DOI: https://doi.org/10.68128/jocrebe.2020.ylmgjivo

Journal of Contemporary Research in the Built Environment ISSN: 2636-4468
Volume 4, Numbers 1&2, 2020 © Department of Building, University of Uyo

APPRAISING THE FACTORS INFLUENCING THE USE OF E-PROCUREMENT IN NIGERIAN CONSTRUCTION INDUSTRY

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ABSTRACT

Purpose: The fragmentation in the Nigerian construction industry is often seen as one out of many contributors to low productivity in construction and has led to well-documented problems with both communication and information processing. In Nigeria, Procurement over the years has been carried out manually and it has been distinguishingly characterized by large paperwork, high cost, corruption, and delay in procurement process. For this reason, this paper x-ray the factors influencing the use of E-procurement in the Nigerian construction industry.

Design/methodology/approach: Quantitative data were collected from construction professionals. The data were analysed using Mean Item Score (MIS) and Kruskal-Wallis H Test.

Findings: The most important risk factors influencing e-procurement in the Nigerian construction industry are safety and insecurity issues, the unreliability of technology, reduced level of personal contact, resistance to change among others. It is established from the study that E-procurement implementation can be expensive among construction firms in Nigeria. The factors influencing the use of E-procurement in the Nigerian construction industry the ease of transitioning from paper to electronic systems as the most important factor influencing the adoption of e-procurement followed by availability of policies to promote e-procurement, and then by the cost of e-procurement technology.

Practical implication: The paper provides procurement managers with relevant factors that influence the adoption decision. This highlights the importance of maximizing the benefits of e-procurement system for potential users to facilitate the adoption process.

Originality/value: The paper complements the existing literature review about the use of e-procurement in the construction industry.

Keywords: E-Procurement; technology; construction industry; firms; professionals.

1. INTRODUCTION

The construction industry is an industry, well fragmented as a result of stakeholders as well as the phases involved in construction projects Quangdung, Liu, & Hossain

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(2011). This fragmentation is often seen as one out of many contributors to low productivity in construction and has led to well-documented problems with both communication and information processing. Pollaphat and Miroslaw (2014) opined that these problems caused by fragmentation are now reduced through the routine use of the internet, a form of information technology that improves coordination and collaboration between firms participating in a project, resulting in better communication practice. It opined further that this is because the level of technology valid in the marketplace today, is extraordinary and massive and it encourages business and collaboration solutions.

The internet, specifically, the World Wide Web has been a key leading to a change in the construction business globally (Esben, 2012). Waziri, Ali, and Ghali (2015) corroborated that its use as a medium for communication, transfer information faster, effectively, and generate opportunities for developing distributed systems that can pass through organization boundaries, provide workflow automation and platforms for teamwork uniquely. Skibniewski and Abduh (2004) reported the merits of web technologies in construction in three areas; communication between project participants, important information services and management and engineering computing. It was widely said that the use of proper information and communication technology (ICT) coupled with communication interfaces and defined structures in the manufacturing industry has been demonstrated to be a tool with efficiency that helps the desegregation of processes for materials supply, product development, production, communication and maintenance procedure (Esben, 2012; Clifford & Alexandru, 2012; Waziri et al, 2015). Due to this, ICT has been applied across sectors widely to cut costs and increase competitiveness which is perceived today as a vehicle for gaining competitive advantage (Bowden, 2005; Esben, 2012).

Procurement is done in virtually all professions. To simply put, procurement is the process of obtaining services, goods, or works from an external source. It is a management act of acquiring and attaining supplies and services. Procurement over the years has been carried out manually and it has been distinguishingly characterized by large paperwork, high cost, corruption, and delay in the procurement process e.t.c (Nimbadia, 2013). However, the approach and arrival of the internet have brought about the commencement and adoption of e-procurement process in the area of procurement and supply chain management (Baily, Farmer, Crocker, Jessop, & Jones, 2008).

E-procurement is the use of electronic channels in buying goods and services. Starting from the identification of the goods or materials, through payment and to contract management, all these can be carried out with e-procurement (Davila, Gupta & Palmer, 2003). Aberdeen group (2008) opined that companies have been motivated by opportunities proffered by global markets to go global which as caused e-procurement to be irreplaceable. Angappa (2009) viewed the emergence of e-procurement as an influencing vehicle for attaining a reduction in cost and productivity improvement. Two main phases of e-procurement were stated in the UN Procurement Practitioner's Handbook (2006). These are the pre-award phase consisting of E-Notification, E-Submission, E-Evaluation, and E-Awarding; and also the post-award phase E-Ordering, E-Invoicing and E-payment. And every activity in these phases can be executed using a communication media and/or e-procurement technologies and tools (UN Procurement Practitioner's Handbook, 2006).

