Determinant factors influencing e-procurement adoption on construction projects in Nigeria

Uche Moneke[1]* and Benedict Amade[2]
[1]Department of Project Management Technology, Federal University of Technology, P.M.B. 1526, Owerri, Imo State Nigeria. Email:

[2]Department of Project Management Technology, Federal University of Technology, P.M.B. 1526, Owerri, Imo State Nigeria. Email: benedictamade@futo.edu.ng

***Corresponding author**: Uche Moneke, Department of Project Management Technology, Federal University of Technology, P.M.B. 1526, Owerri, Imo State Nigeria.

Abstract:

Electronic procurement has the potential to change the narrative of the construction industry in both developed and developing countries around the world. However, its growth among construction industry practitioners in a developing country like Nigeria is still at its lowest point of adoption. The aim of this study was therefore to identify the determinants of electronic procurement and their impact on the adoption of construction projects in Nigeria. A questionnaire survey technique was used to collect data from a cross-section of 224 practitioners from a public sector environmental entity. The study used structural equation modelling (SEM) to support the contingency hypothesis that theorises the relationship between the determinants of e-procurement adoption. A myriad of determinants that influence e-procurement adoption have been identified, some of the variables on the one hand have been found to have some moderate statistical significance with e-procurement adoption. Key findings revealed that sub-determinant factors with evidence of relevance include: user friendliness with e-procurement solutions, capacity building of procurement officers, joint decision-making on materials supplied, re-calibration of e-procurement processes, integration with suppliers, and cooperation between government, vendors and service providers.

Keywords:

Construction projects; determinants; electronic procurement; Nigeria; structural equation modeling.

1 Introduction

According to Deraman et al (2019), there is a great deal of potential for the construction industry to leverage e-procurement and to lead the sector to significantly improve the overall efficiency of its activities by benchmarking the success of e-business methods and solutions across different industries. The creation and adoption of new developments and ideas has triggered the state of efficiency of industry players, which, in turn, has led to regular changes in every productive effort. E-procurement may be characterised as the use of web-based information and communication technologies (ICTs) for individual or all phases of the procurement cycle, including receipt, search, request, arrangement, sourcing and post-purchase survey Croom and Brandon-Jones (2004). While there are different types of e-procurement that focus on different phases of the procurement cycle, such as e-commerce, e-auction/reverse, e-index/purchase and e-procurement. E-procurement can be seen as a start to completion arrangement that incorporates and directs a number of acquisition measures across an entity. As a result of the improved and changing jobs created by online purchases, firms in both public and private firms are gradually gaining an understanding of the expected benefits of e-acquisition (Vaidya et al., 2006). Public entities worldwide have, in fact, distinguished e-procurement as a need and a critical component in the advancement of e-government in the economy, largely because of its preference for the intending buyer (public establishment), for example, the discounted system, deferrals and costs; better correspondence with intended customers; more streamlined rivalry (simpler and more extensive admissions); The primary favourable circumstances for the dealer (the venture) are improved access to data, reordered correspondence with the public organisation, reduced costs and delays in instalments, and improved security and privacy (Parida, 2005). In a comparative setting, e-procurement has increased its perception of improving inter-functional and inter-organizational relations and has become the main driving force behind many supply chain practises. Today, e-procurement is exceptionally linked to key sourcing, which can be construed as a commitment to basic purchase exercises that extend across hierarchical limits (Andersen, 2004).

In several industries, innovation has remained an important part of rising productivity and service delivery in recent years. The need for customer loyalty and service delivery expertise is not limited to procurement firms. Regardless of how other significant changes are inherent in the introduction of e-procurement to promote the related functions of construction procurement, the benefits of implementing e-procurement are enormous. Given the benefits of e-procurement in terms of the average procurement function, as Kahiu (2015) put it, "it is still certain that e-procurement innovation is still at the lowest possible pace" (Gunasekaran and Ngai, 2008). There are numerous reports on e-procurement failure in various climates and developed countries such as the United States and the United Kingdom. In a developing country like Nigeria, the situation is even worse. The adoption of e-procurement in procurement companies, especially public bodies, has been relatively slow. In a study, Davis et al (1989) discovered that more than half of procurement-related activities are performed manually in procurement firms. Akinyi (2010) went on to say that, in most cases, the manual process of completing procurement activities is costly, slow, and inefficient, and that information storage and recovery has not been motivating. Now is the time for an upgrade, a mechanised and interconnected acquisition system that will quickly increase the speed of the acquisition while remaining safe for the people involved. Many procurement components have failed to grasp the e-procurement way of life, though some organisations are likely to exaggerate the degree to which they express e-procurement use. The

low rate of adoption of e-procurement can be attributed in part to the belief that it entails large-scale projects requiring a lot of money and time, which limits its true capabilities.

