Article DOI: https://doi.org/10.37284/eajbe.6.1.1376

East African Journal of Business and Economics
eajbe.eanso.org
Volume 6, Issue 1, 2023
Print ISSN: 2707-4250 | Online ISSN: 2707-4269
Title DOI: https://doi.org/10.37284/2707-4269

EAST AFRICAN NATURE & SCIENCE ORGANIZATION

Original Article

Electronic Tendering and Organizational Performance of Parastatals in Nakuru County

Wanjiku Ruth Nyokabi[1*], *Oteki Evans Biraori*[1] *& Njogu Grace Wacera*[1]

[1] Muranga University of Technology, P. O. Box 75-10200, Murang'a Kenya
* Correspondence ORCID ID: https://orcid.org/0000-0003-2564-848X; Email: w.rnyokabi@gmail.com
Article DOI: https://doi.org/10.37284/eajbe.6.1.1376

Date Published: *15 August 2023*

Keywords: *Automatic Supplier Evaluation and Selection, Online Supplier Registration, Supplier Management, Organisation Performance*

ABSTRACT

E-tendering plays a key role in ensuring that the best suppliers are selected for a continuous supply of better-quality products and services. The study focused on the role of e-tendering through online registration of suppliers, virtual screening, automatic evaluation and automated supplier selection criteria- through the use of an electronic Decision Support System (e-DSS). The study adopted the null hypothesis that e- tendering had no statistically significant influence on parastatals in Nakuru County. The study population included five (5) selected state-owned organisations in Nakuru municipality with a total population of 236 employees in selected departments where a sample size of 91 employees was drawn by application of Daniel's (1999) sample size formula. Structured questionnaires were used as the main instrument to collect data, out of which 80 respondents gave their responses, an 87.9% response rate. The regression analysis showed a 4.6% change in organisational performance was described by e-tendering. The study confirmed there was a statistical significance (p=.000) between e-tendering and organisation performance, where e-tendering, as a supplier management tool, was able to account for a positive marginal significant increase (B=.133) in organisational performance. There was a moderate positive correlation between organisational performance and e-tendering at .519. The study recommends that parastatals enhance system integration for compatibility and easy access and flow of information, leverage technology, and facilitate training and educating their suppliers on how to use the organisation's systems and other ICT-related functions.

APA CITATION

Nyokabi, W. R., Biraori, O. E. & Wacera, N. G. (2023). Electronic Tendering and Organizational Performance of Parastatals in Nakuru County. *East African Journal of Business and Economics*, *6*(1), 290-299. https://doi.org/10.37284/eajbe.6.1.1376

CHICAGO CITATION

Nyokabi, Wanjiku Ruth, Oteki Evans Biraori and Njogu Grace Wacera. 2023. "Electronic Tendering and Organizational Performance of Parastatals in Nakuru County". *East African Journal of Business and Economics* 6 (1), 290-299. https://doi.org/10.37284/eajbe.6.1.1376.

HARVARD CITATION

Nyokabi, W. R., Biraori, O. E. & Wacera, N. G. (2023) "Electronic Tendering and Organizational Performance of Parastatals in Nakuru County", *East African Journal of Business and Economics*, 6(1), pp. 290-299. doi: 10.37284/eajbe.6.1.1376.

Article DOI: https://doi.org/10.37284/eajbe.6.1.1376

IEEE CITATION

W. R. Nyokabi, O. E. Nyokabi & N. G. Wacera "Electronic Tendering and Organizational Performance of Parastatals in Nakuru County", *EAJBE*, vol. 6, no. 1, pp. 290-299, Aug. 2023.

MLA CITATION

Nyokabi, Wanjiku Ruth, Oteki Evans Biraori & Njogu Grace Wacera. "Electronic Tendering and Organizational Performance of Parastatals in Nakuru County". *East African Journal of Business and Economics*, Vol. 6, no. 1, Aug. 2023, pp. 290-299, doi:10.37284/eajbe.6.1.1376.

INTRODUCTION

The revolution of technology has initiated procurement to adapt to new and current technological advancements. Tendering is one of the areas of procurement that became automated to facilitate better procurement performance by not only reducing paperwork but also reducing costs, which is the ultimate aim of any procurement function (Baily et al., 2015). E-tendering is the sending of requests for information and prices to suppliers and receiving the responses using the Internet (Raffa &Esposito, 2006). E-tendering systems improve proficiency of the process by adopting automation (Abdullahi, Ibrahim, Ibrahim & Balla, 2019). This tool is concerned with the publishing of the tender documents towards awarding the tender to the selected supplier (Gardenal, 2013).

