

# Determinants of E-Procurement Adoption Model and their Performances in Tanzania

\*Shatta, D.N.<sup>1</sup>, J.S. Luge<sup>2</sup> and S.K. Mihayo<sup>3</sup>

<sup>1,2</sup>Department of Business and Entrepreneurship Studies, National Institute of Transport

<sup>3</sup>Department of Logistics and Transport Studies, National Institute of Transport

Correspondence: *deusshatta@gmail.com*

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## Abstract

*The objective of this study was to assess the determinants of e-procurement adoption model and their performances in Tanzania. The study adopted a cross-sectional survey research design. A stratified sampling technique and a sample size of 157 respondents were used. A questionnaire and documentary review were used for data collection. The collected data were analyzed by using Partial Least Squares Structural Equation Modeling with the help of SmartPLS 3 software. Findings reveal that the attitude, social influence, legal framework and performance expectancy do perform well in implementing e-procurement system. The study concludes that the attitude, social influence, legal framework and performance expectancy are determinants of e-procurement adoption model. It is recommended that Tanzania needs to pay attention to the attitude of all stakeholders, social influence, performance expectancy, and the use of legal framework during implementation of e-procurement systems.*

**Keywords:** e-Procurement, Adoption, Determinants, Performance

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## Introduction

Worldwide, there has been an incredible shift towards the adoption of e-procurement system (Waithaka & Kimani, 2021b; Ndei & Mutuku, 2021; Ratnawati & Suryawan, 2021; Esimit Kibet, 2021; Willy & Paul, 2021; Yuliawati & Kurniawan, 2021; Masudin *et al.*, 2021). In developing countries, Africa in particular, the concept of e-procurement is just gaining popularity especially in the public sector (Afolabi *et al.*, 2019; Alehegn, 2018; Bainsan, 2018; Jeptoo & Karanja, 2017; Mwangi, 2018; Gambo *et al.*, 2019; Siwandeti *et al.*, 2021a). This is because e-procurement system is one of the most effective ways of attaining sustainable procurement performance, which meets the needs of the present suppliers and buyers without comprising the ability of future generations to meet their own needs (Iles, 2017; Waithaka & Kimani, 2021b; Siwandeti *et al.*, 2021b; Ndei & Mutuku, 2021; Ratnawati & Suryawan, 2021; Esimit Kibet, 2021; Willy & Paul, 2021; Yuliawati & Kurniawan, 2021;

Masudin *et al.*, 2021).

Despite the growing literature on the determinants of the adoption of new technologies including e-procurement (Elias, 2021; Shatta & Shayo, 2021, San *et al.*, 2020; Dwivedi *et al.*, 2017; Taluka, 2016; Shatta *et al.*, 2020b) and their performance including procurement performance (Waithaka & Kimani, 2021b; Ndei & Mutuku, 2021; Ratnawati & Suryawan, 2021; Esimit Kibet, 2021; Willy & Paul, 2021; Yuliawati & Kurniawan, 2021; Masudin *et al.*, 2021), authors have been debating regarding the determinants of new technologies adoption and their performance. For example, the debate on the determinants influencing the adoption of e-procurement system still persists (Adjei-Bamfo *et al.*, 2020; Adjei-Bamfo & Maloreh-Nyamekye, 2019; Alehegn, 2019; Pitso *et al.*, 2018; Tutu *et al.*, 2019; Waithaka & Kimani, 2021a; Watuleke, 2017).

The persistence of the debating about the determinants of e-procurement adoption model was the motive of this study to be conducted