A few studies have been conducted with the aim of determining the determinants for e-procurement implementation. Some of the investigations were conducted in Kenya (Chebii, 2016; Kahiu, 2015; Mose et al., 2013; Obat, 2016), Europe (Cimander et al., 2009), Hong Kong (Gunasekaran and Ngai, 2008), Singapore (Kheng and Al-hawamdeh, 2002; Teo et al., 2009), Iran (Mohammadi, 2013), Germany (Veit et al., 2016). There have been few studies on the effect of technology, government, provider responsiveness, government, management, regulation, procurement, employee, risk, and safety-related elements on e-procurement. There is scarcely any research in Sub-Saharan Africa that based its activities on developing countries, with particular reference to the state of Imo, Nigeria, on the one side, from the previously listed e-procurement determinants. The organisational components of e-procurement have been the subject of more of the determinants of e-procurement. This study differentiated and summarised the determinants of e-procurement outside of the organization's quality, and thus defined relevant variables (both internal and external) that could influence e-procurement implementation in Nigeria. One of the reasons for this study in Imo State, Nigeria, is that it was appropriate given the rising level of corruption in public construction procurement processes, as demonstrated by Oyewobi et al., (2011), Umunnakwe, (2018), Amade et al., (2019), Adeyemo and Amade (2016), Aduwo et al., (2020), and Transparency International (2016). As a result, the aim of this study was to determine the factors that influence e-procurement in construction projects. It's also worth noting that none of the studies listed above had the opportunity to demonstrate the use of advanced techniques like the Structural Equation Model (SEM) for achieving key determinants for e-procurement implementation. SEM is a description of the most recent observable technique used to investigate the relation between a series of linked, demonstrated or inactive variables, according to Chai et al (2015) and Su and Yang (2010). It's also a hybrid of a multivariate investigative approach, with a focus on factor analysis and relapses. The aim of this study is to identify key determinants of e-procurement using a SEM approach to fill the gap of e-procurement decision-makers in construction projects in the Nigerian state of Imo. As previously mentioned, SEM has recently become a popular tool for anticipating and clarifying a structure (Hair Jr et al., 2016). At the conclusion of this investigation, the investigator chose to use SEM under some conditions that would allow it to be more adaptable and provide a complex structural model.

The term determinant is used in this study to refer to a variety of subjects, including success factors, critical success factors, and acceptance and implementation of construction projects.

The following is a breakdown of the paper's structure. First, a review of relevant literature from previous e-procurement research is presented. Second, the proposed research hypotheses and models are discussed, followed by the data collection methods and, finally, the interpretation of the study's findings. The paper concludes with a discussion of the main findings and conclusions.

2 Review of relevant literatures

Electronic procurement (e-procurement) is a state-of-the-art procurement system that uses electronic devices such as the web for business-to-business electronic trading buy-ins between

organisations. According to Afolabi et al (2019a), e-procurement systems are nothing more than the use of resources and software for the conduct of web-based procurement activities. In addition, it helps to provide facilities and materials for transactions using web-based innovation for an efficient exchange of business (David et al., 2008). Vaidya et al, (2009) defined e-procurement as the use of web-based (web) innovations such as ICT in order to carry out an exchange or critical acquisition of related activities. It is intriguing to note that e-procurement may tend to be less attractive and energising from a variety of viewpoints, more difficult to update than e-commerce. In any case, e-procurement has a greater capacity for cost reserve funds and business improvement than Internet retail or venture asset structures that will make a huge shift in the way business exchanges are completed later. The Electronic Procurement System (EPS) is a process that uses innovation to complete each of its exercises and procurement cycles, such as holding, approving, demanding, approving and interacting with the budgetary processes of the company. There are three phases of e-Acquisition vz; ERP (Electronic Request Processes) which integrates mention and support of purchase measures through the use of web innovation; e-Acquisition, which is the solicitation of data and costs from providers and the acceptance of electronic inputs and e-Acquisition, used to identify and reach new providers through web and web innovation. In the case of companies, e-procurement is the coordination of mechanical appliances in the acquisition of exercises within the supply chain when conducting a variety of tasks. As such, e-procurement or e-procurement is one of the benefits of creative improvement over the use of traditional paper-based approach for acquisition tasks. E-procurement understands one of the increasing and favourable circumstances of online business in deciding on an anticipated future option in the purchase of merchandise and projects, as well as in moving the costs of these products/administratives and cooperating with providers (Gunasekaran and Ngai, 2008).