E-tendering is justified on the basis that it assists in identifying opportunities and combines efforts in recognising an aggregation of different users in and around the organisation, reduces the overall cost of the transaction by reducing paperwork, reduces off-contract expenditures by using technology to create awareness of available contracts (Plant & Valle, 2008; Gathima & Njoroge, 2018). The introduction of e-tendering tapped into competitive pricing and encouraged fair marketing methods. It presented the best way of incorporating agricultural markets through a digital and virtual platform. It also enabled automatic commodity auction of agricultural products, provided transparency, reduced transaction time, and also improved market income (Pavithra, Gracy, Raka, & Ganesh, 2018). The investment in e-tendering has facilitated productivity and profitability within its construction industry, where most ICT capabilities have been implemented. However, different governments have yet to provide a conclusive IT policy to overcome poor implementation of such ICT capabilities (Olukayode &Adeyemi, 2011).

In Kenya, all state organisations' tendering process is regulated by the Public Procurement Assets and Disposal Act (PPADA). Due to the implications of corruption, scandals and poor performance, the government introduced IFMIS in 2014 to assist in the regulation of fraudulent activities. From a study on the county government of Nairobi, it was seen that they employed the use of electronic bidding, online tender specification and documentation, electronic replies to tender responses and electronic tender notices. It was seen the use of e-tendering basics improved the performance of the organisation (Gathima & Njoroge, 2018).

Organisational performance is the measuring of the actual results of a firm against the anticipated objectives of the organisation; it is also a comparison between the output and the organisation's projected output (Richard. Devinney, Yip & Johnson, 2009, Almatrooshi, Singh & Farouk, 2016). It consists of three areas, (i)financial accomplishment -profits and returns on investment and product (ii)market operation - market share and sales and (iii) shareholder return (Richard et al., 2009). Determining organisational performance is a crucial aspect in determining the development of the organisation (Felizardo, Elisabete & Thomaz, 2017).

The performance embodies the aptitude of the organisation to meet its responsibilities through proper management, good governance, and consistent dedication to meeting the results put forward (Kilonzo, 2014). It is measured based on the firm's ability to increase productivity, reduce inventory and strengthen its market share (Kipkemoi, 2017). The goal of organisational

Article DOI: https://doi.org/10.37284/eajbe.6.1.1376

performance is to increase efficiency and effectiveness in order to promote a continuous supply of products and services throughout the organisation. It is also geared towards continuous improvement by focusing on setting objectives and objectives that can be met by employees in a continuous process (Gathima & Njoroge, 2018).

Statement of the Problem

Despite the fact that e-tendering streamlines the procurement process and boosts efficiency with access to a higher-quality vendor pool, most public organisations have not fully embraced it. Therefore, such benefits gained vary from organisation to organisation. For e-tendering to function as an e-supplier management tool, certain components of automatic supplier screening, virtual supplier registration, automatic evaluation and selection must be integrated (Abdullahi et al., 2019). These cater for supplier base optimisation, mitigation of supplier risk, and reduction of total cost of ownership while promoting effective buyer-supplier relationships for better quality and services (Baily et al. 2015). Inadequate utilisation of e-tendering leads to corruption and an overall increase in tendering costs. Studies have mainly focused on e-tendering from an e-procurement capability point of view. They showed the level of responses, effects, factors, and challenges that e-tendering may face during its incorporation (Gathima & Njoroge, 2018; Gichuhi &Waruguru, 2020; Harelimana, 2018; Chegugu, 2018). The aim of this study therefore was to investigate e-tendering as a tool for managing suppliers and its contribution towards organisation performance.

Research Objective

To investigate the integration of e-tendering and its influence on the organisational performance of parastatals in Nakuru County

Research Hypothesis

E- tendering has no significant influence on the organisational performance of parastatals in Nakuru County.

LITERATURE REVIEW

This research was anchored on the Innovation Diffusion theory. The pioneer of this theory was E. M Rogers (1983), who defined diffusion as the course of which improvement is broadcasted via certain media throughout some time amid users of a specific process. It is a process where information is altered within its structure and function. This theory is purported that innovation is made to increase economic performance (Rotich & Okello, 2015).

