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Factors Influencing Effective E-Procurement Use in Public Sectors: The Case of Selected Higher Learning Institutions in Dar Es Salaam

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Abstract

The aim of this research was to explore the current factors influencing the effective use of eProcurement system in public sectors in Tanzania so that areas which need improvement can be identified, this is because, despite the adoption of eProcurement system, together with the efforts and initiatives undertaken by government in improving the same, still the use of the system is less effective in many public sectors in Tanzania. Quantitative and qualitative approaches were adopted whereby primary data were collected through questionnaires, in-depth interview and documentary review based on the purposive and simple random sampling method, population of 50 respondents with sample size of 30 respondents were included in this study. Moreover, quantitative data collected were entered in the Statistical Package for Social Science (SPSS) software, cleaned and then descriptive statistics analysis were calculated. However, qualitative data were being transcribed, cleaned and analyzed using Nvivo software for content analysis, finally mean, standard deviations and voice quotations focused on content analysis were presented. Preliminary literature review depicts that factors influencing eProcurement use rotated around to ICT infrastructures, staff competency as well as top management support and these lays the benchmark of this study. The findings of this study will facilitate recommendation to the government on establishment of more effective policies and strategies towards eProcurement usage. Moreover, the study will also be useful to various stakeholders from public and private companies, in setting the appropriate procurement policies and strategies towards eProcurement use at their work places.

Keywords: *eProcurement; Public Sectors; Policies; Strategies*

Introduction

Tremendous advancement and growth of internet services in the world has compelled nations to have a paradigm change to include the use of Information and communication technology (ICT) in the name of eProcurement in conducting day-to-day procurement activities and services provision. Potentials attached to the use of this technologies have revolutionized procurement processes and supported the

improvement of traditional or manual procurement processes (Suzzy, 2019). The traditional system of procurement suffered from various problems such as undue delays in tendering process, heavy paper works, physical threats to bidders and human interface at every stage of procurement processes, lack of transparency, discretionary treatment in the entire tender process and corruption (Belisari et al., 2019). Therefore, various organizations in the world adopted eProcurement systems in the attempt to leverage this technological infrastructure to their advantage (Pani et al, 2011; Gaborutwe, 2017). Adaptation and use of eProcurement system has several perceived advantages such as growth of sales, transparency and accountability.

However, the use of eProcurement has been a slower process in the developing countries for instance in Ghana factors like low budgets, incompetence of employees, insufficient and inadequate technological infrastructures and concerns on security, have hindered its optimal use (Suzzy, 2019). In addition, inadequate ICT legal framework, low skills in ICT use and lack of Government Policy affected the use eProcurement in different African countries such as Kenya and Botswana (Gaborutwe, 2017; Rotich&Okello, 2015).

In Tanzania, Legal frameworks have progressed to support use of eProcurement in the country, public procurement Act No 7 of 2011 as amended in 2016, supported the introduction and use of eProcurement in Tanzania (Mamiro, 2010). In spite of the legal support to improve use of eProcurement but its usage is not evident, it is still hindered by numerous factors and amongst them are, lack of regular training on eProcurement and staff competency (Ivambi, 2016). The PPRA report on 2022 indicated that the compliance on the usage of eProcurement especially in the public sectors is lower than expected, and this implies the existence of some underlying factors hindering its prime operation. Hence this study intends to explore the current factors influencing the effective use of eProcurement system in public sectors focusing on selected higher learning institutions in Dar es Salaam, so that areas which need improvement can be identified.

Theoretical Review

There are various model and theories which have been used in describing the adoption and diffusion of technology these are Theory of planned behavior (TPB) (Ajzen 2002), Theory of reasoned action (Khraim *et al.*, 2011), Technological, Organizational and Environmental Framework (TOEF) (Pudjianto *et al.,* 2011), Diffussion of Innovation Theory (DOI) (Rodgers,2003), Technology Acceptance Model (TAM) (Venkantesh et al., 2016). TAM has been used in many studies because it highlights better behavior of individual in adoption of new technology (Afori 2019).