2.1 Determinants of e-procurement adoption

This investigation will examine in depth the investigations of previous observational investigations on e-procurement determinants with the aim of finalising a road map for the current research on e-procurement and construction projects. As articulated by Amade et al (2019), though distinguishing between the most important determinants, steps can be put in place to help eliminate or restrict the existence of particular issues that may adversely affect e-procurement selection in construction projects. This investigation differentiated 31 determinants, which are classified into eight (8) subclasses. Despite the advantages of the e-procurement referred to above, the deployment of e-procurement for use in construction projects is a challenging task and involves coping with complex difficulties before it can be successfully implemented. These difficulties vary from nation to nation and are usually dependent on business circumstances. The contributions of a multitude of researchers on e-procurement determinants and proposed study theories and models are discussed below.

2.1.1 Supplier responsiveness related components

In a traditional e-procurement platform, providers need to support the parent company by interacting with them as colleagues. As a result, the provider's assistance and responsibility lies primarily in the use of e-procurement (Mohammadi, 2013). The following theories have therefore been formulated.

H_1: Supplier responsiveness related components positively influence e-procurement adoption.

2.1.2 Risk and security related components

The well-being, reliability, protection and privacy of information are key to ensuring a stable environment for e-procurement. Without adequate protection and reliability of e-procurement offices, there would be a propensity for corruptible inclinations. The framework and information segments of e-procurement technology should be strongly protected from data security-related hazards, such as virus attacks, unauthorised logging (Cimander et al., 2009; Moon, 2005). The choice and configuration of the fitting security control offices can have real implications for the activities of the organisation. Security controls protect the confidentiality, reliability and assurance of the e-procurement framework (Gunasekaran and Ngai, 2008). The following theory is then postulated.

H_2: Risk and security related components positively influence e-procurement adoption.

2.1.3 Management related factor

Top administrative support has to do with the inclusion of high-level managers in the e-procurement adoption measure (Umunnakwe, 2018). The senior supervisory crew has the capacity to set out the vision and goals of the company by means of planning arrangements and procedures that are essential to the start of the path towards the establishment of an e-procurement framework. As Teo et al (2009) put it, the introduction of any new innovation would not be conceivable without the assistance of top-level administration. The following theory is therefore proposed.

H_3**:** Management related factor positively influence e-procurement adoption.

2.1.4 Technology related variables

Technology related factor centres around the viable adoption of ICT tools and gadgets corresponding to the use of e-procurement in an organisation. As Carayannis and Popescu (2005) have stated, the ICT framework is the main element of e-business presence and, as such, is responsible for the successful implementation of an efficient electronic procurement facility. Firms should reliably create and expand different parts of ICT tools with the ultimate aim of exploiting all the advantages that result from them for the sole purpose of tackling issues with different traders/vendors. The following theory is therefore proposed.

H_4: Technology related variables positively influence e-procurement adoption.

2.1.5 Procurement related variables

This includes the solution of the potential difficulties associated with the authoritative structure concerning the use and deployment of e-procurement. Others incorporate the chain of command and reveal the connections between the different gatherings. The procurement cycles, as per Andersen (2004), are typically limited by public bodies. The public body is normally ordered with a duty to ensure that the procurement methodology set out in the Act is strictly followed. The additional capacity of the public organisation is to monitor the acquisition framework and report on the overall functioning of the public procurement strategy. The following theory is therefore proposed.

H_5**:** Procurement related variables positively influence e-procurement adoption.

2.1.6 Government aid related components

Governments all over the world are consciously attempting to convert their procurement processes to electronic procurement. Nonetheless, the lack of knowledge and attitudes required to integrate e-procurement into public space remains a mirage (As-Saber and Rahim, 2011). According to Chebii (2016), in order to predict the future benefits of receiving e-procurement, procurement staff must be able to use the programme to empower the organisation to carry out its tasks (Adebayo and Evans 2015; Chebii, 2016). As a result, the following hypothesis is proposed.

H_6: Government aid related components positively influence e-procurement adoption.

2.1.7 Employee related elements

The future of e-procurement is bright, but it will require the expertise of a different group of people to deal with new challenges. Staff preparing for procurement training, as well as the use of e-procurement equipment, are both required for the deployment of e-procurement measures (Kahiu, 2015; Obat, 2016). When using e-procurement tools, representatives of an organisation must acquire the necessary skills to work successfully and productively. As a result, it is widely accepted that completing an e-procurement task would be beneficial to team members if the staff was given adequate consideration. As a result, it is critical that all members of the organisation are familiar with e-procurement technology (Mohammadi, 2013). As a result, the following hypothesis is proposed.

H_7**:** Employee related elements positively influence e-procurement adoption.