Innovation effectiveness affects every individual and differs preferably in the following steps: Knowledge- an overview of the innovation and how it operates; persuasion- perspective idea about the innovation-; decision- actions that are either geared towards acceptance or rejection and implementation- innovation is put into practical application (Orr, 2003). Rogers dictated that for this theory to work efficiently, four specific elements are needed, the innovation idea, the communication medium to provide a means of sharing information, the time involved in making the decision and also a social system (Rotich & Okello, 2015).

The theory suggests that for any type of innovation to be fully integrated into a firm, there need to be structures such as compatibility of the innovation with the firm current systems, the ability of the innovation to be tried and for the shareholders to observe (Rotich & Okello, 2015). Similarly, in E-tendering, similar considerations must be taken into consideration. With the rate of technological changes in the economy, firms need to make sure that both themselves and the suppliers have compatible systems and to understand where the suppliers lie in the adoption of innovation category, that is, they are the innovators or the laggards.

Even though the theory provides relevant and invaluable information, it does come with few limitations, in that the theory fails to offer a participatory approach and centres more on behaviours (Rotich & Okello, 2015), it functions well with the implementation of behaviours rather

Article DOI: https://doi.org/10.37284/eajbe.6.1.1376

than their prevention, it also does not consider individual resources or social groups (La Morte, 2019). A study in construction readiness suggested that the use of e-tendering saves both time and cost while increasing productivity and consequently enhancing competitive advantage (Alyahya, Skitmore, Bridge, Nepal & Cattel, 2018). They urge that e-tendering simplifies the tendering process, which consequently assists in cost reduction while reducing the overall time cycle.

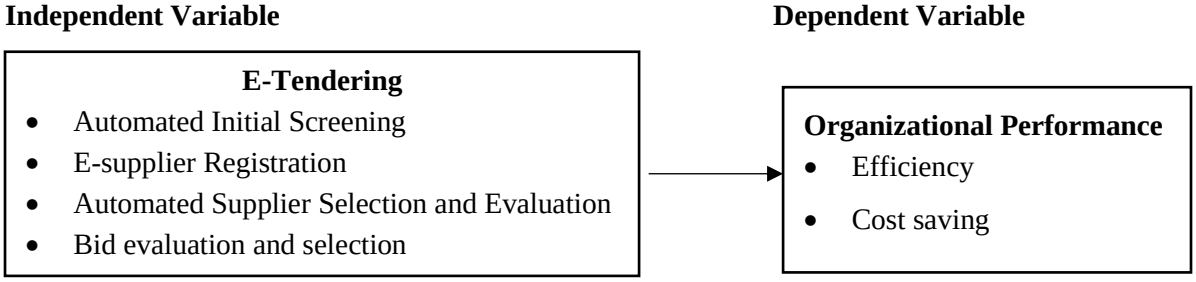
A study done on the development of e-tendering in the Nigerian Public sector showed that e-tendering to select consultants or suppliers is done by group decision-making who come up with a set of criteria to evaluate the series of firms bidding for the contract. With each individual giving their preference, the aspect of fraud and corruption is compromised and fighting corruption through transparency is not able to be achieved (Abdullahi et al., (2019).

E-tendering promotes automated screening of the product or service, price or lead time and contributes towards Ricardian Rents- rents that are acquired through control of scarce resources, Knudsen, (2003). Despite the advantages presented by the adoption of e-tendering, some of the challenges include security concerns, compliance with the country's law and also it fails to support tenders which end in the manual evaluation of the tender (Abdullahi et al., (2019).

Gichuhi and Waruguru (2020) researched e-tendering effects on the procurement performance of the Geothermal Development Company in Nakuru. The study revealed that the company did use e-tendering to provide competitive bidding, reduce paperwork and consequently enhance transparency. The study also showed that there was no statistically significant relationship between e-tendering and procurement performance. However, there existed a positive correlation between e-tendering and procurement performance of the Geothermal Development Company.

Conceptual Framework

Figure 1: Conceptual Framework



METHODOLOGY

The study applied descriptive research. The research was carried out in Nakuru County, which is located in Rift Valley. Five (5) parastatals were selected since they were the only corporations that conducted supply chain management functions, to about five hundred thousand shillings (Ksh500,000). These parastatals included; the Postal Corporation of Kenya (PCK), Kenya Power and Lighting Company (KPLC), National Social Security Fund (NSSF), National Health Insurance Fund (NHIF) and the County Government of Nakuru (CGN).