in Tanzania. In addition, notwithstanding the benefits and efficiency of e-procurement in procurement performance, this system is still not widely accepted in Tanzania (URT, 2016; URT, 2018). This is due to the fact that 30.9 per cent of the trained suppliers for piloting the Tanzania National electronic Procurement System (TANePS) in the country were reluctant to register in the system and 1.2 per cent of registered suppliers deregistered from the system (URT, 2018; URT, 2019). Likewise, 63.4 per cent of the selected procuring entities for piloting TANePS were not implementing the system (Shilla, 2019; URT, 2019) and 60 per cent of the trainees (staff from procuring entities) did not understand the performance of the system during massive training (Shilla, 2019). This phenomenon posed a serious problem which has not been addressed by the current empirical studies. Therefore, there was a need to assess the determinants of e-procurement adoption model and their performance in Tanzania by using Technological, Organizational and Environmental (TOE) model and Unified Theory of Acceptance and Use of Technology (UTAUT). Two constructs (social influence and performance expectancy) suggested in UTAUT and can predict new technologies adoption were used in this study. In addition, attitude and legal framework suggested in TOE model and which can predict new technologies adoption were employed. However, UTAUT has been criticized that it does not consider the public organizational' perspective instead it considers individuals' perspectives (Dwivedi *et al.*, 2017; Taluka, 2016). Likewise, TOE has been criticized that it does not consider the individuals' perspective and does not show the concrete model in adopting new technology (Masele, 2014). These criticisms motivated this study to integrate two constructs suggested in UTAUT and other two constructs suggested in TOE model in order to have a new theoretical model that can accommodate both the organizational' perspective and individuals' perspective. Many studies have shown that, there are direct effects of e-procurement adoption on performance. For example, Waithaka and Kimani (2021b), who aimed at establishing the influence of

e-procurement practices on the supply chain performance, reviewed 12 papers to assess the feasibility of the effect of e-procurement on supply chain performance. The findings revealed that, the adoption of e-procurement has a significant effect on the supply chain performance. These findings not only call for an empirical study but also demand for future researchers to consider the determinants of the e-procurement adoption model and their performance.

A study by Ndei and Mutuku (2021) explored the relationship between electronic procurement and performance of organizations. Specifically, the study aimed at establishing the relationship between e-sourcing, e-ordering, e-invoicing, e-payment and performance of an organization. Four theories namely, Disruptive Innovation Theory, Diffusion of Innovation Theory, Technology Acceptance Model Theory and Theory of Planned Behaviour were used in this study (Ndei & Mutuku, 2021). Descriptive research design and census survey method were adopted. A sample of 135 participants was used and both open ended and close ended questionnaires were used to collect primary data. The quantitative data were analysed using both descriptive and inferential statistics with the help of IBM statistics Version 24 while qualitative data were analysed using content analysis. The study findings revealed significant correlations between e-procurement (e-sourcing, e-ordering, e-invoicing, e-payment) and performance of the organization. These findings suggest that, further studies should be conducted on the determinants of e-procurement systems on other performance context using other theories such as UTAUT and TOE model.

A study by Ratnawati and Suryawan (2021) assessed the implementation of e-procurement as a reflection of good Governance. The study used descriptive and qualitative approaches. Observations, interviews, and documentation were used to collect data, which were analysed qualitatively using content analysis. The findings revealed a strong relationship between application of e-procurement system in goods procurement and good Governance. These findings confirm not only the influence of

e-procurement on good governance but they also demand for other researchers to consider the determinants of e-procurement and their performances by using UTAUT and TOE model. However, UTAUT and TOE model do not show the indirect interactions of their elements for adopting new technology. Therefore, the existing theories and theoretical models are clarifying inadequately the integrated theoretical model for the combined perspectives hence inspired this study to be conducted to fill the gap. This study has developed an integrative model that comprehensively explains the determinants from UTAUT and TOE which, in turn, had been recommended as important determinants of Tanzania National electronic Procurement System (TANePS) implementation, expansion, and reform of which the existing literature is explaining unclearly. In addition, most of the current existing empirical literatures regarding e-procurement adoption focus on suppliers' perspective or on buyers' perspective and studies which combine both suppliers' and buyers' perspectives concurrently are inadequately posing a need for researching (Ibem et al., 2016; Watuleke, 2017). In addition, studies which assess the determinants of e-procurement adoption model and their performance are missing in the current empirical literature. For the purpose of filling the identified gap, this study has included both perspectives of buyers and suppliers on determinants of TANePS adoption model and their performance, a substance that the existing empirical literature is explaining insufficiently.