Though still at its early stage in Nigeria, Studies (Olusegun, 2017; Ibem et al, 2012; Agboyi & Ackah, 2012) have discovered that the use of e-procurement in different industrial zones has kept on increasing since mid-1990s when email and web services of internet became famous because it makes information easily acquirable and

increasing the scope for selection of products. The adoption of e-procurement in Nigeria has also increased too because Nigeria is the fastest growing telecom market in Africa has over 155 million mobile lines(active) and a growth of 9% yearly (NCC, 2014). Moreover, what we know as "computer age" has been characterized by changes in the traditional economy to a computerized one (Achuora, Arasa & Ochriri, 2012). Thus, this exploration paper intends to assess the factors influencing the use of E-procurement in the Nigerian construction industry. y area

The South-South of Nigeria comprises of Akwa Ibom, Bayelsa, Cross River, Delta, Edo, and the River States selected from the nine States and is geographical located within the Niger Delta region, Nigeria. The study focused on this area due to familiarity with the environment for the sake of data collection and also due to numerous on-going road construction. Niger Delta region is rich in oil and gas, it remains the primary source of income for the country, accounting for about 97% of the total export item generating revenues (Agbu, 2005 and Jike 2005). They further explained that, this mineral became well-known in the region in 1958, and since then, the resources accruing from the exploration of crude oil has dominated the country's economy. The indigenes of the area depend on their land, water, and forest as farmers, fishermen, and hunters, for their survival before the discovery of mineral resources. These economic activities were devastated as a result of the operation of exploration by oil companies. As a result of the exploration activities, the region becomes unproductive and undeveloped for survival, thus necessitating the establishment of NDDC to implement developmental projects as a means of compensating the inhabitants of the area. The lack of completed desired and impacting development demands this study.

2. REVIEW OF RELATED LITERATURE

2.1. Nigerian Construction Industry

The structure of Nigerian construction industry is very complicated in that it has a wide range of different types of clients and contractors which are public and private, main contractors and subcontractors, one-man firms and international companies, low technology firms and sophisticated specialists, builders and civil engineers and a whole range of construction professionals connected within the industry (Oladapo, 2006). It further corroborated that the major divisions in the industry are building construction division and civil engineering division and heavy engineering construction, division. Although, the activities in the industry are being carried out on a project basis and could be within an organization or part of a construction program (Esben, 2012).

According to Oyediran & Akintola (2011), Nigeria as a nation is still at the infancy stage of infrastructural development where lots of construction activities are being carried out across the nation by the federal, state and local governments as the major clients in Nigeria. All these construction works are carried out by construction companies which are either indigenous or multinationals whose structure occasionally affects the level of construction output in the construction industry (Oladapo, 2006). But, most of these construction works are being executed by foreign construction firms. However, changes in government, transformation agenda and local content policy in the infrastructural sector have created opportunities for Nigerian indigenous contracting firms to grow and take part in the developmental processes (Oyediran & Akintola, 2011).

The federal government of Nigeria often seems to be involved in most complex projects such as road, sea, and airport projects and some heavy engineering projects. This is followed by the state government which is responsible for about 22.7% of the projects in the industry, although there are still some forms of partnering with different groups of investors in the industry (Olusegun, 2017). The professionals in the industry are a group of individuals often assembled into temporary and functional teams which include; architects, engineers, estate surveyors, project managers, quantity surveyors. This group of professionals is expected to possess the relevant skills, knowledge, tools and techniques to achieve the project goals (Oyediran & Akintola, 2012).

Basically in Nigeria, the construction companies are classified on the scope of operation, ownership and management control (Olusegun, 2017). Like other nations of the world, construction companies could be classified as small, medium, and large. In Nigeria, large companies are majorly governed by the multinationals with very few indigenous that could be classified as a medium while most are classified as small size firms (Olusegun, 2017). Conceptual evidence disclosed that Julius Berger Nigeria Plc is the leader in the Nigerian construction industry, as it controls a large part of public sector construction work in the industry (Aduwo *et al*, 2016). The Nigerian construction industry continues to be a major stimulant in the country's economic growth and development (Ibem *et al*, 2016). This strong interrelationship between the economy and the construction industry further strengthens the need to ensure that project planning and management are cost-effective (Olusegun, 2017).