2.1.8 Legal related elements

Legal elements related to each other have to do with the obligations and obligations of people taking part in a business exchange, with the sole aim of achieving each other's ideal objectives. As indicated by the Kheng and Al-hawamdeh surveys (2002), they believed that the laws

governing business for business and e-procurement innovations had not yet been established. Issues relating to lawfulness, copyright laws relating to electronic archives, just as electronic marks remain uncertain. Without understanding the difficulties and impediments presented by electronic procurement appropriations, both government and private sector specialists will be unable to achieve the benefits of e-procurement deployment (Chebii, 2016; Cimander et al., 2009). The hypothesis below is therefore proposed.

H_8**:** Legal related elements positively influence e-procurement adoption.

Tab. 1: Summary of literature reviews on determinants of e-procurement

No	Determinants	Sources
1	**Government aid related components (Go)** 1. Federal government provides human capital support for the procurement units (Go 1) 2. Central government provides enough funds to cater for the implementation of new procurement procedures (Go 2) 3. Employees that work in the procurement unit are adequately trained by the government (Go 3) 4. Federal government always comes to aid procurement unit staff when the need arises (Go 4) 5. Cooperation between government agencies, vendors and service providers (Go 5)	Chebii (2016); Adebayo and Evans (2015); Moon (2005)
2	**Employee related elements (Em)** 1.Employee's level of competence in Information Technology (Em 1) 2.Employee Acceptance (Em 2) 3. End user training (Em 3) 4. User friendliness with e-procurement solution (Em 4)	Obat (2016); Kahiu (2015); Mohammadi (2013); Veit et al, (2011); Umunnakwe (2018); Mose et al, (2013); Parida and Parida (2005); Patel et al, (2016); Adebayo and Evans (2015); Bof and Previtali (2007).
3	**Supplier responsiveness related components (Su)** 1.Presence of joint development work with suppliers (Su 1)	Chebii (2016); Patel et al, (2016); Obat (2016); Umunnakwe (2018); Adebayo and Evans (2015); Mohammadi

	2. The authenticity of the results for the manufacturing processes of parts that are supplied resides with suppliers (Su 2) 3. Joint decisions regarding the supplied materials/products are usually made (Su 3) 4. Taking full responsibility on any complication that may arise during procurement is assured (Su 4) 5. Integration with suppliers (Su 5) 6. Close collaboration with suppliers (Su 6) 7. Adequacy of suppliers and IT solutions (Su 7)	(2013); Gunasekaran and Ngai (2008).
4	**Legal related element (Le)** 1. Legal harmonization (Le 1)	Cimander et al, (2009).
5	**Technology related variables (Te)** 1.Availability of ICT equipment/facilities (Te 1) 2.Availability of highly qualified ICT personnel (Te 2) 3. Computerized functions in the procurement department (Te 3) 4. Deploying technology in procurement related job functions is highly recognized by government (Te 4) 5. Availability of adequate funds by government for implementation of technology (Te 5)	Chebii (2016); Obat (2016); Patel et al, (2016); Kahiu (2015); Bof and Previtali (2007); Mohammadi (2013); Cimander et al, (2009); Afolabi et al, (2019a).
6	**Risk and Security related components (Ri)** 1.Risk perception (Ri 1) 2. Availability of suitable security system (Ri 2)	Umunnakwe (2018); Parida and Parida (2005); Gunasekaran and Ngai (2008); Moon (2005); Mose et al, (2013); Veit et al, (2011).
7	**Management related factor (Ma)** 1.Top management involvement and support (Ma 1)	Adebayo and Evans (2015); Kahiu (2015); Umunnakwe (2018); Gunasekaran and Ngai

		(2008); Afolabi et al, (2019a); Teo et al, (2009); Parida and Parida (2005).
8	**Procurement related variables (Pr)** 1.Recalibration of the e-Procurement process (Pr 1) 2.Clear and achievable procurement implementation phase (Pr 2) 3. Safety of the procurement platform (Pr 3) 4. Procurement regulations (Pr 4) 5. Capacity enhancement of procurement officers (Pr 5) 6. Knowledge sharing amongst procurement units (Pr 6)	Mohammadi (2013); Adebayo and Evans (2015); Kahiu (2015); Umunnakwe (2018); Moon (2005); Patel et al, (2016).

The hypothesized research framework is shown in figure 1.