The study population included five (5) selected state-owned organisations in Nakuru municipality with a total population of 236 employees in selected departments, where the sample size was drawn from by application of Daniel's (1999) equation.

$$n = \frac{N*X}{X+N-1}$$

where: n= the desired sample size; X= $Z_{a/2}{}^2$ *p*(1-p) /MOE^2; $Z_{a/2}{}^2$ Critical value of the

Article DOI: https://doi.org/10.37284/eajbe.6.1.1376

normal distribution at 80% confidence level (1.28); MOE=margin of error (5.3%); p = the proportion in the target population estimated (50%)' N= population size (236)

$$n = \frac{236*146}{146+236-1}$$

When the above formula was applied, a sample of 91 respondents was acquired.

Table 1 shows the sample size distribution of the 91 respondents per parastatal in the departments that were selected.

Table 1: Sample Size

Item	Finance and Accounting	Procurement	ICT	Logistics	Total
KPLC	7	8	5	4	24
NSSF	3	3	4	3	13
PCK	3	3	2	4	12
CGN	10	8	5	3	26
NHIF	5	3	4	4	16
Frequency	28	25	20	18	91
%	30.77	27.47%	21.98%	19.78	100

The study used a semi-structured questionnaire as the main method of gathering information to provide more concrete information on e-tendering and organisational performance from their perspective. A single linear regression analysis was used to determine the degree and tendency of the relationship between e-tendering and organisational performance. The regression equation used to link e-tendering and organisational performance was as follows:

$$Y=\beta_0 + \beta_1 X_1 + e$$

where Y = Organisational performance, X_1= E-Tendering, β_1 = constant and e = error term

RESULTS AND DISCUSSION

Response Rate

The researcher disseminated 91 questionnaires in a drop-pick system, where 80 questionnaires were returned. This represented a response rate of 87.9% as shown in *Table 2*, which is considered an exemplary representation of the population as it conforms to Kothari & Garg's (2014) stipulation that a response rate of 70% and above is excellent. This showed that the response rate was sufficient enough in providing relevant findings that were important in gauging how e-tendering influences organisational performance in the selected parastatals.

Table 2: Response Rate

Item	Finance and Accounting	Procurement	ICT	Logistics	Total
KPLC	6	7	4	3	20
NSSF	3	3	4	2	12
PCK	3	3	2	4	12
CGN	8	5	4	3	20
NHIF	5	3	4	4	16
Frequency	25	21	18	16	80
%	27.5	23.1	19.8	17.6	87.9

E-tendering

The mean values showed the level of agreement towards each statement, with higher mean values indicating more agreement. The standard deviation values indicate the degree of variability in the responses. Findings in *Table 3* indicate that Statement 1 ("Suppliers can register online as company suppliers") received the highest level of agreement, with a mean score of 4.04 and a relatively high standard deviation of 1.06. Statement 3 ("The system automatically evaluates suppliers for selection") and Statement 4 ("Supplier selection criteria is automated") received the lowest mean scores for both, with a mean of 2.69. The standard deviation values for

Article DOI: https://doi.org/10.37284/eajbe.6.1.1376

these statements were also relatively high, indicating variability in the responses. The aggregate mean score of 3.30 suggests a moderate level of agreement or approval towards the statements as a whole.

Table 3: E-Tendering

Statements	Mean	Std. Dev
Suppliers can register online as company suppliers	4.04	1.06
Supplier eligibility and screening are done online	3.78	.86
The system automatically evaluates suppliers for selection	2.69	1.01
Supplier selection criteria are automated	2.69	.95
Aggregate	3.30	.97