This study revealed that there is a need of using TAM by combining it with TOEF to increase the power of the model in predicting the current factors influencing the effective use of eProcurement in Tanzanian public sectors. The major TAM constructs are perceived usefulness (PU) of the technology to the users and the complexity or perceived easiness of using the technology (PEOU) which are behavioral components of the model, while other components of the model are behavioral intention (BI) and attitude (AT) as supporting components of PU and PEOU (Venkantesh et al., 2012), hence the model allowed the study to identify factors influencing effective use of eProcurement which may be attributed by complexity or easiness in use of new technology such as Staff competencies towards new technology, facilities available to support the new technology and the software/ technology itself. In addition, TOEF shows the three-enterprise contexts that governs the adaptation and proper implementation of any technological innovation and these are technological context, organizational context, and environmental context (Tornatzky et al., 1990). Therefore TOEF in this study allowed to identify factors influencing the adaptation and use of eProcurement in different technological, organizational and environmental contexts.

Methodology

The study was undertaken using primary data from five (5) public higher learning institutions which are MUHAS, DIT, TIA, IFM and MNMA. These institutions were chosen purposely due to the case study nature of the study where by the intention was to conduct a very detailed investigation and analysis of facts in line to the topic of the study, moreover these institutions enrolls a vast number of students hence implying huge eProcurement usage in their procurement operations. The study applied simple random sampling technique where information obtained from questionnaires and interviews administered to staffs working in procurement department, operations departments, head of departments working with the procurement departments and senior officials in the management were collected. Data obtained through the questionnaires were entered in the Statistical Package for Social Science (SPSS) software version 22, cleaned and then descriptive statistics analysis were used to analyze variables being related, results were presented using mux-min, mean and standard deviation for each item in a given study construct. Furthermore, factor loading scores were computed for each construct using items defining a particular construct to find out sampling adequacy and their correlation.

Validity and Reliability

Reliability was tested to ascertain if the research tools measures the intended outcomes (saunders et al., 2012). Cronbach's alpha was used to measure the internal consistency of the research instruments. The results on the reliability on Cronbach's alpha ranged from 0.778 to 0.808. Since all the values were above 0.7, which is the cutoff point, this indicated that the questionnaires used were reliable in measuring the studied constructs (Sunders et al., 2012). Table 1 indicates the reliability results.

In order to assess if items measured the same construct, exploratory factor analysis were done. Before exploratory factor analysis, Kaiser Meyer Olkin (KMO) and Bartlett's Test for Sphericity (BTS) were tested for factor analysis suitability. Hence it is argued that KMO should be greater than 0.6 and BTS should be less than 0.05 of the significant level to indicate that the data are suitable for factor analysis (Basto & Pereira, 2012). Since BTS had a value of less than 0.001 and KMO had a values greater than 0.675 then data were suitable for factor analysis.

According to Basto and Pereira (2012), for items which measures similar outcomes to have similarities, factor loadings should have the cutoff point of above 0.3. Items in this study were reliable for the studied phenomenon and analysis as they had factor loadings with cutoff points above 0.3.

Also Fornell and Larcer (1981) recommends that items measuring study constructs are valid only if the Average Variance Extracted (AVE) is at least 0.5. Items measuring study constructs in this study were valid as mostly had AVE at least 0.5.

Table 1: Fitness of items for EFA in each study construct

Study constructs	Determinant	KMO	Bartlett's Test	Cronbach 's alpha	Average Variance Extracted
			Chi-square (p-value)		Ave
eProcurement use	0.204	0.751	73.486 (<0.001)	0.778	0.477
ICT infrastructure on eProcurement	0.264	0.679	62.378 (<0.001)	0.768	0.603
Staff competence on eProcurement use	0.36	0.675	47.836 (<0.001)	0.733	0.562
management support	0.256	0.767	63.725(<0.001)	0.808	0.639