This study employed two constructs (performance expectancy and social influence) for new technology adoption from UTAUT and two constructs (legal framework and attitude) for new technology adoption from the TOE model. The study also involved four endogenous constructs and one exogenous construct. Endogenous constructs included performance expectancy, social influence, attitude, and TANePS adoption. The exogenous construct was legal framework because it has regarded as a dominant construct which influences other constructs towards e-procurement adoption in the public sector. The TOE model and

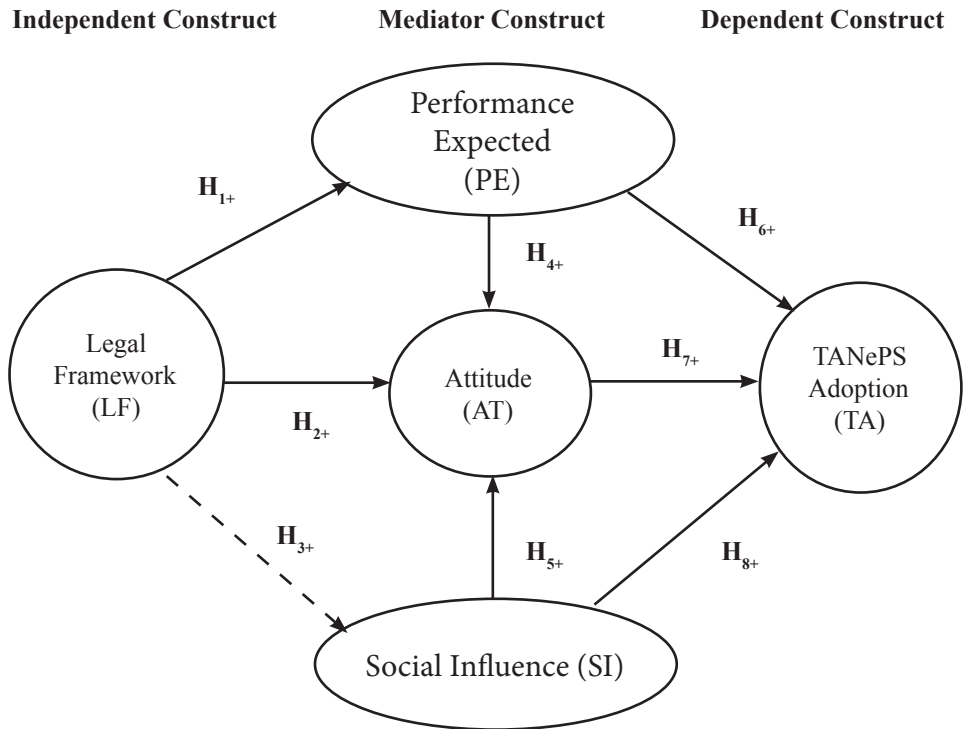
the previous studies hypothesized that legal framework and attitude have ability to predict the outcome of new technologies adoption (Masele, 2014; Shatta *et al.*, 2020a). Likewise, UTAUT and the prior studies predicted that performance expectancy and social influence can affect the new technologies adoption (Taluka, 2016; Shatta & Shayo, 2021). Basing on the debate of the current literature (Dwivedi *et al.*, 2017; Shatta *et al.*, 2020a; Zhang *et al.*, 2020) with regard to the determinants of new technologies adoption, a number of hypotheses were formulated. In order to validate the proposed hypotheses of the prior studies and the concepts suggested in UTAUT and TOE model, the following hypotheses were tested:

- H1: Legal framework positively and indirectly influences TANePS adoption through performance expectancy
- H2: Legal framework positively and indirectly influences TANePS adoption through attitude
- H3: Legal framework positively and indirectly influences TANePS adoption through social influence
- H4: Performance expectancy positively and indirectly influences TANePS adoption through attitude
- H5: Social influence positively and indirectly influences TANePS adoption through attitude
- H6: Performance expectancy positively and directly influences TANePS adoption
- H7: Attitude positively and directly influences TANePS adoption
- H8: Social influence positively and directly influences TANePS adoption

The concepts were conceptualized and tested as portrayed in the conceptual model presented in Fig. 1.