Table 4 showed that Statement 1 ("Competitive number of suppliers participated in the e-tendering process") had a moderate level of agreement with a relatively low standard deviation indicating that the responses were sparsely spread (M=3.86, SD=.67). Statement 2 ("Products offered were of high quality") had a neutral response with a high standard deviation which shows that the responses were closely related (M=3.64, SD=.96). Statement 3("E-tendering has freed up time for departments to focus on long-term strategy") also had an average response (M=3.58, SD=.87). Statement 4 ("There is room for price negotiations with suppliers") had an averagely high level of agreement (M=3.80, SD=.82). However, Statement 5 ("The company can get discounts from suppliers") had a relatively low level of disagreement with a high standard deviation indicating the responses were closely related (M=3.20, SD=1.04). Statement 5 ("E-tendering has significantly reduced the cost of paperwork") had the highest level of agreement (M=4.10, SD=.96). This implied that the parastatals had been able to save on cost and improved their efficiency by integrating e-tendering components of supplier management in their procurement process. The respondents highlighted that they chose the lowest bidder, removed uncompetitive suppliers and used centralised procurement and outsourcing their suppliers to reduce overall costs. They also mentioned the following challenges they faced during the integration of the upscaled innovation; failure of suppliers to comply and cooperate and the high cost of maintenance and management of software. They also mentioned that suppliers could only view the organisation page and could not interact with it. Poor internet connectivity and the high cost of supplier training also played a role in limiting the intensive e-tendering integration.

Table 4: Organisational performance and e-tendering

Statement	Mean	Std. Dev
A competitive number of suppliers participate in the tendering process	3.86	.67
Products offered were of high quality	3.64	.96
E-tendering has freed up time for departments to focus on long-term strategy	3.58	.87
There is room for price negotiations with suppliers	3.80	.82
The company can get discounts from suppliers	3.20	1.04
E-tendering has significantly reduced the cost of paperwork	4.10	.96
Average	3.70	.89

Table 5 reports the results of a regression analysis where organisational performance is predicted by the e-tendering variable. Based on the information provided in the table, the model has the following characteristics: R Square: This value represents the proportion of variation in the organisational performance that can be explained by the e-tendering as the independent variable. The R^2 value is 0.046, indicating that only 4.6% of the variation in organisational performance can be explained by e-tendering. This value represents the proportion of variation in organisational performance that can be explained by the e-tendering, adjusted for the number of independent variables in the model. In this case, the adjusted R^2 value is 0.033, indicating that only 3.3% of the

Article DOI: https://doi.org/10.37284/eajbe.6.1.1376

variation in the organisational performance can be explained by the e-tendering when adjusted for the number of independent variables. The standard error of the estimate represents the standard deviation of the error term in the regression model. In this finding, the Std. Error of the Estimate is 0.42243, indicating that the average distance between the observed values and the predicted values is approximately 0.42 units. Only 3.3% of Organisational performance could be accounted for by e-tendering; the other 96.7% was attributed to factors not mentioned in this study. A 4.6% change in organisational performance was described by e-tendering. This showed that e-tendering had a significantly low influence on organisational performance. The results of this analysis suggest that the independent variable (e-tendering) is weakly related to the dependent variable (organisational performance) and explain only a small proportion of its variation.

Table 5: Model summary for e-tendering and organisational performance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.214[a]	.046	.033	.42243

Table 6 presents the results of a multiple regression analysis that aimed at examining the relationship between organisational performance and one e-tendering. The table provides the following information: Unstandardised Coefficients show the beta weights (B) that correspond to each independent variable. In this case, there is only one independent variable (e-tendering), and its unstandardised coefficient is 0.133. The standardised coefficient shows the beta weights (Beta) for each independent variable standardised to a z-score. The standardised coefficient for E- tendering is 0.214. The t-value for the independent variable is used to test whether the regression coefficient is significantly different from zero. The t-value for e- tendering is 1.931. The p-value associated with E- tendering is 0.057, which is marginally significant at the alpha level of 0.05. The model for these results is Y=3.186+.133. The constant (3.186) represents the predicted value of the dependent variable when e-tendering is zero. The unstandardised coefficient for the independent variable (0.133) suggests that a one-unit increase in e-tendering is associated with a 0.133-unit increase in organisational performance. The standardised coefficient (0.214) indicates that for each one-unit increase in e-tendering, organisational performance increases by 0.214 standard deviations. The t-value of 1.931 suggests that the effect of e-tendering on the organisational performance is not statistically significant at the alpha level of 0.05, but the marginally significant p-value (0.057) suggests that the relationship between the two variables may still be important and that the effect may be statistically significant at a higher alpha level or with a larger sample size. This is consistent with Gichuhi and Waruguru (2020), whose findings showed that e-tendering did not have a statistical influence on procurement performance.

