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PERSPECTIVES ON THE BENEFITS OF E-PROCUREMENT TO THE NIGERIAN CONSTRUCTION INDUSTRY

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ABSTRACT

Purpose: The e-procurement platform is an innovative tool that can reduce many of the challenges of the Nigerian construction industry. E-Procurement systems are believed to have the ability to tackle some of the bottlenecks of the traditional processes of procuring goods, services and managing the entire procurement process in the construction sector. This paper thus x-rayed the benefits of e-procurement in the Nigerian Construction Industry based on the perspectives of construction professionals in Ondo State.

Design/methodology/approach: To achieve this aim, the quantitative research design was employed in which, professionals were chosen from construction organisations (contracting and consulting firms) and were asked to express their perception of the benefits of e-procurement on a 5-point Likert scale-based questionnaire. 84 copies of questionnaire were administered in the study area. Out of which a total of 53 copies were completed, returned and successfully deemed fit for analysis. Data obtained was analysed using the Mean Item Score (MIS) and Kruskal-Wallis test.

Findings: It was observed that respondents from small-sized firms ranked all benefits high but the highest-ranked benefit is "cost and time saving". Also, the medium-sized firms ranked all benefits high but the highest-ranked benefit is "less paperwork". Similarly, respondents from the large-sized firms also ranked all benefits high but the highest-ranked among the benefits is "cost and time savings". Overall, "cost and time savings" was ranked as the top most benefit of e-procurement in the Nigerian construction industry.

Research limitations/Implications: The limitations include the use of Ondo State alone as the study area and reliance on solely questionnaires to obtain data. Methods such as interview as well as comparative studies should be considered in future studies. The contribution of this study to the body of knowledge is that it was able to substantiate the benefits of e-procurement and its importance in improving the construction process in the Nigerian construction industry.

Practical implications: This study recommends that practitioners and government should examine the perceived benefits and notice the fact that they were all highly rated by all the groups of respondents. This should encourage the drive towards the entrenchment of e-procurement in construction processes, irrespective of the cost and initial technical limitation.

Originality/value – The study revealed the perspectives of three categories of construction organisations on the benefits of e-procurement and the need to encourage the drive towards the entrenchment of e-procurement in construction processes, irrespective of the cost and initial technical limitation in the Nigerian construction industry.

Keywords: Construction industry, E-procurement, Firms, Professional, Technology

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1. INTRODUCTION

E-procurement has been maximally used worldwide but mainly for the goods and services industries, as indicated by Davila, Gupta & Palmer (2003), Hawking, Stein, Wyld and Foster (2004), Kheng and Al-hawamdeh (2002). Despite the uses of E-procurement in several areas of the economy, less success has been recorded in the construction industry. According to Eadie, Perera, Heaney & Carlisle, J. (2007), the use of information and communication technology in construction firms will continue to be 'piecemeal', only the organizations that can utilize Information and Communication Technology in their business processes will be able to integrate construction processes and procedures. Factors like computer illiteracy and inadequate knowledge of ICT have been cited among the reasons for the low adoption of ICT in the construction industry in many countries (Samuelson, 2008). Another fact is that construction firms' core business activities are performed basically on construction sites and applications upholding actual work on-site are hard to find (Esben, 2012). Also, the low adoption of e-procurement in the Nigerian construction industry is attributed to the many investment areas needed for e-procurement investment (i.e. people, process and technology) and, perhaps, a clear understanding of its benefits. Generally, it is believed that e-procurement is costly and adopting e-procurement requires substantial changes in the internal processes of organizations.