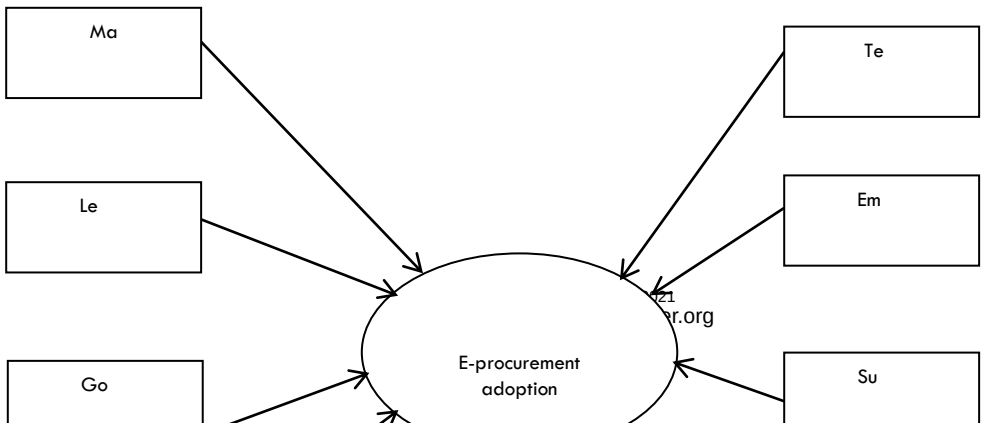

Fig. 1: Conceptual research model of determinants of e-procurement

3 Research methodology

This investigation was carried out using a cross-sectional research design method, while a purposeful and convenient sampling method was used to determine the sample. The sample size of a known population was determined using a number of firms. From that point on, the sample size was determined using the Krejcie and Morgan tables for the determination of the sample size (Krejcie and Morgan, 1970). In the development of research instruments, (31) constructs were distinguished from literature as illustrated in Table 1. Each of the constructs had a number of items measured with the aid of Likert scales ranging from (1) strongly disagreed to (5) strongly agreed. Despite data on model construction, the demographics of the practitioners and their e-procurement meetings were obtained. With a population of 754, a total of 257 questionnaires were sent by electronic means to the operations and headquarters of some medium-sized construction companies operating in the three (3) zones of Imo State, Nigeria. The investigation focused explicitly on a portion of the key workforce in charge of procurement and other related procurement exercises. Out of the 257 questionnaires sent out, a total of about 232 were recovered, while a total of 224 were found to be good for use. The methodology used for the study consists of two stages. Initially, the model estimation was validated by a confirmatory factor analysis (CFA). In addition, a structural model and path analysis was used to investigate the connections between the constructs with the final objective of validating the hypotheses previously postulated. As Hair Jr et al (2016) put it, SEM is a wonderful statistical method used in the social sciences that has the ability to test a few simultaneous connections. Despite the fact that such a great deal of consideration has already been given to covariance-based methodology, a variance-based methodology with an unmistakable procedure and emphasis makes it a potential option in contrast to covariance-based methodology (Amade et al., 2019; Hair Jr et al., 2016). IBM SPSS version 25.0 was the software used to analyse the results.

3.1 Results

This investigation consists of a confirmatory factor analysis (CFA) with the final objective of validating the estimation model by evaluating the relationship between items/pointers using their separate underlying constructs. In the execution of the CFA for the constructions, both the main order construct and the second order construct were also designed. In the assessment of the estimation model, the components of the model were evaluated to a one-on-one basis with respect to certain quality laws, such as smart estimation models and the structural model.

To the conclusion of this investigation, the research applied cross-sectional and separate review techniques. The population of the study is comprised of all categories of management and expert workers in some of the medium-sized construction firms located in the investigation territory. The measurement sizes of each of the (31) designs were determined by the results of the literature survey. The endogenous (dependent) variable viz; "e-procurement execution" was modelled as an intelligent higher-request construct. In the hierarchical cluster model, the estimation model is usually studied in two unique phases. The primary stage consists of the construction of the lower application, for example, the elements of the e-procurement determinants and the implementation of the construction project were assessed for reliability and validity. From that point on, the latent (autonomous) variable scores (31 constructs classified as 8) were recovered. At the next step, another estimation model using the latent variable scores was drawn. The higher-demand constructs were analysed for the reliability and validity of the intelligent construction (construction project implementation). In conclusion, the structural model was evaluated with the final objective of recovering t-statistics and p-values for the purpose of responding to earlier identified hypotheses. A Cronbach alpha estimate of 0.71 was obtained for the eight (8) constructs. As indicated by Zainudin (2012) and Farrokhian et al (2014), the estimate of 0.70 and above is strong and reliable; this estimate shows a high degree of internal consistency. Other unwavering test reliability and results are shown in the table below.