### **Materials and Methods**

This study adopted a cross-sectional survey research design. Stratified sampling technique was used to sample 157 respondents of whom 100 were trained procurement experts from the selected procuring entities for piloting TANePS adoption and 57 were trained suppliers. In addition, this study was able to achieve higher



**Figure 1: Conceptual Model of the Study**

**Key:**

- Existing Literature
- - - → Theoretical Gap

**Source:** Conceptualized from Literature, 2021

statistical powers with unexpected sample size because the actual sample size collected was more than the minimum number of sample size required for this study under the rule of thumb suggested by Hair *et al.* (2018) which requires that the number of indicators of the exogenous latent construct (with maximum indicators) times ten equals to be the minimum number of the sample size for the research model to be tested through its hypotheses. A questionnaire with closed ended questions and documentary review were used for data collection.

Questionnaire with closed ended questions were assigned numbers to enable the process of quantitative data analysis be more accurate and simpler. All missing values were assigned 99 as special number before executing the PLS algorithm and bootstrapping. In data analysis for this study, the PLS-SEM evaluation procedures were used for reflective models

suggested by Sarterdt *et al.* (2017). Basing on PLS-SEM evaluation procedures for reflective model suggested by Sarterdt *et al.* (2021), the analysis was performed by assessing reflective measurement models and structural models. This study adopted PLS-SEM evaluation procedures for reflective models due to the nature of the constructs and their indicators in the theoretical model (Hair *et al.*, 2019). All indicators depend on their constructs hence, reflective model was appropriate for this study. The collected data were analyzed using descriptive statistics with the help of IBM SPSS statistics Version 21 and Partial Least Squares Structural Equation Modeling with the help of SmartPLS 3 software.

**Results**

***Path Coefficients and Performance of the Constructs (Determinants)***

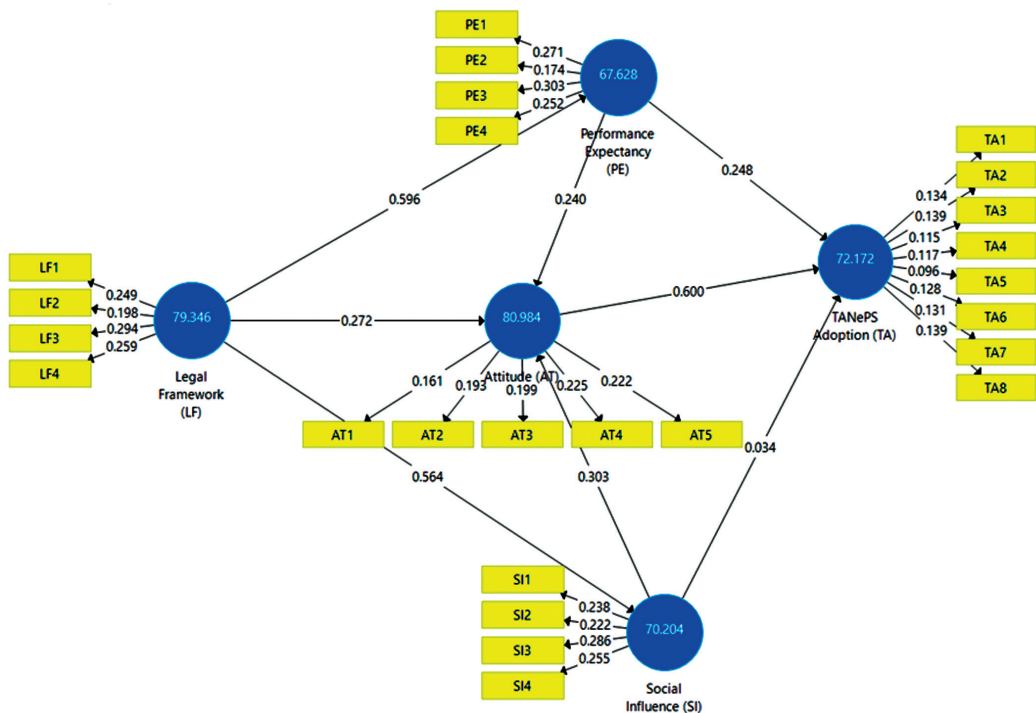
After running the Importance Performance