The development of internet technology has profoundly changed the way the construction industry does business. It has been over 40 years since the introduction of ICT tools and systems into the construction industry, yet some organizations are still unable to obtain the many potential benefits of ICT investment - many years after the initial expenditures have been incurred. Furthermore, the industry has been identified as 'slow' in embracing innovative ICT tools and systems such as e-commerce, e-Procurement, e-Tendering, etc. Therefore, an increase in the availability of information related to value benefit will be significant as one of the primary motivations for professionals in the industry to adapt to new technologies. The opportunity for direct benefits in their operations may drive change (Isikdag et al., 2011). As the construction industry implements e-Procurement, decision-makers need benchmarks to understand the value of e-Procurement for organizations and projects. Therefore, this paper aims to reveal the understanding of professionals on the benefits of e-procurement in the Nigerian Construction Industry and thus to provide a benchmark for future studies.

2. LITERATURE REVIEW

Studies on the adoption of e-procurement in the construction industry emerged in the early 2000s as indicated by Isikdag et al. (2011). There have also been studies on the benefits of e-procurement (for examples Issa et al., 2003; Aranda-Mena, 2004; Rankin et al., 2006; Hashim, Said &Idris, 2013). The purpose of this section of this paper is to discuss global submissions on the key benefits of e-procurement in the Construction industry. e-Procurement generally causes a reduction in transactional costs, achieves faster and automated transactions, and helps the buyer to focus more on the strategic part of procurement. This explains the findings of Croom and Brandon-Jones (2007) who observed that e-procurement include savings in purchasing transaction cost, resulting from less paperwork, fewer mistakes and a more efficient purchasing process. Eakin (2003) also classified e-Procurement benefits into three, by noting that the principle metrics that will demonstrate a return on investment (ROI) in e-Procurement are:

i. Hard benefits (directly measurable), which are required to deliver enhanced shareholder value and thus gain approval, such as price savings and process cost reduction.
ii. Soft benefits (indirect benefits), whose direct effect on cash flow may be difficult to quantify accurately (i.e. individual time freed up through more efficient processes), but may well be indicative of progress.
iii. Intangibles, which are benefits but are not directly measurable in financial terms. It is important not to misclassify soft but measurable benefits as intangible, just because measurement may be more difficult. Intangibles include cultural change, e-platform financial approval for all spending, high visibility of supplier performance.

Oladapo (2006) observed that the three main benefits of ICT oriented solutions like e-Procurement are; makes the professional job easier, facilitates decision making and savings in operating cost. E-Procurement also offers some of the best solutions to human inefficiency which according to Olusegun (2017), are so severe in the Nigerian Construction Industry. Also looking at e-Procurement models like e-tendering in quantity surveying firms, its benefits include: simplifying the process; reduced tendering period; fast and accurate pre-qualification and evaluation, avoiding the need for double or triple entry of the same information, and the reduction in labour-intensive tasks of receipt, recording and distribution of tender documents.

Oyediran and Akintola (2011) examined the state of e-tendering among 66 architects, contractors, engineers and quantity surveyors. The study found out that general lack of basic e-tendering infrastructure, low proficiency in the use of e-tendering technologies, irregular power supply, cost of e-tendering technologies and absence of legal backing for electronic transactions were the key barriers to the uptake of e-tendering in Nigeria. Further, a recent comparative analysis of barriers to e-procurement among quantity surveyors in the UK and Nigeria was conducted by Bello and Iyagba (2013). That study was based on the findings of earlier research conducted by Eadie et al (2012) as previously highlighted. The result revealed that there was no significant difference in the barriers to e-procurement as seen from the lens of quantity surveyors in the two countries; suggesting that despite the technological, socio-cultural and economic differences between the UK and Nigeria the barriers to e-procurement use in the two countries are similar.