Table 6: Regression coefficients table

Model		Unstandardised Coefficients		Standardised Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.186	.232		13.717	.000
	ET	.133	.069	.214	1.931	.057

Table 7 presents the results of an analysis of the variance table with the following information; Based on the information provided in *Table 7*, the F-value between groups is 4.186, with 9 degrees of freedom for the numerator and 70 degrees of freedom for the denominator. The p-value associated with this F-test is 0.000, which is less than 0.05, indicating that there is a statistically significant difference between the group means. This implied that the significance value was low enough to reject the null hypothesis. The mean square between groups is 0.567, and the mean

Article DOI: https://doi.org/10.37284/eajbe.6.1.1376

square within groups is 0.135. These values indicate the amount of variability in the data for each source of variation. The sum of squares between groups is larger than the sum of squares within groups, suggesting that most of the variability in the data can be attributed to differences between groups rather than within groups. These results suggest that there are significant differences between the groups on the variable of interest and that further analyses, such as posthoc tests, may be necessary to determine which groups differ from each other. This coincides with Oteki (2018) that e-tendering had a significant impact on the performance of procurement by saving time and using little labour power. This is consistent with the information given that e-tendering was able to increase efficiency in selecting the best supplier and that the cost of managing their suppliers was reduced since a pool already existed through virtual registration.

Table 7: ANOVA test for the hypothesis

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5.103	9	.567	4.186	.000
Within Groups	9.481	70	.135		
Total	14.585	79			

Table 8 indicates the correlation coefficients between organisational performance (OP) and e-tendering (ET), as well as the significance values (two-tailed) and the sample sizes (N) for each variable. The correlation coefficient between OP and ET was 0.519, which indicates a moderate positive correlation between the two variables. This suggests that there is a tendency for higher levels of e-tendering to be associated with higher levels of organisational performance. The significance value associated with the correlation coefficient between organisational performance and e-tendering is less than 0.05 ($p < 0.001$), indicating that the correlation is statistically significant. This suggests that the observed correlation between organisational performance and e-tendering is unlikely to be due to chance and provides evidence for a real relationship between the two variables. The sample size for both variables is 80, indicating that the analysis is based on a relatively large sample size, which increases the reliability of the results. The correlation coefficient between e-tendering and itself is 1.000, which is a perfect positive correlation. The significance value is not applicable as it represents the correlation between the variable and itself. These results suggest that e-tendering is positively correlated with organisational performance, and the relationship is statistically significant. However, correlation does not imply causation and further research may be necessary to establish a causal relationship between the two variables. The findings were certified by Gichuhi and Waruguru (2020), whose study showed that there was a positive and significant relationship between e-tendering and performance. This was confirmed by the organisations affirming that there was an enhancement in the quality of products and services provided, the cost of supplier paperwork was reduced, and the organisations were able to get discounts from suppliers while allowing room for price negotiations. This ultimately led to saving on overall costs, and organisation effectiveness was improved.

Table 8: Correlation Coefficient for E-tendering and Organisational Performance

		OP	ET
OP	Correlation Coefficient	1.000	.519
	Sig. (2-tailed)	.	.000
	N	80	80
ET	Correlation Coefficient	.519	1.000
	Sig. (2-tailed)	.000	.
	N	80	80

Article DOI: https://doi.org/10.37284/eajbe.6.1.1376

CONCLUSION

The study determined that the county parastatals had adopted the use of e-tendering, which improved efficiency, accuracy and increased accountability and transparency of the practitioners in the company. This led to suppliers' increased trust and thus improved competitive buying, which promoted the quality of inventory and services provided. They were able to reduce overall costs by removing uncompetitive suppliers, selecting the lowest bidder, and outsourcing their suppliers. However, the aspect of automatic evaluation and selection, which depended on the organisations' e-procurement capability, had yet been realised as they still used IFMIS, which did not have that proficiency of automated selection. Even though there was a positive relationship, some aspects of e-tendering that were measured were lacking. It was seen that the parastatals could not automatically select and evaluate suppliers since they did not have the capability for the electronic decision support system (e-DSS) necessary for criteria selection and evaluation. This showed that e-tendering was still an area where not much integration had been conducted, and most of the parastatals still conducted manual tendering.

Recommendation

This research advocates investment in improving the e-tendering component to support supplier selection capabilities. This means that they should leverage technology that allows the concept of supplier management to be incorporated into an e-tendering aspect of e-procurement. This study also recommends that the parastatals collaborate with the suppliers to enhance compatibility. This study also recommends that the policymakers provide adequate policies and procedures for automatic evaluation and selection in the PPADA.

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