Matrix Analysis (IPMA) in SmartPLS 3, the results were as follows: firstly, all path coefficients of hypothesized relationships exceeded 0.2 value except one which was 0.034, which implied that the research model of this study is good for decision making regarding the proposed determinants influencing e-procurement adoption. Secondly, all the constructs showed high performance which exceeded 50 percent. These results implied that all constructs need to be taken into consideration during e-procurement implementation because of their performances shown in the research model. The results of path coefficients and the performance of the exogenous construct, endogenous constructs are shown in Figure 2.

that they are highly needed in the research model of this study because they had shown significant effects on TANePS adoption. This is due to the fact that the first and the second quadrants of the matrix in Figure 3 show higher performances of all constructs (determinants) in research model of this study.

**Discussion**

The hypothesized relationships which were found statistically significant (H1, H2, H4, H5, H6 and H7) are consistent with the findings of the previous studies by Dwivedi *et al.* (2017); Shatta *et al.* (2020a). However, some hypothesized relationships which were found statistically significant in this study (H6 and

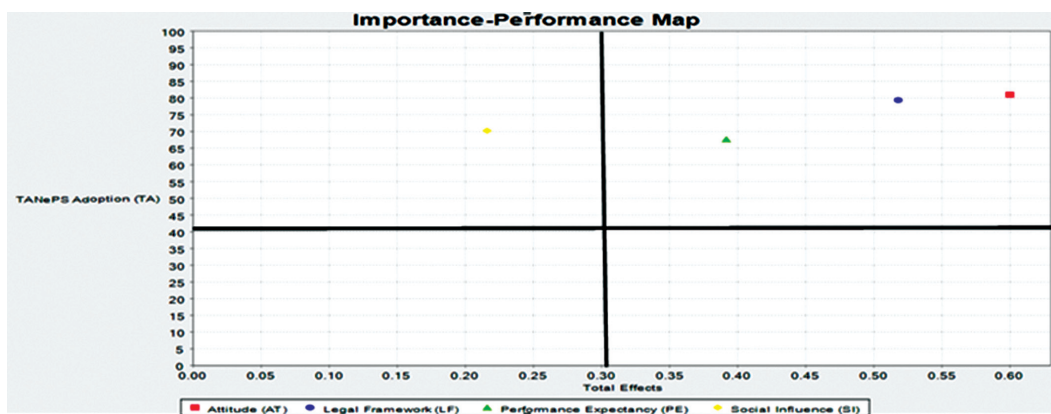


**Figure 2: Path coefficients and Performances of Constructs**

**Assessment of Determinants of E-procurement Adoption Model and Their Performances**

Basing on the positions of the constructs after opening the report for importance-performance matrix analysis (IPMA) in SmartPLS 3, all constructs (legal framework, performance expectancy, social influence and attitude) had higher performances which meant

H7) are not consistent with the results of the previous studies by Masele (2014) and Taluka (2016). On the other hand, basing on the results of the hypotheses tested and the importance-performance analysis of the constructs, the new model of this study can be used in studies which combine two perspectives (organizational and individual perspectives). Furthermore,



**Figure 3: Importance-Performance Map (TA) (Constructs Unstandardized Effects)**

the integrated model with determinants influencing positively, directly and indirectly the adoption of new technology (TANePS) for buyer's and supplier's perspectives has been well comprehended in this study of which the existing theoretical literature was explaining the indirect relationships inadequately. The indirect relationships between performance expectancy and social influence from UTAUT and legal framework and attitude from TOE model have been sufficiently comprehended in this study, a substance that the existing empirical and theoretical literature was missing. Above all, the hypothesized relationship (H3) which was found statistically significant is the new theoretical contribution which is not found in the current empirical literature (Dwivedi *et al.*, 2017; Shatta *et al.*, 2020a). Performance assessment of the determinants of e-procurement is the new empirical contribution because the previous studies are missing such kind of analysis. However, the hypothesized relationship (H8) which was found statistically insignificant is not consistent with the previous literature of Dwivedi *et al.* (2017).

### Conclusion

All constructs of this research model (legal framework, performance expectancy, social influence and attitude) are determinants of TANePS adoption model and have higher performances.