There is increased integrity and transparency in the tendering process, reasonably high return on invested funds on such technology, improved quality of tender specification and supplier response and provision of quality management information (Lou & Ashalwi 2009; Oyediran & Akintola, 2011). Proponents of e-procurement argue that it helps governments to save money and provides a more accountable, effective and faster way to manage procurement by streamlining government acquisition processes and integrating technology infrastructures (Azadegan & Ashenbaum, 2009). Neef (2001) highlighted the potential benefits of e-Procurement to be the following; lowered transaction costs, faster ordering, wider vendor choices, standardised, more efficient procurement processes, greater control over procurement spending (less maverick buying) and better employee compliance, more accessible internet alternatives for buyers, less paperwork and fewer repetitious administrative procedures, reengineered procurement workflows. E-Procurement provides a wide range of important innovations that can drive adoption (Aslani, Laios & Moschuris, 2008; Aberdeen Group, 2009). It can transform the purchasing process from an operational to a strategic activity (Gupta & Narain, 2012). The benefits of e-Procurement according to Baily, et al (2008), Public Procurement

Authority (PPA) (2011), Chomchaiya (2014), Bikshapathi (2006) and Subramarian and Shaw (2002) include reduced administrative procedures, shortened procurement cycle times, reduced transaction cost, improved efficiency and transparency, and sharing of information. It should be noted that the aforementioned studies were conducted in different parts of the world –developed and developing countries, but the outcome remains a pool of benefits probably applicable to the overall construction process.

According to Eadie et al (2007), an organization that uses e-Procurement has some advantages. First is price reduction in tendering; Empirical studies carried out in the United States of America indicated that the two most important measures for the success of procurement processes are cost and time. In this method, there is no paperwork, postage fee and other costs associated with the preparation and sending of order documents. It is also faster to send a document electronically as compared to the manual process of sending tender documents through the post office. In addition, it makes tracking and tracing of orders better, for it is much easier to trace the orders and make necessary corrections in case an error is observed in the previous order.

Secondly, there is a reduction in time required to source materials; this reduction in time has been acknowledged as a relevant benefit of e-procurement by Bikshapathi (2006). Bikshapathi (2006) stated that "e-Procurement is a rapid efficient method of finding and connecting new sources, being a lean channel for communication". A lot of time is spent on paper invoicing in terms of writing, filing and postal communication but while in e-Procurement, staff have sufficient time to engage on strategic issues of procurement. The time wasted in moving from one town or country to look for potential contractors is greatly reduced since, with a click of a button, information can be readily gotten from the internet. Thirdly, it lowers administration cost. Rankin et al. (2006) argue that e-procurement results in a paperwork reduction and this leads to lower administration costs.

Fourthly, reduction in procurement staff; since most of the procurement process is done electronically, the number of staff needed to facilitate the process reduces. Eadie et al (2007) noted the reduction in staff is an important way of producing a competitive advantage through reduced costs. Another benefit of e-procurement is an improvement of communication; Eadie et al (2007) argue that e-procurement allows sections of electronic documentation to flow through the supply chain; it improves the speed of returns and contractor price visibility. The study further stated that since it is easier to communicate requirements in a quicker and more accessible manner, it will result in a better understanding of requirements and due compliance besides allowing clients to gauge the state of the market by seeing how much interest is shown in the tender. A reduced operating and inventory cost is also another benefit of e-procurement; this is from the fact that that much if not all paperwork is eliminated. Postage costs are also not incurred, among other expenses associated with sending and receiving documents when sending them by post. Other benefits are enhanced inventory management, increased accuracy of production capacity and negotiated unit cost reduction (Subramarian & Shaw, 2002). There have been some studies related to e-procurement across continents, some have even highlighted the benefits of e-procurement but with a limited focus on the entire procurement process in the construction industry. Perhaps, none has also been done in recent time to establish derivable benefits of e-procurement even though its deployment is still limited to date. This raises the question of whether the benefits are understood by concerned construction industry stakeholders, hence this study.