2.2. Factors Influencing the Use of E-procurement

In a look at Malaysian SME's environment, Eadie (2012) observed the relevant factors influencing the uptake of e-Procurement like external factors such as technology, infrastructure and legislation; and internal factors such as resource constraints and management characteristics. Croom and Johnson (2003), E-procurement implementation can be expensive, particularly, in instances when a process based on disagreeing platforms is to be incorporated at a later date. The more distinct the technical platforms, the more prohibitive it becomes. Aduwo (2016) explained the lack of critical mass uptake of e-Procurement and its non-adoption in the Nigerian Building Industry (NBI) to be principally due to; internal factors within the organizations, external factors outside the organizations and the perception of the risks associated with the use of e-Procurement by people in the industry. Also, it was argued by Lou (2010) that the perceived benefits of e-procurement can be achieved if a construction firm is in a state of readiness to effectively absorb technology-enabled innovation into its practice in advance for investment.

According to Norzaidi *et al* (2013), the two key factors influencing the intended use of e-procurement are perceived ease of use (PEOU) and the perceived usefulness (PU). Perceived ease of use is the extent to which a person believes that the usage of a thing will influence his or her performance (Esben, 2012). It showed that the PEOU is an attitude and it suggested that the level of user's perceived ease of use can be studied by researching the end-user to know if he or she perceives that using a system is effort-free. Yusliza and Ramayah (2011) defined attitude as the response of an individual towards a system. Existing studies proposed that the PEOU is majorly an attribute of technology applications such as internet commerce, online banking, and mobile commerce (Luarn & Lin, 2005; Guriting & Ndubisi, 2006). The perceived ease of browsing, performing transactions and applying information should enhance favourable and coercing individual experience (Chen,

2002; Cheung & Liao, 2003). So, there is an important relationship between perceived ease of use and attitude towards the use of e-procurement.

The perception of PU varies between the type of e-procurement system and the users. It was argued that workers in performance-oriented firms with e-procurement are reinforced for benefits and good performance generally (Lai & Yang, 2009). This means that the usefulness of e-procurement in the improvement of performance will have a positive impact on attitude towards the application. Hence, there is a significant relationship between attitude and perceived usefulness towards the use of e-procurement. Although, the technology acceptance model (TAM), proposed that the perceived ease of use is thought to influence the perceived usefulness of the technology i.e the easier the usage of technology, the higher the benefit derived from the technology concerning performance enhancement Yusliza and Ramayah (2011). Thus, there is a relevant connection between perceived ease of use and perceived usefulness.

2.3. Factors Influencing the Use of E-procurement

The internal barriers influencing e-procurement are age, size, category of organization, number of office, poor financial base, unavailability of technical expertise, lack of top management support, amongst others. For factors related to the perception of the risks in e-procurement, the following are the influencing factors: safety and insecurity issues, lack of confidentiality and flexibility, resistance to change, fear for loss of jobs and end to corruption, unreliability of the technology, reduction in the level of personal contacts, illegality of e-procurement contracts. The external barriers are poor ICT and internet infrastructure, unreliable power supply, lack of a national ICT policy, cost of e-procurement technology, inadequate government support, lack of uniform standards, unavailability of e-procurement software applications and tools, amongst others.

Also according to the result of a research conducted by Ibem *et al*., (2016), the results showed the three most important factors influencing the adoption of e-Procurement amongst the participants in order of importance were: the benefits of e-Procurement in enhancing efficiency in project delivery; eliminating geographic barriers and effective communication among project team members. 29 factors were also investigated in seven different dimensions and the three emerged most significant predictors of e-Procurement adoption in the survey. According to Asian Development Bank (2013) the factors such as Government direction, policy & legal framework, agencies change, awareness & capacity building, technology etc. added to the successful adoption and implementation of e-procurement operations.

Azanlerigu and Akay (2015), also divided the factors influencing e-Procurement into various independent variables, which are: lack of employee competency, the inadequacy of legal framework, inadequate technological infrastructure, the security of procurement transaction data etc.

