0.826), management support e-procurement activities (0.822) and management reward employee who excel in e-procurement (0.793). The last factor that influenced e-procurement implantation was staff competence which explained 7.22% of the total variance. The subcomponents and factor loadings of the factor of staff competence were determined as institution sponsors employees to embark on ICT training (0.774), employees have adequate knowledge in e-procurement (0.747), employees have knowledge in the use of ICT tools (0.728), procurement officers are well versed in the e-procurement processes (0.688), e-procurement is not a threat to their jobs (0.672) and procurement officers are able to resolve challenges encountered by staff during the e-procurement process (0.655).

After the factors that influence e-procurement implementation in Technical Universities were determined, a reliability analysis was conducted on these factors separately. Cronbach's Alpha reliability coefficients of these four factors and their subcomponents were as follows; ICT infrastructure (0.766), public procurement regulations (0.899), management commitment to e-procurement (0.901) and staff competence (0.844). The results indicate that the data which was used in making the analyses was reliable. Summary of the results is presented in Table 3 below.



**Figure 1.** Eigenvalue scree plot

**Table 3.** Principal Component Analysis Results

Factors and components	Factor loading	Eigen Values	Variance Explained (%)	Cronbach's Alpha
<b>F1: ICT Infrastructure</b>				
There is Sufficient budget allocation for ICT infrastructure	0.966	39.253	36.073	0.766
There is enough ICT equipment which facilitates the e-procurement process	0.957			
There is reliable internet supply to all departments	0.944			
We have adequate software and hardware which enhances the e-procurement process	0.873			
There is Sufficient ICT infrastructure	0.870			
<b>F2: Public Procurement Regulations</b>				
Tendering process affects e-procurement positively	0.981	19.071	20.141	0.899
Public procurement has adequate regulations	0.971			
Budget allocation determine technology	0.815			
Well laid down procurement policies	0.883			
Government promotes implementation of e- procurement	0.815			
<b>F3: Management Commitment to E-procurement</b>				
Managerial policies favour implementation of e-procurement	0.921	15.662	16.156	0.901
Managers are committed to e-procurement implementation	0.901			
Employees are trained in e-procurement skills	0.891			
Management Style promote change implementation	0.826			
Management support e-procurement activities	0.822			
Management reward employees who excel in e-procurement	0.793			
<b>F4: Staff Competence</b>				
The institution sponsors employees to embark on ICT training	0.774	7.224	8.838	0.844
Employees have adequate knowledge in e-procurement	0.747			
Employees have knowledge in the use of ICT tools	0.728			
Procurement officers are well versed in the e-procurement processes	0.688			
E-procurement is not a threat to their jobs	0.672			
Procurement officers are able to resolve challenges encountered by staff during the e-procurement process	0.655			

\*Rotation Method: Oblimin with Kaiser Normalization with Kaiser Normalization. Rotation converged in 21 iterations.

## 5. Conclusions and Recommendations

The main aim of this study was to assess the factors that influence e-procurement implementation in Technical Universities in Ghana. In the study, four (4) factors and 22 subcomponents were found to influence the implementation of e-procurement in Technical Universities. The four factors explained 81.208% of the total variance. These factors are ICT infrastructure, public procurement regulations, management commitment and staff competence. An adequate ICT infrastructure helps link potential suppliers and the Technical Universities, hence, increasing the chances of effectively implementing e-procurement systems. The Technical Universities having a reliable internet link and adequate software and hardware (ICT infrastructure), with

other factors held constant are likely to succeed in the implementation of e-procurement systems. Therefore, benefiting in terms of reduced costs and increased efficiency associated with e-procurement. Managerial commitment to the implementation of e-procurement ensures ease of implementation. Institutions which train and motivate employees by addressing their needs will have a committed workforce, hence facilitating the implementation of e-procurement. Based on the findings, this study concludes that improving employee skills, through training in ICT and e-procurement regulations and procedures results in increased employee competence and consequently resulting in ease of implementation of e-procurement. Finally, the study concluded that the ICT infrastructure was not adequate, also management commitment to e-procurement, staff

competence and application of public procurement regulations is not satisfactory in the Technical Universities. This fact accounts for the low rate of adoption of e-procurement in Technical Universities in Ghana. Findings of this study are consistent with the findings of Kahi (2015) and Mambo (2015) which concluded that ICT infrastructure, public procurement regulation, managerial commitment and staff competence are major determinants in the implementation of e-procurement systems.

Based on the aims and findings of this study the following recommendations are made:

To get the benefits associated with successful implementation of e-procurement, the Technical Universities in Ghana need to invest in ICT infrastructure (both in hardware and software).

Secondly, management of the various Technical Universities should be able to adopt change management strategies towards making the transformation process a success. This is so because e-procurement brings change in an organization that requires managerial and employee commitment. Therefore, management should show accommodating and positive attitude towards employees to enhance innovativeness or adaptiveness to change like shifting from manual procurement to e-procurement that could be of benefit to the organizations.

Lastly, the employees especially the procurement officers, need to be trained in the use of ICT and all procurement procedures and functioning. Therefore, bodies like Ghana Public Procurement Authority which is mandated with the responsibility of ensuring that procurement procedures established under the Act are complied with, need to prepare and distribute manuals and standard tender documents, provide advice and assistance to all procuring entities and its employees in the country.

The study was limited to Technical Universities in Ghana, therefore, the study recommends that related study should be undertaken in other public organization/institutions. Factors such leadership style and suppliers' capacity should also be considered. Such studies should involve sample sizes larger than 100 which this study used to increase result reliability for further generalization.

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