The Critical Success Factors Affecting Tanzania National E-Procurement System Adoption on Performance of Public Procurement in Tanzania: A Case of Rural Water Supply and Sanitation Agency (RUWASA)

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Abstract: *This study aimed to examine the critical success factors influencing the adoption of TANePS on the performance of public procurement at RUWASA. The research was conducted at RUWASA in the Morogoro region, employing a case study research design. The target population consisted of 55 employees from RUWASA in the Morogoro region, with a sample of 50 respondents selected purposively. Data were collected through questionnaires. The study concluded that technological, organizational, and environmental characteristics significantly contributed to the adoption of the Tanzania National Electronic Procurement System (TANePS) at RUWASA. The study recommends that RUWASA and other public entities adopt this new system endorsed by PPRA to enhance organizational performance, particularly by reducing cycle time in the tender process. The cost-benefit analysis revealed that public institutions like RUWASA would experience more value addition than cost increase through the implementation of the Tanzania National Electronic Procurement System.*

Keywords: Adoption, Critical Success Factors, TANePS, Performance, Public Procurement

1. Introduction

In most developed countries, public procurement has become increasingly intertwined with other infrastructure to drive enterprise growth, facilitated by the use of technology in e-procurement as an innovative strategic action for organizational performance (Jeptoo & Karanja, 2017). E-procurement enables buyers to utilize the internet for purchasing goods and services, with online tendering allowing supplier participation. However, challenges arise from suppliers' lack of IT expertise for online transactions, hindering smooth information technology implementation.

Despite technological advancements, electronic procurement adoption among small to medium-sized businesses remains low (Watuleke, 2017; Njoroge, 2010; Malekia, 2016). Difficulties such as online tendering failures, skill gaps, system complexity, opportunity gaps, and process mistrust contribute to this trend. Despite this, e-commerce's penetration in many African nations remains limited.

In Tanzania, efforts have been made to enhance procurement through the National Information and Communication Technology Broadband Backbone project (NICTBB) since 2009 (Jeptoo & Karanja, 2017). The Tanzanian government introduced TANePS, an online system encompassing e-tendering, e-sourcing, e-payment, and e-ordering, aiming to replace manual procurement (Malekia, 2018). However, challenges like compatibility issues with payment and inventory systems have hindered widespread TANePS adoption.

To address these issues, the Public Procurement Regulatory Authority (PPRA) conducted extensive training to raise awareness of the benefits and impact of adopting the system (United Republic of Tanzania Evaluation Report, 2019). Despite this effort, challenges such as internet connectivity, system complexity, and limited knowledge among local suppliers persist (Malekia, 2018 & Sagile, 2019).

Earlier research has explored various aspects of e-procurement, including project performance, training, team building, and the effects on expenditure (Malekia, 2018 & Sagile, 2019; Amani, 2018). For instance, Amani (2018) examined how e-procurement implementation influenced project performance in Tanzania's private sector, considering factors like staff training and teamwork. Matano et al. (2020) studied the implications of e-procurement on the National Youth Service's procurement. Additionally, Mufleh (2020) delved into the effects of e-procurement enablers on expenditure reduction.

Amidst these research efforts, this study aims to investigate critical success factors influencing TANePS adoption's impact on public procurement performance in Tanzania. The complex interplay of technology, training, and organizational dynamics shapes the landscape of e-procurement in both developed and developing countries, offering opportunities and challenges for enterprises and public entities alike.

2. Research Methodology

This section outlines the research methodology that guided the study. The study employed a case study research design.

The target population of the study consisted of 55 employees from RUWASA in the Morogoro region, while a sample size of 50 respondents was used. The purposive sampling technique was used to draw a sample from the target population. Data were collected through questionnaires.

3. Research Finding and Discussion

Inferential statistics extrapolate population data from the sample and calculate the likelihood of population characteristics based on the sample's features. Inferential statistics can help evaluate the strength of correlation between independent and dependent variables. The researcher conducted both correlation and regression analyses to comprehensively review and identify the study's objectives and research questions. Regression analysis was employed to assess the contribution and significance of independent variables to the dependent variable and to ascertain the model's applicability. Additionally, correlation analysis was utilized to determine the direction and strength of relationships between independent variables and the dependent variable.

3.1 Correlation of the variables

The researcher runs the correlation matrix in order to check whether there was association between variables. The correlation coefficient shows the strength and direction of the relationship between the study's variables. The correlation coefficients range from +1 to -0, with some variations. The regression line has a positive slope when + is positive, and a negative slope when + is negative.