3. RESEARCH METHODOLOGY

3.1. Survey

The survey examines the conclusions of a sample of Nigerian construction professionals towards the point of the study. According to Kothari (2004), the Research

design is the investigation with the scheme of identifying variables and their relationship to one another. Quantitative research focuses on finding statistical relationships within numerical data. Quantitative research design was adopted for the study and it was based on the set objectives of the study through the administration of well-structured questionnaires with both open-ended questions and close-ended questions so that respondents can express their view based on their experience. The sample size for this study is 84 numbers of practicing construction firms. Census method was used in selecting the firms, in which office locations of 70 firms were visited for data collection. Data was collected from construction professionals in the firm, such as; Architects, Quantity surveyors, Builders and Engineers in the study area. The professionals were chosen from client organization, contracting, and consulting firms. The respondents were asked to express their level of assessment on a 5-point Likert. Adequate questionnaires were administered to construction firms in Ondo on a 5-point Likert-type scale with focuses 1 and 5 representing strongly disagree and strongly agree, respectively. Other parts of the questionnaire are intended to assemble demographical data about the respondents.

3.2. Data Collection

Adequate questionnaires were administered to construction firms in Ondo. This research work employed the use of primary data. The procedure for data collection for this research work as stated earlier was through the use of a well-structured questionnaire administered to construction firms. Out of 70 copies of the administered questionnaire, 53 were completed and returned. This represents 63.1% response rate which is far above the usual response rate of 20-30% for questionnaire surveys in construction management studies, as suggested by Akintoye (2000). Most firms have their existence between 6-10 years with 43.4% followed by 11-20 years with 28.3% followed by 0-5 years with 15.1% and 20-40 years with 13.2%. The average year of existence of these organizations is 12.3 years. The most type of respondents is the Architects with 28.3% followed by the Quantity surveyors with 26.4% followed by the Engineers (Civil, Structural, Mechanical and Electrical) with 24.5% and lastly, the builders with 20.8%. Most firms sampled 11-20 numbers of staff with 43.4% followed by 6-10 numbers of staff with a percentage of 26.4 followed by 20-50 numbers of staff with 20.8% and 0-5 numbers of staff with 9.4%. 64.2% of these firms have ICT departments while 35.8% of construction firms do not have ICT departments. 58.5% of the firms have 0-5 ICT related officials (highest) followed by firms with no ICT related official with a percentage of 20.8% followed by firms having 6-10 ICT related officials with 11.3% followed by 7.5% having 11-20 ICT related officials and 1.9% having 11-20 ICT related officials.

3.3. Data Analysis

An appropriate technique of analysing data is very important to be able to process the data collected accurately. Relative importance index/mean score was also used to analyze the questionnaire. Data processing was carried out with the aid of computer-based statistical software known as a statistical package for social sciences (SPSS). The basis for making ranking decisions is that the factor with the highest Mean Item Score (MIS) is ranked as the 1st and the others follow in subsequent descending order.

Since a Likert scale of 5-point was employed for the collection of the data, the formula for Mean Item Score can be written as:

$$MIS = \frac{(5F5 + 4F4 + 3F3 + 2F2 + 1F1)}{F5 + F4 + F3 + F2 + F1}$$

Where, F is the frequency of each ranking. The basis of ranking the utilization, success or the significance of factors using Mean Item Score is based on this premise:

1.00 ≤ MIS ≤ 1.50: Not important (or significant, or satisfactory, or effective)

1.50 ≤ MIS ≤ 2.50: Low importance (or significance, or satisfaction, or effectiveness)

2.50 ≤ MIS ≤ 3.50: Moderate importance (or significance, or satisfaction, or effectiveness)

3.50 ≤ MIS ≤ 4.50: High importance (or significance, or satisfaction, or effectiveness)

4.50≤ MIS ≤ 5.00: Very High importance (or significance, or satisfaction, or effectiveness)

Moreover, The Kruskal-Wallis test (sometimes referred to as the Kruskal-Wallis H Test) is the non-parametric alternative to a one-way between-between groups analysis of variance which allows the comparison of the scores on some continuous variable for three or more groups. It is similar in nature to the Mann-Whitney test which allows comparison for not more than two groups. Kruskal-Wallis test was conducted to determine whether the main significance of each factor was equal across the small size firms, medium size firms and large size firms. Where small size firms represent firms having 0-5 numbers of staffs, medium size firms represent firms having 6-10 numbers of staffs and large size firms represents firms having above 11 numbers of staffs.

4. Data Analysis, Results and Discussion of Findings

4.1. External Factors Influencing the Adoption of E-procurement

From the table, it is evident that from the Small size firms the most important factor influencing e-procurement is the unreliable power supply, followed by the cost of e-procurement technology, the unreliability of e-procurement software/tools and poor ICT/Internet infrastructure. For the Medium size firms, cost of e-procurement technology ranked the highest factor influencing e-procurement, followed by the unreliable power supply, poor ICT/Internet infrastructure and unreliability of e-procurement software/tools. For the Large size firms, cost of e-procurement technology ranked the highest factor influencing e-procurement, followed by the unreliable power supply, poor ICT/Internet infrastructure and unreliability of e-procurement software/tools. For all firms, the Cost of e-procurement technology ranked the highest factor influencing e-procurement, followed by the unreliable power supply, poor ICT/Internet infrastructure and unreliability of e-procurement software/tools. The result is presented in Table 1.