Factor Loadings for Items in Each Study Construct

Factor Loadings for Items Forming eProcurement Use

EProcurement use was defined by four distinct items. EPU1 had a maximum factor loading of 0.774 as compared to EPU6 which had a factor loading of 0.620. While scholars recommends that the factor loading should be at least 0.5, the researcher were comfortable that all items forming eProcurement use had factor loadings above the recommended threshold. Furthermore, the extraction sum of squares was 47.68, and the solution was not rotated as only one component was formed. Table xxx below for further information

Table 2: Factor loadings for items forming eProcurement use

Study constructs	Items	Factor Loadings
eProcurement use	EPU1	.774
	EPU2	.649
	EPU3	.719
	EPU4	.714
	EPU5	.656
	EPU6	.620
ICT infrastructures	ICT1	.684
	ICT2	.782
	ICT3	.807
	ICT4	.825
staff competence	STC1	.697
	STC2	.781
	STC3	.888
	STC4	.602
management support	MGT1	.713
	MGT2	.824
	MGT3	.812
	MGT4	.843

Source; Field work (2022)

Findings

Influence of ICT on the Effective Use of eProcurement

Table 3: Mean scores of the influence of ICT on eProcurement

Item	Minimum	Maximum	mean	Standard deviation
Availability of hardware materials	1	5	3.9	1
Availability of software application	2	5	4.2	0.81
Internet connection	1	5	4.18	1.1
Rapid technological changes	2	5	4.18	0.85

As shown on table 3 findings revealed that, the four items had mean above 3.90 indicating that respondents agreed with the statement that ICT influences the use of eProcurement, specifically the level of agreement were as follows; availability of software had highest mean 4.2 with standard deviation of 0.82 followed by internet connection which had mean 4.18 with standard deviation of 1.1, rapid

technological changes had mean 4.18 with standard deviation of 0.85 and availability of hard ware materials had mean 3.92 with standard deviation of 1.0 this findings indicates that availability of hardware materials, software application. Internet connection and rapid technological changes greatly influences the use of eProcurement system.

Influence of Staff Competence on Effective Use of eProcurement

The influence of staff competence on the use of eProcurement system were investigated using four distinct items which were, ICT knowledge and skills on eProcurement system, skilled and competent staffs to implement eProcurement system, trainings (on job training) on e-procurement system and seminars, workshops on e-procurement system. The findings were as shown in table below.

Table 4: Mean scores of the influence of STC on eProcurement

Item	Minimum	Maximum	mean	Standard deviation
ICT knowledge and skills	1	5	3.82	0.92
Skilled staff to implement the system	1	5	3.74	0.96
Trainings (on job)	2	5	3.92	0.9
Seminars, workshops	1	5	3.94	0.82

As indicated in table 4 above, respondents agreed with all items. Specifically, the level of agreement were as follows; Seminars, workshops on eProcurement had highest mean 3.94 with standard deviation of 0.82 followed by training (on job training) on eProcurement system had mean 3.92 with standard deviation of 0.9, ICT knowledge and skills on eProcurement system had mean 3.82 with standard deviation of 0.92 and skilled and competent staff to implement eProcurement system had mean of 3.74 with standard deviation of 0.96. This finding imply that ICT knowledge and skills, trainings, seminars and workshops influences the use of e-procurement.

Influence of Top Management On the Use of eProcurement

The influence of top management on the use of eProcurement system were assessed using four distinct items which were financial support on installation costs of e –procurement system, budget of running e procurement system, motivation to achievers and management commitment. The findings were as shown in table below.

Table 5: Mean scores of the influence of MGT on eProcurement

Item	Minimum	Maximum	mean	Standard deviation
Financial support for installation of the system	1	5	3.82	0.92
Budget for running the system	1	5	3.74	0.96
Management motivation	1	5	3.92	0.9
Management commitment	1	5	3.94	0.82

As indicated on table 5 above, all items had mean between 3.70 and 3.95 which indicate agreement with the statement. The level of agreement for each item were as follows; management commitment had highest mean 3.94 with standard deviation of 0.82 followed by motivation to workers had mean 3.92 with standard deviation of 0.9, financial support on installation cost of eProcurement system had mean 3.82 with standard deviation of 0.92 while budget for running eProcurement system had mean 3.74 with standard deviation of 0.94 This denotes that management financial support on

installation costs of eProcurement system, setting budget for running the system, motivating workers and management commitment influences the use of eProcurement system in public sectors.