Tab. 2: Summary of the measurement model

Code	**Main Construct**	**Sub-Construct**	**Mean**	**Standard Deviation**	**Item-to-total correlation**	**Cronbach's alpha**
Su	Supplier responsiveness related components	Su 1	67.8	23.9	0.040	0.71
		Su 2	71.1	21.5	0.686	
		Su 3	68.7	23.0	0.065	
		Su 4	67.9	23.2	0.243	
		Su 5	71.6	22.8	0.581	

		Su 6	63.6	22.8	0.073	
		Su 7	70.6	21.9	0.007	
Te	Technology related variables	Te 1	74.1	23.8	1.000	
		Te 2	64.8	22.2	0.360	
		Te 3	69.2	23.9	0.343	
		Te 4	66.9	14.2	0.567	
		Te 5	63.6	26.5	0.005	
Go	Government aid related components	Go 1	73.7	23.9	0.893	
		Go 2	72.9	21.4	0.793	
		Go 3	66.7	22.9	0.240	
		Go 4	70.1	21.7	0.141	
		Go 5	67.5	18.1	0.226	
Ri	Risk and security related components	Ri 1	69.7	20.6	0.024	
		Ri 2	75.4	21.0	0.085	
Pr	Procurement related variables	Pr 1	72.9	18.6	0.154	
		Pr 2	69.9	22.7	0.096	
		Pr 3	77.1	18.8	0.041	
		Pr 4	68.9	22.7	0.046	
		Pr 5	75.7	19.6	0.055	
		Pr 6	63.9	21.2	0.006	
Le	Legal related element	Le 1	70.2	23.2	0.006	
Em	Employee related	Em 1	70.3	20.2	0.101	
		Em 2	70.0	17.1	0.075	

	elements	Em 3 Em 4	69.1 72.2	23.4 19.0	0.020 0.006	
Ma	Management related factor	Ma 1	63.4	18.3	0.053	

The path analysis and findings were verified with the help of IBM SPSS Statistics 25.0 in an attempt to perform a research model test. The performance of the model is shown in Figure 2. Connections between factors are shown, while normalised coefficients are shown in Table 3.