Kruskal-Wallis test showed that all external factors influencing e-procurement's adoption have a significant p-value of above 0.05 (ranging from 0.141-0.835). Since the p-value of each factor is greater than 0.05, this implies that there is no significant difference in the view of these 3 categories of respondents as to the importance of these 4 external factors influencing e-procurement in Ondo state.

Table 1: External Factors Influencing the Adoption E-procurement

External Factor	Small Size Firms		Medium Size Firms		Large Size Firms		Overall		Kruskal Wallis
	RII	RK	RII	RK	RII	RK	RII	RK	Sig.
Cost of e-procurement technology	0.88	2	0.9	1	0.91	1	0.91	1	0.835
Unreliable power supply	0.92	1	0.86	2	0.87	2	0.87	2	0.675
Poor ICT/Internet infrastructure	0.76	4	0.79	3	0.87	2	0.84	3	0.162
Unreliability of e-procurement software/tools	0.8	3	0.7	4	0.79	4	0.77	4	0.141

4.2. Internal Factors Influencing the Adoption of E-procurement

From Table 2, it is evident that from the Small size firms the most important factor influencing e-procurement is the unavailability of technical expertise, followed by the poor financial base, age, size and category of firms and lack of top management support. For the Medium size firms unavailability of technical expertise ranked the highest factor influencing e-procurement, followed by age, size, and category of firms, poor financial base and lack of top management support. For the Large size firms, poor financial base ranked the highest factor influencing e-procurement, followed by age, size and category of firms, lack of top management support, and unavailability of technical expertise. For overall firms, age, size, and category of firms and poor financial base ranked the highest factor influencing e-procurement, followed by unavailability of technical expertise and lack of top management support.

Table 2: Internal Factors Influencing the Adoption of E-procurement

Internal Factor	Small Size Firms		Medium Size Firms		Large Size Firms		Overall		Kruskal Wallis
	RII	RK	RII	RK	RII	RK	RII	RK	Sig.
Age, size and category of firm	0.84	3	0.79	2	0.87	2	0.85	1	0.311
Poor financial base	0.88	2	0.77	3	0.88	1	0.85	1	0.192
Unavailability of technical expertise	0.92	1	0.83	1	0.81	4	0.83	2	0.539
Lack of top management support	0.80	4	0.73	4	0.87	2	0.83	2	0.106

Kruskal-Wallis test showed that all internal factors influencing e-procurement's adoption have a significant p-value of above 0.05 (ranging from 0.106-0.539). Since the p-value of each factor is greater than 0.05, this implies that there is no significant difference in the view of these 3 categories of respondents as to the importance of these 4 internal factors influencing e-procurement in Ondo state.

4.3. Perception of Risk Influencing the Adoption of E-procurement

From Table 3, it is evident that from the Small size firms the most important risk factor influencing e-procurement is safety and insecurity issues, the unreliability of technology, followed by resistance to change, reduced level of personal contact, loss of job fears and end to corruption, lack of confidentiality and flexibility followed by Illegality of e-procurement contract. For the Medium size firms, safety and insecurity issues ranked the highest factor influencing e-procurement, followed by a reduced level of personal contact, followed by loss of job fear and end to corruption and unreliability of technology followed by resistance to change, followed by lack of confidentiality and flexibility, followed by the illegality of e-procurement contract. For the Large size firms, safety and insecurity issues and unreliability of technology ranked the highest factor influencing e-procurement, followed by a reduced level of personal contact followed by resistance to change followed by loss of job and end to corruption, followed by lack of confidentiality and flexibility and lastly, the illegality of e-procurement contract. For overall firms, safety and insecurity issues, the unreliability of technology, reduced level of personal contact, resistance to change, loss of job fear and end to corruption, lack of confidentiality and flexibility, and illegality of e-procurement contract.

Kruskal-Wallis test showed that all risk factors of e-procurement's adoption have a significant p-value of above 0.05 (ranging from 0.075-0.994). Since the p-value of each factor is greater than 0.05, this implies that there is no significant difference in the view of these 3 categories of respondents as to the perception of risk of these 6 factors influencing e-procurement in Ondo state.