Extent of the Rate of eProcurement Usage

Procurement usage were assessed in six distinct items which were e-sourcing, e-advertising, e-submission, e-evaluation, e-awarding, e-contract management. The findings were as shown in table below.

Table 6 Mean scores of the rate of eProcurement usage

Item	Minimum	Maximum	mean	Standard deviation
e- sourcing	2	5	3.54	0.8
e-advertising	2	5	4.06	0.87
e-submission	2	5	3.58	0.93
e-evaluation	1	5	3.02	0.96
e-awarding	1	5	1.25	0.17
e-contract management	1	4	1.45	0.28

From findings on table 6, e-advertising had a highest mean 4.06 with standard deviation 0.87 followed by e submission had mean of 3.58 with standard deviation of 0.93, e sourcing had mean 3.54 with standard deviation 0f 0.8, and evaluation had mean 3.02 with standard e-evaluation 0.92. This findings shows that respondents agreed using advertising, e submission and e sourcing.

Further findings indicates that e awarding had mean 1.25 with standard deviation of 0.17 and e contract management had mean 1.45 with standard deviation 0.28

Descriptive Statistics Analysis for Study Construct

From the given set of items measuring the relationship between a certain construct with eProcurement use, the study evaluated the overall mean score showing the particular relationship. For instance, the relationship between staff competence and eProcurement use was assessed using four items, thus the average score for all four items was taken as the sum of scores for each question divided by four items. Mathematically presented as; mean score for the relationship between staff competence and eProcurement use = (STC1 + STC2 + STC3 + STC4)/4. Similar approach was used for the remaining constructs. The results were summarized as shown in the table below

Descriptive Statistics for study construct

Table 7

Construct	N	Minimum	Maximum	Mean	Std. Deviation
eProcurement	50	2	4.67	3.5767	0.59876
ICT	50	2.25	5	4.12	0.72885
Staff competence	50	1.25	5	3.855	0.67213
Management support	50	1	5	3.395	0.93007

Findings from the table 7, above revealed that the influence of ICT infrastructure on eProcurement use had the mean score of 4.12 (standard deviation = 0.72885). Similar findings were found for the influence of staff competence on eProcurement use had a mean score of 3.855 (standard deviation

= 0.67213) which is almost around 4.0. Furthermore, the mean score for the relationship between top management support and eProcurement use was found to be 3.395 (standard deviation = 0.93007). Thus, using the scale identified in table above, we may conclude that ICT infrastructures and staff competence had a strong effect "strongly agree scale" on eProcurement use as compared to top management support which had a normal effect "agree scale" on eProcurement use.

Discussion of Findings

The findings have highlighted the factors which are still influencing the effective use of eProcurement in public sectors. The findings have indicated that ICT infrastructure such as hard ware materials availability, internet connection and software greatly influencing the effective use of eProcurement. These findings concurs with the study done by Abdul, H and Lyimo, (2019) on factors influencing implementation of eProcurement in public entities, they found out that information system infrastructure is among the factors. Mambo, (2015) when studying the factors influencing implementation of eProcurement in.the national government in Kenya, concluded that ICT and rapidly technology changes, provisional of powerful network infrastructure impact the implementation of eProcurement extensively**.**

Further study findings showed that staff competence also still had greater influence on effective eProcurement use, this was shown by the findings when examined the influence of staff competence on eProcurement use, ICT infrastructures had also a strong effect "strong agree scale" to have strong effect on eProcurement use with a score of mean 3.855 (SD = 0.67213), also findings indicated that ICT knowledge and skills, trainings (on job training), seminars and workshops to staff on e-procurement system continues hindering the effective use of eProcurement. This finding is consistent with those of Suzzy, (2019) who studied the challenges of eProcurement adoption in Ghana public sector. She revealed that employee's competence, inadequate technological infrastructure significantly influences eProcurement adoption in public sector in Ghana.. Furthermore, the findings are in agreement with those of Kevin George Obat (2016), noted that staff training on use of eProcurement system, provision of enough resources necessary for implementation of eProcurement are the top critical success factors for eProcurement adoption. Toritich J, K et all (2017) had similar finding when conducted study on influence of staff competence in the implementation of eProcurement in selected county in Kenya, he found out that employee competence had significant positive influence in the implementation of eProcurement.