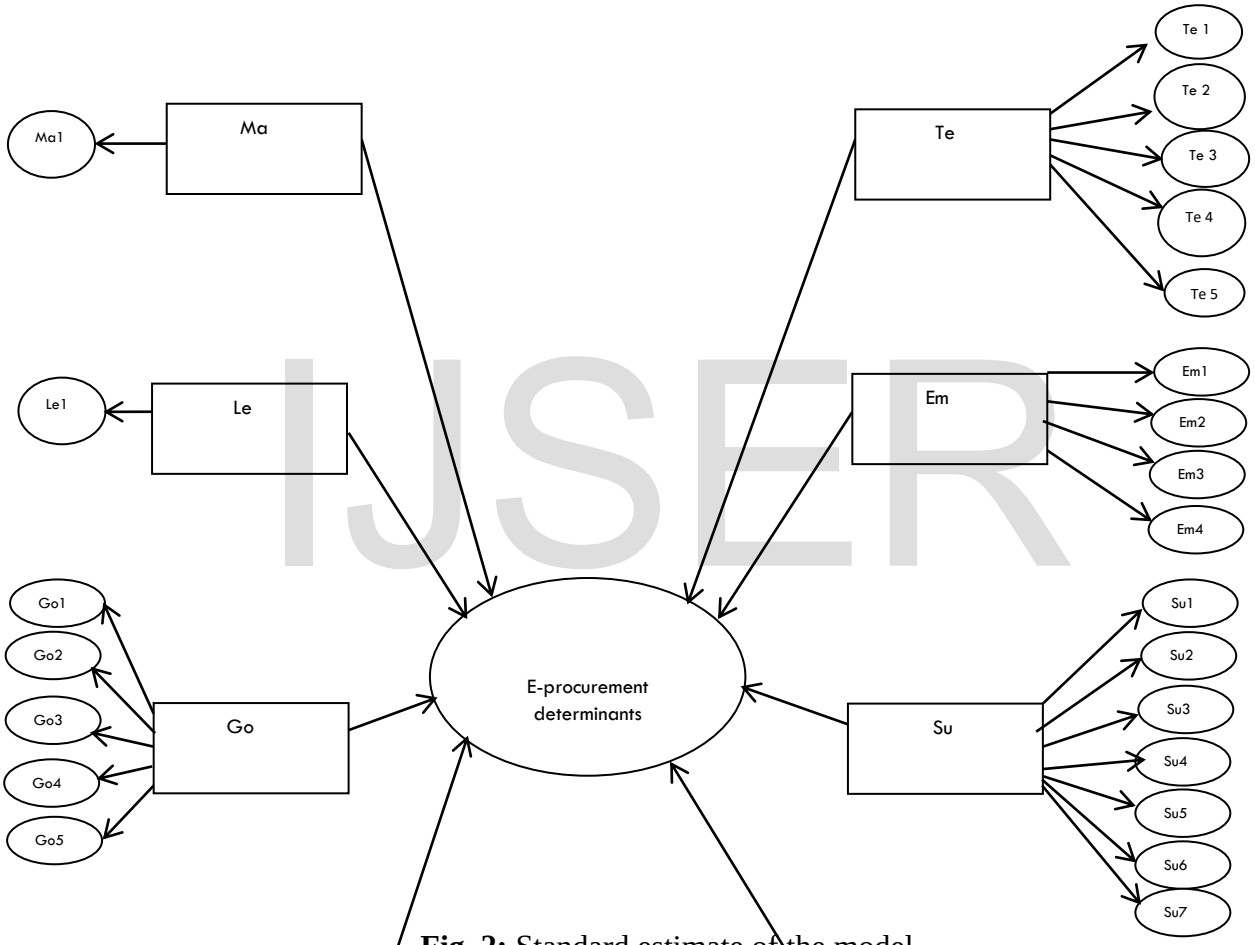

Fig. 2: Standard estimate of the model

Table 3 shows the fit lists of the models. The indices as shown by Hatcher (2005) [illegible] Su and [illegible]ang (20[illegible] the chi-square measurements. It is us[illegible]e the fitness of the study m[illegible]d fit indices check that the propose[illegible]e a g[illegible]mple [illegible]dictor. Four different indices, as recommended by Eybpoosh et al, (2011) and [illegible]bian et al, (2014), included: chi-square per degree of freedom, Non-Normed Fit Index (NNFI), Comparative Fit Index (CFI), and Average Absolute Standardized Residual (AASR). [illegible]nother study, Memon et al (2013) used the Goodness-of-fit Index (GFI), the Balanced Goodness-of-fit Index (AGFI) and the Root Mean Square Error of Approximation. Table 3 shows the [illegible]ndices of the model.

The result shown in Table 3 shows that all fit indices are acceptable, and in this way the proposal for a general structural model has matched the information perfectly.

Tab. 3: Standardized coefficients, significant numbers of model and fit indices of structural model results

Hypotheses	**Standardized path coefficient**	**t-values**	**Remarks**
Te 1 → Te	.701	.047	No
Te 2 → Te	.920	.010	No
Te 3 → Te	.994	.001	No
Te 4 → Te	.524	.104	No
Te 5 → Te	.134	.107	No
Go 1 → Go	.558	.079	No
Go 2 → Go	.605	.057	No
Go 3 → Go	.597	.049	No
Go 4 → Go	.685	.046	No
Go 5 → Go	.049	.192	**Yes**
Su 1 → Su	.895	.010	No
Su 2 → Su	.233	.117	No
Su 3 → Su	.011	.206	**Yes**
Su 4 → Su	.465	.049	No
Su 5 → Su	.046	.161	**Yes**
Su6 → Su	.198	.083	No
Su 7 → Su	.486	.040	No
Ma 1 → Ma	.886	.010	No
Le 1 → Le	.746	.029	No

Pr 1 → Pr	.034	.147	**Yes**
Pr 2 → Pr	.318	.093	No
Pr 3 → Pr	.942	.005	No
Pr 4 → Pr	.347	.235	No
Pr 5 → Pr	.007	.362	**Yes**
Pr 6 → Pr	.195	.096	No
Em 1 → Em	.976	.004	No
Em 2 → Em	.202	.130	No
Em 3 → Em	.383	.185	No
Em 4 → Em	.003	.421	**Yes**
Ri 1 → Ri	.390	.097	No
Ri 2 → Ri	.281	.145	No
Note: *SEM* (**H_1- H_8**): ***Model Fit=CMIN/DF=1.987, CFI=0.91, RMSEA=0.092, AGFI=0.90, GFI=0.92, NFI=0.96,*** *Significance at $p < 0.05$*			

Table 3 shows the synopsis of the factors and their connections and furthermore the upheld and non upheld models.

3.2 Discussion of findings

After the information investigation measure, it was found that, with the exception of technology-related elements, legal related components, management related factors, and risk and safety related elements, all other elements were strongly linked in a number of categories. This study was designed to investigate the determinants of e-procurement in the context of the implementation of construction projects. Hypothesis 2 found that one of the classifications for government support related components was important and that there was a strong link between cooperation between government agencies, traders and sub-factor specialists (Go5) and general e-procurement selection for construction projects, with a normalised coefficient value of 0.049. In the case of Hypothesis 3, two classes of Supplier Responsiveness related variables were found to be significant, resulting in a strong relationship between common choices for the materials/items provided (Su 3) and integration with suppliers (Su 5) with a standardised coefficient estimate of 0.011 and 0.046 individually and affirming the significant effect of the