Table 3: The Perception of Risk in the Adoption of E-procurement

Perception of risk	Small Size Firms		Medium Size Firms		Large Size Firms		Overall		Kruskal Wallis
	RII	RK	RII	RK	RII	RK	RII	RK	Sig.
Safety and insecurity issues	0.84	1	0.80	1	0.89	1	0.86	1	0.075
Unreliability of technology	0.84	1	0.77	3	0.89	1	0.85	2	0.115
Reduced level of personal contact	0.76	3	0.79	2	0.87	2	0.84	3	0.286
Resistance to change	0.80	2	0.76	4	0.77	3	0.77	4	0.99
Loss of job fear and end to corruption	0.76	3	0.77	3	0.75	4	0.76	5	0.994
Lack of confidentiality and flexibility	0.76	3	0.74	5	0.61	5	0.66	6	0.176
Illegality of e-procurement contract	0.40	4	0.41	6	0.34	6	0.37	7	0.552

4.4. General Factors Influencing the Adoption of E-procurement

From the table, the Small size firms have factors such ease of engagement between parties, availability of policies to promote e-procurement, security and data protection challenges and Ease of transitioning from paper to electronic system as the most important factors influencing the adoption of e-procurement, followed by lower cost of the

transaction, availability of technological infrastructure, reliability of e-procurement systems/tools, compatibility of e-procurement systems/tools, availability of infrastructure to promote e-procurement followed by speed of transaction and ease of integration of systems with existing processes. For the Medium size firms, availability of infrastructure to promote e-procurement and ease of transitioning from paper to electronic systems are the most important factors influencing the adoption of e-procurement, followed by the compatibility of e-procurement tools/system and availability of policies to promote e-procurement, followed by security and data protection challenges, followed by lower cost of the transaction, availability of technological infrastructure, reliability of e-procurement systems/tools, followed by the ease to respond electronically, ease of integration of e-procurement systems with existing processes, followed by the speed in transaction and ease of engagement between parties.

Table 4: General Factors Influencing E-procurement's Adoption

	Small Size Firms		Medium Size		Large Size Firms		Overall		Kruskal Wallis
General Factor	**RII**	**RK**	**RII**	**RK**	**RII**	**RK**	**RII**	**RK**	**Sig.**
Ease of transitioning from paper to electronic systems	0.96	1	0.94	1	0.94	1	0.94	1	0.041*
Availability of policies to promote e-procurement	0.96	1	0.91	2	0.93	2	0.93	2	0.552
Availability of infrastructure to promote e-procurement	0.92	2	0.94	1	0.89	5	0.91	3	0.388
Lower cost of transaction	0.92	2	0.89	4	0.92	3	0.91	3	0.862
Ease to respond electronically	0.96	1	0.87	5	0.92	3	0.91	3	0.275
Speed in transaction	0.88	3	0.84	6	0.92	3	0.90	4	0.190
Availability of technological infrastructure	0.92	2	0.89	4	0.91	4	0.90	4	0.960
Security and data protection challenges	0.96	1	0.90	3	0.89	5	0.90	4	0.160
Compatibility of e-procurement systems/tools	0.92	2	0.91	2	0.88	6	0.89	5	0.731
Reliability of e-procurement systems/tools	0.92	2	0.89	4	0.88	6	0.87	6	0.780
Ease of integration of systems with existing processes	0.88	3	0.87	5	0.89	5	0.87	6	0.759
Ease of engagement between parties	0.96	1	0.84	6	0.89	5	0.87	6	0.230

For the Large size firms, ease of transitioning from paper to electronic system is most important, followed by availability of policies to promote e-procurement, followed by the speed in the transaction, lower cost of the transaction, ease to respond electronically, followed by availability of technological infrastructure, ease of integration of systems with existing processes, availability of infrastructure to promote e-procurement, ease of engagement between parties, security and data protection challenge, followed by the reliability of e-procurement systems/tools and compatibility of e-procurement systems/tools. For overall firms, ease of transitioning from paper to electronic systems is the most important factor influencing e-procurement, followed by availability of policies to promote e-procurement followed by lower cost of the transaction, ease to respond electronically, availability of infrastructure to promote e-procurement, followed by the speed in the transaction, availability of technological infrastructure, security and data protection challenges, followed by the compatibility of e-procurement systems/tools, followed reliability of e-procurement systems/tools, ease of integration of systems with existing processes, ease of engagement between parties.