Finally, findings from the study showed that, top management support had normal effect on agree scale with the eProcurement use when the study examined the influence of top management on eProcurement use, however this implies that, financial support from top management on installation costs of eProcurement system, budget of running eProcurement system, motivation to workers and management commitment still influences the effective use of eProcurement system. This finding is in line with that of Panda and Sahu (2015) who did a cross sectional study on electronic procurement implementation in India, they argued that top leadership support was identified to be a key factor behind success of eProcurement implementation. Similarly Lobong, (2020) did a study on factors influencing eProcurement implementation in public sector in South Sudan, he made similar finding that the adoption of eProcurement is a costly venture that requires enormous amount of capital. Another study by Gunasekarana and Ngai (2017) found out that top management support and commitment is necessary to ensure that there is commitment of resources, overcome resistance to change and cultivate the organizational climate conducive for the adoption of technological innovation. Moreover, Ongola (2017) on his study concluded that, the four major factors affecting the effective implementation of e procurement system involves staff competency, implementation costs, executive involvement and level of management commitment.

Conclusion

The objective of this study was to identify the current factors which still influencing the effective use of eProcurement in the selected higher learning institutions in Dar Es Salaam. The overall findings of this study indicates that, ICT infrastructures such as hardware materials, software applications (the system itself), and network connection are factors which still influencing the effective use of e procurement system in the selected higher learning institutions.

On other hand lack of competent staff on ICT also continues being a factor hindering to greater extent the use of eProcurement system. Moreover, Top management support in terms of financial support in installation and running the system, management commitment in administering the system, and management motivation to workers significantly influences the effective use of eProcurement system in these selected higher learning institutions.

Finally, most of the higher learning public institutions surveyed, were not effectively using eProcurement system as it was noted that they mostly used e-awarding, e-advertising and e-evaluation but e-awarding and e-contract management were used in small extent or not at all.

Study Recommendations

From the findings made, the study recommended that**,** there is a need to improve ICT soft wares (the system itself) and infrastructures. Organizations should provide conducive ICT infrastructures such as hardware materials like mainframes, scanners, printers, computers servers which are needed to support eProcurement usage also improve the system itself (software applications) and provision of reliable internet connection for effective and efficient use of eProcurement system.

Similarly, the government should employ competent and skilled personnel who will oversee and implement the eProcurement system. However, seminars, trainings, workshops and on job trainings should be conducted frequently in order to improve workers' competence towards the use of eProcurement system.

Furthermore, Public sectors should set enough budget to support purchasing of materials required for running eProcurement system since the usage of eProcurement system requires financial resources for its effective operation. Also, top management should monitor, control, administer the use of the eProcurement system and motivate the achievers.

Lastly, government should improve the legal frameworks and setting appropriate procurement policies and strategies to facilitate effective eProcurement usage in public sectors. However, means should be established to deal with staffs who are reluctant of using the system**.**

Areas for Further Study

This study assessed the factors influencing the use of eProcurement system in public sectors, focusing on few selected public higher learning institutions in Dar es Salaam, the researcher suggested that apart from public sector, similar study may be conducted in other public institutions apart from higher learning institutions, also a relevant study may be conducted in private sectors.

Moreover, the study examined the influence of ICT infrastructures on the use of eProcurement system, further studies may be conducted by examining more variable items on ICT infrastructures which were not examined in this study such as ICT legal frame works, like IT laws on use of the system,

cybercrime acts, and confidentiality issues. Yet more studies can be conducted to identify the factors influencing employees' reluctance towards the use of eProcurement system at their work places.

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