Supplier Responsiveness related variables. In Hypothesis 6, Procurement related components provided a factually noteworthy relationship with the dependent variable of e-procurement for construction projects. Two classes of variables related to procurement have been identified as important. The re-calibration of e-procurement initiatives (Pr 1) and the increase in the capacity of public procurement officials (Pr 5) had their standardised coefficient estimates of 0.034 and 0.007 separately indicating that they had an overall effect on e-procurement adoption for construction projects. In addition, Hypothesis 7 was recognised as having a noteworthy connection between one of the Employee related variables classifications and the selection of e-procurement for construction projects. The normalised value of the coefficient is 0.003 for user benevolence for e-procurement arrangements (Em 4). It is interesting to note that all three elements according to the pattern in which they appear have been identified; employee-related components, contract-related variables, supplier-related responsiveness and related government support elements have been identified to make a fundamental contribution to the selection of e-procurement for construction projects in their different groups. The results of these findings are also validated with recent studies by Amade et al (2019); Umunnakwe (2018); Obat (2016); Kahiu (2015); Patel et al (2016); Adebayo and Evans (2015) on the determinants of e-procurement. The use of human resources in information technology (IT) plays a major role in the use of e-procurement in public procurement agencies. Employees must also understand the complexity of e-procurement in the use and management of the functions of their company. As Kahiu (2015) pointed out, the lack of competence, the need to prepare and the lack of motivation of individuals in most public procurement organisations are some of the fundamental reasons behind the non-use of e-procurement. Limiting the improvement of public procurement officials was also in sequence. The outcome of these findings is in line with that of Mohammadi (2013) at a vehicle company in Iran, Adebayo and Evans (2015) in Nigeria, Kahiu (2015) in Kenya, Umunnakwe (2018) and Amade et al (2019) in Nigeria, Moon (2005), Patel et al (2016). The effect of these results can also be summarised in a portion of the climates listed above, as these climates additionally have characteristics of the qualities of a developing nation such as Nigeria. The normalised coefficients of model output are fully shown in Table 3. Hypothesis 1 has never shown any impact on the adoption of e-procurement for construction projects as the indirect relationship has been found to be negligible. That is, the technology-related components have no significant impact on the adoption of e-procurement. The findings of this investigation are in contrast to the results of past published works, as technology-related aspects have a significant impact on the use of e-procurement. Chebii (2016), Obat (2016), Patel et al, (2016), Kahiu (2015), Bof and Previtali (2007), Cimandre et al, (2009), Afolabi et al (2019a). There are a lot of theories that might be responsible for this case. As the respondents who, through their exposure and experience, are more familiar with the state of technology in their nation and are more likely than not to rely on the ease of use of e-procurement solutions as a condition for making the above-mentioned decision on technology-related elements. For example, power deficiency is a matter that can be resolved over time such that additional access to the web is possible; however, the client's point of view could be crucial to the respondents. The control of related elements, legal factors and risk and safety related elements did not have a substantial impact on the use of e-procurement in construction projects. As a result, four of the eight determining groups were found to be noteworthy and to have an impact on the adoption of e-procurement for construction projects. However, this investigation has presumed that the other four determinants are not necessary for the receipt of e-procurement, as the technology-related considerations, for

example, are important in improving the implementation of e-procurement so that they also apply to various elements that may not have been declared a determinant.

This review adds to the body of writing by filling the void in the e-procurement decision-making process for construction project-based companies to gauge the determinants from an alternative viewpoint. The analysis contributes to the increase in the existing knowledge base of the determinants. In view of the fact that the exploration of e-procurement in Nigeria is still clearly at a low ebb, the analysis of this existence of the determinants could lead to a higher perspective on the elements for the effective adoption of e-procurement for construction projects. This will forever pave the way for persuasive dynamic decision-making when faced with the option of specifically identifying effective e-procurement determinants in the field of analysis.

4 Conclusion and recommendations

The investigation assessed the determinants for fruitful implementation of e-procurement on construction projects in Nigeria. The investigation uncovered that stakeholders in the business of construction see user friendliness with e-procurement solution as the main determinant for the adoption of e-procurement technologies for construction project delivery. This was trailed by capacity improvement of procurement officials, joint choices with respect to the provided materials/items are usually made, recalibration of the e-procurement process, coordination with suppliers/providers and collaboration between government agencies, sellers and service providers. The determinants were grouped into employee related elements, procurement related variables, supplier responsiveness related components and government aid related components. This investigation further demonstrates that these determinants are critical to the adoption/implementation of e-procurement on construction projects in Imo state, Nigeria. For supportability when deploying e-procurement facilities on construction project conveyance, the identified determinants recognized from this exercise ought to be thought of. This investigation prescribes that when adopting e-procurement technologies into the Nigerian built environment fabrics/sector, exertion ought to be focused towards making the required awareness about the presence and benefits associated with e-procurement facilities. Reliable and persistent expert trainings by proficient affiliations/bodies and the likes, especially to public sector agencies.

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