Kruskal-Wallis test showed that all factors influencing e-procurement's adoption have a significant p-value of above 0.05 (ranging from 0.160-0.960) except one (ease of transitioning from paper to electronic systems) which has a significant p-value of 0.041. Since the p-value of each factor is greater than 0.05, this implies that there is no significant difference in the view of these 3 categories of respondents as to the importance of these 12 general factors influencing e-procurement in Ondo state. However, there is a significant difference in the view of the respondents as regards the ease of transitioning from paper to electronic systems in construction firms in Ondo state.

4.5. Summary of all Factors Influencing the Adoption of E-procurement

Following a similar approach, some factors influencing e-procurement in construction firms were identified from the view of related literature and respondents were asked to rate them according to the level of use by each firm using a Likert scale of 1 to 5 with 1 being "very low" and 5 being "very high".

The results of the analysis show the ease of transitioning from paper to electronic systems is the most important factor influencing the adoption of e-procurement followed by availability of policies to promote e-procurement, followed by cost of e-procurement technology, lower cost of technology, ease to respond electronically, availability of infrastructure to promote e-procurement, followed by speed in transaction, availability of technological infrastructure, security and data protection challenges, followed by reliability of e-procurement systems/tools, compatibility of e-procurement system/tools, ease of integration of systems with existing processes and ease of engagement between parties, followed by unreliable power supply, followed by safety and insecurity issues, followed by age, size and category of firm, poor financial base, unreliability of technology, followed by poor ICT/Internet infrastructure, reduced level of personal contact, followed by unavailability of technical expertise, lack of top management support, followed by unreliability of e-procurement softwares/tools, resistance to change, followed by loss of job fear and end to corruption, followed by lack of confidentiality and flexibility, followed by illegality of e-procurement contract.

Kruskal-Wallis test showed that all factors influencing e-procurement's adoption have a significant p-value of above 0.05 (ranging from 0.075-0.994) except one (ease of transitioning from paper to electronic systems) which has a significant p-value of 0.041.

Since the p-value of each factor is greater than 0.05, this implies that there is no significant difference in the view of these 3 categories of respondents as to the importance of 11 general factors influencing e-procurement in Ondo state. However, there is a significant difference in the view of the respondents as regards the ease of transitioning from paper to electronic systems in construction firms in Ondo state.

Table 5: Summary of Factors Influencing the Adoption of E-procurement

Factor	Overall		Kruskal Wallis
	RII	RK	Sig.
Ease of transitioning from paper to electronic systems	0.94	1	0.041*
Availability of policies to promote e-procurement	0.93	2	0.552
Lower cost of transaction	0.91	3	0.862
Speed in transaction	0.91	3	0.275
Availability of infrastructure to promote e-procurement	0.91	3	0.388
Ease to respond electronically	0.91	3	0.835
Security and data protection challenges	0.90	4	0.160
Reduced level of personal contact	0.90	4	0.190
Availability of technological infrastructure	0.90	4	0.960
Reliability of e-procurement systems/tools	0.89	5	0.780
Compatibility of e-procurement systems/tools	0.89	5	0.731
Ease of integration of systems with existing processes	0.89	5	0.759
Ease of engagement between parties	0.89	5	0.230
Cost of e-procurement technology	0.87	6	0.675
Lack of top management support	0.86	7	0.075
Unreliability of e-procurement softwares/tools	0.85	8	0.311
Loss of job fear and end to corruption	0.85	8	0.115
Age, size and category of firm	0.85	8	0.192
Illegality of e-procurement contract	0.84	9	0.286
Poor ICT/Internet infrastructure	0.84	9	0.162
Poor financial base	0.83	10	0.539
Unavailability of technical expertise	0.83	10	0.106
Unreliable power supply	0.77	11	0.141
Lack of confidentiality and flexibility	0.77	11	0.990
Resistance to change	0.76	12	0.994
Safety and insecurity issues	0.66	13	0.176
Unreliability of technology	0.37	14	0.286

4.6. Discussion of Findings

Croom and Johnson (2003) corroborated that E-procurement implementation can be expensive, particularly, in instances when a process based on disagreeing platforms is to be incorporated at a later date. The more distinct the technical platforms, the more prohibitive it becomes. Findings from this research show that the cost of e-procurement technology is high. The cost of e-procurement technology has high MIS among other factors as ranked by construction firms in Ondo state, Nigeria. The findings of the result slightly affirm that of Azanlerigu and Akay (2015), which presented the factors influencing its adoption to be: lack of technical expertise, the inadequacy of legal framework, inadequate technological infrastructure, and security of procurement transaction data. The quantitative result strongly correlates with the findings made by Ibem and Laryea (2015) which have ease of transitioning from paper to electronic system in e-Procurement as the most influential factor

influencing the decision to use e-Procurement. Moreover, both results also slightly corroborate that of Asian Development Bank (2013) which have the most important factors influencing the adoption of e-Procurement to be; government direction, policy & legal framework, agencies change, awareness & capacity building, technology etc.