3. METHODOLOGY

A quantitative research design was adopted for the study and it was based on the set objective of the study, which is, to evaluate the benefits of e-procurement to the construction industry. Following the review of related literature, various benefits of e-procurement were identified and presented in a well-prepared questionnaire and face-validated by respected academics. Through the administration of the well-structured questionnaires, the data required for achieving the objective of the study was attained. The eighty-four construction organisations (construction and consultancy) identified in Ondo State which is the study area formed the population for this study. Therefore, since the population was manageable, census survey of the eighty-four (84) construction organisations was adopted in this study. . The choice of the population for this study is based on the fact that construction organisations are key in the construction industry and they greatly influence and are influenced by changes in the construction industry. Data was collected from construction professionals in the organisations, such as; Architects, Quantity surveyors, Builders and Engineers. The respondents were asked to express their level of assessment of the benefits of e-procurement on a 5-point Likert scale of 1 to 5 with 1 being "very low" and 5 being "very high". At the end of data collection, a total of 53 copies were completed, returned and deemed fit for analysis which represent 63% of the total population set for the study. Mean Item Score was used in ranking the forms of e-procurement while the Kruskal-Wallis test was employed in assessing the difference in the view of the three categories of respondents on the benefits of e-procurement. The possibility of a disparity in perception of benefits of e-Procurement by different firm sizes inspired the classification of responses and analysis into small, medium and large firms. CSES (2012) and Ward & Rhodes (2014) defined micro-businesses as business organisations with 0-9 employees, small-sized enterprises are businesses with employees between 10 – 49 employees and medium-sized enterprises are businesses with 50 – 249 employees, while large enterprises have above 249 employees. It should be noted that some of the organisations that responded have branches outside Ondo State. The score "3.5" was selected as a reference benchmark (decision rule) for mean item score interpretation.

4. PRESENTATION AND DISCUSSION OF FINDINGS

4.1. Benefits of e-Procurement to the Construction industry

Respondents ranked the benefit of e-procurement on a Likert scale of one to five, with one being "very low" benefit and five being "very high" benefit. The result is presented in Table 1. From Table 1, it is evident that the Small size firms ranked all benefits higher than 3.5 and the highest-ranked benefit is "cost and time saving" with an MIS value of 5.00. The Medium size firms also ranked all benefits higher than the 3.50 benchmark and the highest-ranked is "less paperwork" with an MIS value of 4.71. The Large size firms also ranked all benefits high, the highest-rated is "cost and time savings" with an MIS value of 4.74. For overall firm rating, all factors ranked higher than 3.50 and the top most ranked is "cost and time savings" with an MIS value of 4.68. Kruskal-Wallis test showed that all factors have a significant p-value of above 0.05 (ranging from 0.058 - 0.907) except one (supply chain visibility) which has a significant p-value of 0.031. 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 16 benefits of e-procurement. However, there is a significant difference in the view of the respondents as regards the benefit of "supply chain visibility" of e-Procurement in construction organisations.

Table 1: Benefits of E-procurement to Construction Firms

Factor	Micro/Small Size Firms		Medium Size Firms		Large Size Firms		Overall		Kruskal Wallis
	MIS	RK	MIS	RK	MIS	RK	MIS	RK	Sig.
Cost and time savings	5.00	1	4.43	4	4.74	1	4.68	1	0.058
Increased flexibility	4.80	2	4.57	2	4.68	2	4.66	2	0.217
Less paper work	4.40	4	4.71	1	4.47	8	4.53	3	0.075
Profitability on firms activities	4.20	5	4.43	4	4.62	3	4.53	3	0.212
Effective communication	4.60	3	4.36	5	4.59	4	4.53	3	0.466
Increased quality	4.20	5	4.50	3	4.53	6	4.49	4	0.598
Reduction in corruption	4.60	3	4.36	5	4.53	6	4.49	4	0.663
High return on investment	4.80	2	4.29	6	4.53	6	4.49	4	0.443
Faster and automated transaction	4.60	3	4.50	3	4.44	9	4.47	5	0.511
Simplified tendering process and period	4.60	3	4.36	5	4.50	7	4.47	5	0.504
Reduced entry in tendering	4.60	3	4.29	6	4.53	6	4.47	5	0.212
Reduction in errors	4.40	4	4.21	7	4.56	5	4.45	6	0.090
Eliminate geographical barriers	4.60	3	4.21	7	4.53	6	4.45	6	0.300
Supply chain visibility	4.40	4	4.07	8	4.59	4	4.43	7	0.031*
Efficient purchasing process	4.40	4	4.36	5	4.47	8	4.43	7	0.907
Improved inventory management	4.20	5	4.36	5	4.44	9	4.4	8	0.663