### Recommendations

The importance-performance map analysis

(IPMA) results revealed that legal framework, performance expectancy, social influence and attitude have higher performance. These determinants are supposed to be taken into consideration during implementation and expansion of e-procurement systems.

### Limitations of the Study and Areas for Future Research

This study was limited to four constructs which explained only 61.3% of the variance in users' intention to use TANePS which implies that more constructs are required to be included to boost the power of variance. It is therefore recommended that further research may increase the number of constructs suggested in UTAUT and in TOE model to improve the variance in users' intention to use TANePS.

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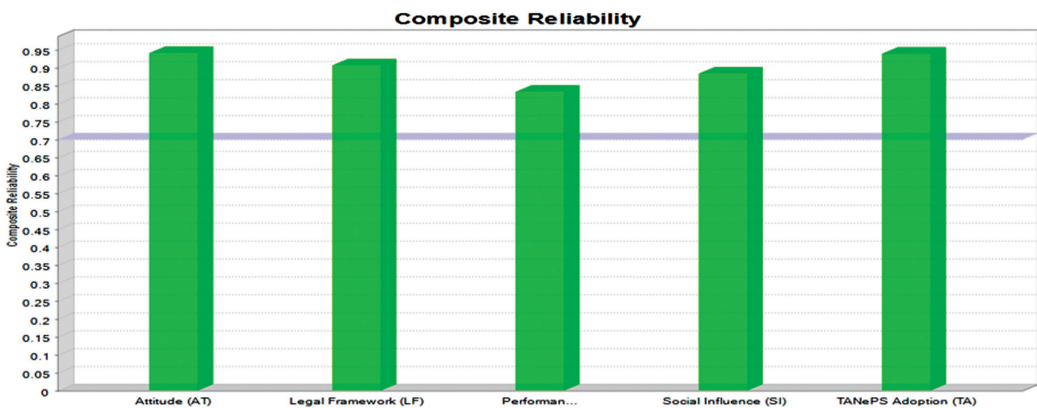
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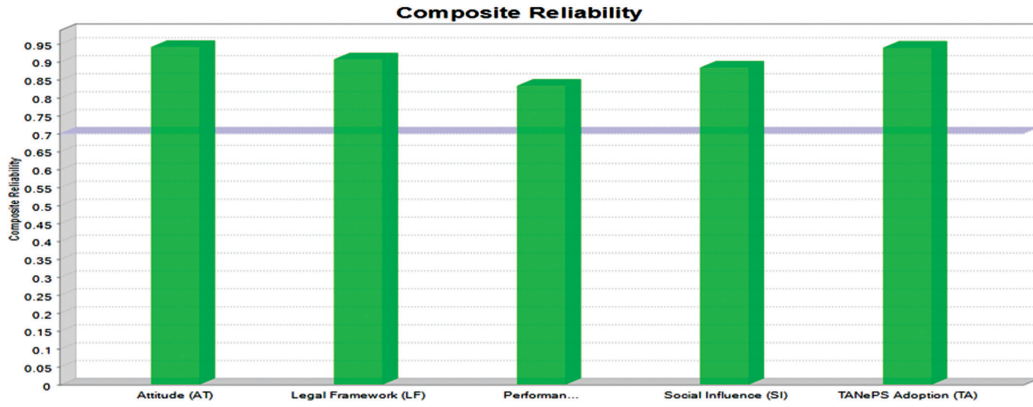
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**APPENDIX A: Path Coefficients, Values of R2 and Reliability of Data by CR**





**APPENDIX B: Education Level of Respondents, Validity of Data by AVE and HTMT**

**Table 1: Education level of the respondents**

	Type of Respondent		Total	
	Procurement expert	Suppliers		
Education level of the respondents	Primary Educ	0	4	4
	Secondary Educ	0	15	15
	Certificate level	0	5	5
	Diploma level	8	14	22
	Bachelor Degree	50	15	65
	Master’s Degree	41	4	45
	PhD Degree	1	0	1
	<b>TOTAL</b>	<b>100</b>	<b>57</b>	<b>157</b>

Source: Authors (2021)