Aduwo (2016) explained the lack of critical mass uptake of e-Procurement and its non-adoption in the Nigerian Building Industry (NBI) to be principally due to; internal factors within the organizations, external factors outside the organizations and the perception of the risks associated with the use of e-Procurement by people in the industry as it was established in this research that the influential of overall construction firm in a descending manner is ease of transitioning from paper to electronic form; availability of policies to promote the use of e-procurement; cost of e-procurement technology; lower cost of technology; ease to respond electronically; availability of infrastructure to promote e-procurement; speed in transaction; availability of technological infrastructure; security and data protection challenges; reliability of e-procurement systems/tools; compatibility of e-procurement system/tools; ease of integration of systems with existing processes; ease of engagement between parties; unreliable power supply; safety and insecurity issues; age, size and category of firm; poor financial base; unreliability of technology; poor ICT/Internet infrastructure; reduced level of personal contact; unavailability of technical expertise; lack of top management support; unreliability of e-procurement software/tools; resistance to change; loss of job fear and end to corruption; lack of confidentiality and flexibility and illegality of e-procurement contract.

4.7. Implications of the Study

E-Procurement technology and its implementations in the construction industry are currently in their infancy and are going through growth pains not unique to emerging innovations and evolving initiatives. Companies that use e-procurement will attract value propositions for greater organizational efficiency and reduced costs and cycle times. This cost reduction is related to reduced paperwork, which translates into fewer errors and a more effective procurement process. Simplifying the procurement process that e-procurement systems are credited with also has a positive effect on the procurement cycle period. While not directly quantifiable into Naira, faster cycle time provides increased flexibility and more up-to-date information. E-Procurement and its adoption in the construction industry is still a subject of much discussion and great expectation. Therefore, there is much potential for research work to be carried out within the context of the Nigerian construction industry.

5. CONCLUSION AND RECOMMENDATIONS

This study was carried out to assess e-procurement adopted by construction firms in Ondo state, Nigeria. The research has contributed to the body of knowledge by assessing the general factors influencing the adoption of E-procurement in the Nigerian construction industry. It is evident that from the Small size construction firms in Nigeria that the most important factor influencing e-procurement is the unavailability of technical expertise, followed by the poor financial base, age, size and category of firms and lack of top management support. For the Medium size firms' unavailability of technical expertise ranked the highest factor influencing e-procurement, followed by age, size, and category of firms, poor financial base and lack of top management support. For the Large size firms,

poor financial base ranked the highest factor influencing e-procurement, followed by age, size and category of firms, lack of top management support, and unavailability of technical expertise It is conspicuous from all indications that the construction firms have ease of transitioning from paper to electronic systems as the most important factor influencing the adoption of e-procurement followed by availability of policies to promote e-procurement, followed by cost of e-procurement technology, lower cost of technology, ease to respond electronically, availability of infrastructure to promote e-procurement, followed by the speed in the transaction, availability of technological infrastructure, security and data protection challenges.

It is established from the study that E-procurement implementation can be expensive among construction firms in Nigeria, particularly, in instances when a process based on disagreeing platforms is to be incorporated at a later date. The more distinct the technical platforms, the more prohibitive it becomes. This research shows that the cost of e-procurement technology is high. The cost of e-procurement technology has high MIS among other factors as ranked by construction firms in the research area. To the limitation of the study, the procedure utilized in this investigation can be imitated in different areas for additionally thinks about. Moreover, additional studies may use more strategies in gathering more reliable data on E-procurement implementation. For this study, the questionnaire was well utilized, using several methods will make the results more flexible and precise Method such as interview, comparing data and many more should be adopted. The limitation is inherent in the population of the study.

It is recommended from the study that rampant adoption requires the government to provide adequate solutions to the external factors influencing the adoption of e-Procurement such as; unreliable power supply, unavailability of technical expertise and legal recognition etc. Nigerian government should develop keen interest in e-Procurement and adopts its use in the majority of their projects. Practitioners should examine the perceived benefits and embrace its use, irrespective of the cost and technicality. Construction firms should be encouraged through educational trainings on e-procurement systems and facilities.

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