4.2. Discussion of Findings

The quantitative result shows that cost and time savings, increased flexibility and less paperwork are the most important benefits of adopting e-Procurement to professionals and organisations. Eadie et al (2007) stated that e-procurement saves cost and time, and this aligns with the result of this study. E-Procurement is believed to ensure cost-effectiveness, less paperwork and less waste from paper use, as well as less space being occupied with papers. In addition, its ability to provide flexibility implies that practitioners adjust and coordinate procurement activities with much freedom and ease to achieve procurement objectives. These findings also corroborate the findings of Croom and Brandon-Jones (2007) which described the benefits of adopting e-Procurement to include; savings in purchasing and transaction cost, less paperwork, fewer mistakes and a more efficient purchasing process. In addition, the quantitative result strongly underpins the submission of Ibem et al., (2016). Ibem submitted that the decision to consider e-procurement by organizations in the Nigerian Building Industry (NBI) is dependent on perceived benefits such as the promotion of efficiency in project delivery, elimination of geographic barrier to participation in procurement activities and improvement of effective communication among project team members. The results also correspond with the

previous studies of Issa et al., (2003); Rankin et al., (2006); and Eadie et al., (2007) which identified the perceived benefits of e-procurement to include cost/time savings and reduction in paperwork. It is worthy of note that the three groups of respondents only significantly differ on one of the listed benefits of e-procurement (supply chain visibility). This outcome signifies a pleasant level of consensus.

Profitability of construction, increased quality, improved inventory management is the least rated benefits by respondents from small-sized firms, even though the variable were all rated highly. Submissions from medium-sized firms showed that reduction in error and elimination of the geographical barrier is the least ranked. Also, the large-sized firm respondents supply chain visibility and efficient purchasing process as the least rated benefits. It is worthy of note that although these variables were ranked low, they all had a mean item score above 4.00 out of a possible maximum of 5.00. It is expected that how benefits are perceived will determine the level of adoption of a system or a practice. The fact that all variables are highly rated should encourage stakeholders in the construction sector to earnestly appraise and consider a significant implementation of the e-procurement system. Based on the current public health challenge of the world that has given rise to remote working in different sectors, there might not be a better time to advocate for the deployment of e-procurement. Though not focused on the construction industry but generally on the public sector, Ash and Burn (2006) also outlined the benefits of e-procurement to include increased invoicing accuracy, better pricing as a result of a reduction in working capital, improved tracking and lower total cost of ownership. There appears to be a huge alignment between the benefits of e-procurement in the construction industry as well as the public sector generally. To achieve or improve the listed benefits, Atmaja and Sferianto (2021) recommended the existence of a quality system and procedures, quality information and quality service in the e-Procurement applications and processes.

5. CONCLUSION AND RECOMMENDATIONS

In this paper, the benefits of e-procurement in the Nigerian construction industry was examined using data derived from an industry-based survey. From the result, it is evident that small-sized, medium-sized and large-sized firms ranked all benefits high. From the overall result, “cost and time savings” was ranked as the topmost benefit of e-procurement in the Nigerian construction industry. To enhance the good prospects and maximise the benefits of e-procurement use in the Nigerian construction industry, the following recommendations have been put forward. Stakeholders should display a renewed interest in e-Procurement adoption going by the high rating attached to benefits by the respondents. Stakeholders should examine the perceived benefits and embrace e-procurement beyond the purchase of materials and equipment but also for the entire project procurement process, irrespective of the cost and technical issues. On the limitation of the study, subsequent studies may use more strategies in gathering complimentary or much more reliable data on e-procurement benefits. In this study, the questionnaire was well utilized, but using several methods will make the results more comprehensive and perhaps more revelatory. Methods such as interview as well as comparative studies should be considered.

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