Table 1: Correlations of the variables

		Organizational characteristics	Environmental characteristics	Technological characteristic	TANePS Adoption
Organizational characteristics	Pearson Correlation	1			
	Sig. (2-tailed)				
	N	50			
Environmental characteristics	Pearson Correlation	.751**	1		
	Sig. (2-tailed)	.000			
	N	50	50		
Technological characteristics	Pearson Correlation	.781**	.808**	1	
	Sig. (2-tailed)	.000	.000		
	N	50	50	50	
TANePS Adoption	Pearson Correlation	.815**	.763**	.778**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	50	50	50	50

According to the results of the correlation analysis, a positive correlation exists between organizational characteristics and TANePS adoption. These findings suggest that enhancing organizational characteristics will lead to an increase in TANePS adoption within the organization. The correlation coefficient for this relationship was ($r = 0.815$, p-value = 0.000).

The results also unveil a positive relationship between environmental characteristics and the adoption of TANePS, evidenced by a correlation coefficient of $r = 0.763$ and a p-value of 0.000. This indicates that improvements in environmental characteristics correspond to enhancements in TANePS adoption within the organization.

Furthermore, as depicted in Table 1, the study identified a correlation between the adoption of TANePS and technological characteristics. The findings also demonstrate that enhancements in technological characteristics within the organization will result in an associated increase. These two variables exhibited a correlation of $r = 0.778$ with a p-value of 0.000.

3.2 Regression of the variables

This study conducted a multiple regression analysis in order to determine the effects of various independent variables on the adoption of TANePS. The study was able to estimate scores for multiple variables using the results of numerous other factors through this approach. Essentially, this involves uncovering the correlations between a dependent variable and several independent or predictor factors. Tables 2, 3, and 4 below provide a clear indication of the multiple regression analysis.

Table 2: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.807a	.874	.786	.49844

a. Predictors: (Constant), organizational characteristics, environmental characteristics, technological characteristics
Source: Field Data (2023)

Table 2 presents the results of how much of the variance in the dependent variable (TANePS adoption) is explained by the independent variables. The R-squared value (R^2) indicates that the four independent variables studied (organizational characteristics, environmental characteristics, and technological characteristics) collectively account for 0.807 (87.4%) of the variance in TANePS adoption. This suggests that there are other factors not examined in this study that contribute to 19.3% of the variation in TANePS adoption.

Table 3: ANOVAa

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	45.140	3	11.035	47.065	.000b
	Residual	10.770	47	.240		
	Total	55.910	50			

a. Dependent Variable: TANePS adoption

b. Predictors: (Constant), organizational characteristics, environmental characteristics, technological characteristics
Source: Field Data (2023)

From Table 3 above, the ANOVA results predicted the dependent variable by illustrating how the regression best fits the model. The results showed that the significance probability value of P=0.000 for the regression model was less than the significance level of 0.05 at a 95% confidence level, indicating that the regression model was significant. Therefore, this model was statistically significant in predicting how Organizational characteristics, Environmental characteristics, and Technological characteristics enhance the adoption of TANePS.

Table 4: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.341	.306		-1.016	.315
	Organizational characteristics	.472	.123	.415	4.546	.000
	Environmental characteristics	.354	.142	.320	3.422	.001
	Technological characteristics	.394	.169	.278	2.564	.013
a. Dependent Variable: TANePS adoption						

Source: Field Data (2023)

Table 4 presents the multiple regression model that was used to determine the relationship between the independent variables and the dependent variable with the following equation.

$$Y = 0.341 + 0.472X_1 + 0.354X_2 + 0.394X_3.$$

Based on the established regression equation, with all factors held constant (organizational characteristics, environmental characteristics, and technological characteristics set to zero), the predicted adoption of TANePS would be 0.341.

Furthermore, the regression equation indicates that when all other variables are maintained at a constant level, a unit improvement in organizational characteristics will result in a 0.472 increase in the adoption of TANePS. This effect is statistically significant with a p-value of 0.000.

Similarly, a unit improvement in environmental characteristics corresponds to a 0.354 increase in the adoption of TANePS, which is statistically significant at a p-value of 0.01. Additionally, a unit increase in technological characteristics leads to a 0.394 increase in the adoption of TANePS, and this contribution is statistically significant with a p-value of 0.013.

4. Conclusion and Recommendations

The study found that three variables used in this study have a substantial positive influence on the adoption of TANePS, as indicated by correlation analysis. On the other hand, other factors affecting the adoption of TANePS were not considered in this study. The variables used show statistical significance based on regression analysis; however, organizational features emerge as the primary predictor of TANePS adoption. Descriptive analysis reveals that most respondents agreed with all the characteristics of the factors influencing the adoption of TANePS in public procuring bodies. Based on these findings, the researcher draws the conclusion that the organizational, environmental, and technological elements studied have a favorable impact on the adoption of TANePS.

The study's recommendations include providing induction training for new employees, conducting regular in-house training relevant to their roles, hiring competent staff for effective TANePS implementation, ensuring suppliers' awareness and adoption of the system in their procurement practices. The study emphasizes that the supplier variable is a key predictor of TANePS adoption, urging organizations to prioritize it. Additionally, the study suggests promoting timely and accurate internal and external information sharing to enhance material flow, as well as advancing information technology infrastructures and systems for improved procurement practices and increased adoption.

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