

ELECTRONIC PROCUREMENT PRACTICES AND SUSTAINABLE ORGANIZATIONAL COMPETITIVE ADVANTAGE OF THE UPSTREAM SECTOR OF THE OIL AND GAS FIRMS IN NIGERIA

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Abstract

This study examined the impact of electronic procurement practices and sustainable organizational competitive advantage of the upstream sector of the oil and gas firms in Nigeria. Specifically, it assessed the relationship between electronic tendering, electronic invoicing, electronic payment, and electronic auctioning and sustainable competitive advantage of some selected upstream sector of the Nigerian oil and gas companies in the Niger-Delta region of Nigeria. The ex-post facto and survey research design were adopted for this study. The population of the study were the employees and management staff of the procurement department of the respective upstream oil and gas firms in the Niger-Delta region of Nigeria. A total of 224 copies of questionnaire were distributed and while 220 were successfully retrieved. Convenience sampling technique was used in administering the copies of questionnaire to the staff that constituted the sample. The research model was estimated using the Ordinary Least Squares (OLS) technique through the use of Statistical Package for Social Sciences (SPSS) Version 22. The study found that that electronic tendering, electronic invoicing and electronic payment have positive significant relationship with sustainable organizational competitive advantage in the upstream oil and gas industry while electronic auctioning has no significant influence but has positive relationship with sustainable organizational competitive advantage in upstream oil and gas industry. The study recommends that management of organizations should encourage the practice of electronic tendering, automate the practice of invoicing and ensure all payments are carried out using e-payment to implement electronic auctioning practices as all these will lead to sustainable organizational competitive advantage of the organizations.

Keywords: Electronic Auctioning, Electronic Invoicing, Electronic Payment, Electronic Tendering, and Sustainable Competitive Advantage

JEL Classification: M1, G14, C44, H57

1. INTRODUCTION

The role of the oil and gas sector in Nigeria's nation building cannot be overemphasized. It is the prime aspect of the nation's industry that provides the revenue that ensures the wellbeing of every citizen. The smooth running of oil and gas firms is a key element in the promotion of broad-based socio-economic growth and development of a nation. The oil and gas firms in Nigeria have evolved over the years and are confronted with some daunting challenges in the face of profitable opportunities (Agagu & Adu, 2008). These challenges typically manifest in terms of poor deployment of infrastructure/equipment, youths restiveness, pollution of the environment, unfavourable government policies and implementation, among others. To surmount these challenges, the oil and gas firms in Nigeria must be efficient in their use of resources and benchmark their performance against that of their peers across the globe. Hence, the need for the oil and gas firms of the country to examine areas that will assist in the improvement of operational performance vis-à-vis competitive advantage that is sustainable. This can be ensured through proper planning and execution of strategies such as the deployment of electronic procurement system (EPS) that will continuously make them relevant in the face of global competition.

In the views of Croom and Brandon-Jones (2004), EPS is the use of Internet-based information and communication technologies (ICTs) to perform the processes of procurement. The processes of procurement for materials and items include searching, sourcing, negotiation, ordering, receipt and post-purchase review and among others. Davila, Gupta and Palmer (2002) explained that EPS is a technological innovation that expedites the purchase of products by organizations through the Internet. MacManus (2002) posited that EPS is an application that can be used to improve proficiency and the performance of the organization. The achievement of improved proficiency and performance by organizations through the adoption of EPS can be seen in the areas of transparency, accountability, and relative advantage, prompt exchange of information, reduced operational costs and among others.

With the advent of the Internet and today's global competitive oil and gas firms, the delivering of quality and innovative services to clients by the oil and gas firms cannot be over emphasised. It is a must for their continuous survival. Consequently, many oil and gas firms are shifting their operational mode from the old-style (traditional) procurement system to the adoption of EPS in order to have improved business efficiency (Davila et al., 2003). The consequences of the continuous use of traditional procurement system by organizations range from lack of access to swift information, labour-intensive, lack of continuous replenishment

supply model, inefficiency etcetera (Omogbe & Osifo, 2020). The adoption of EPS by the oil and gas firms has the potential benefits to increase service firm's competitive advantages on the basis of improved clients' satisfaction with groundbreaking ideas, reduction in the total cost of material acquisition, timely delivery of materials, improved profitability, elimination of paperwork, improved suppliers' relationships with the oil and gas industry management, enhanced operational efficiency and improved procurement process transparency/accountability (Trkman & McCormack, 2010; Matunga, Nyanamba & Okibo, 2013).

The implementation of electronic procurement system practices such as e-tendering, e-invoicing, e-marketing, e-payment, among others is expected to strategically anticipate and manage change in the oil and gas sector (Davila et al., 2002). This will provide ad-hoc solutions issues of EPS whenever necessary. Organizations that implement e-procurement strategic management perspectives will accomplish gains in efficiency. The gains can be seen through substitution of paperwork for new electronically enabled collaboration and integration of tendering data by clients and the reduction in the cost of purchasing by the organization (Davila et al, 2004; Omogbe & Osifo, 2020). In fact, the use of e-procurement system can be the engine for sustainable development and organizational competitiveness (McCue & Roman, 2012). EPS enables an opportunity to increase strong coordination and collaboration by enhancing relationship between supplier and buyer, and efficient integration of the process electronically.

However, the use of e-procurement in achieving the goals of sustainable organizational competitive advantage through the increase in organizational performance and improvement in the ability of the organization to deliver goods and/or services using the Internet is a major challenge for the oil and gas firms. To this end, this study examines electronic procurement practices and sustainable competitive advantage of the upstream oil and gas firms in Nigeria.

1.1. STATEMENT OF THE RESEARCH PROBLEM

The advent of the Internet has made e-procurement system usage by firms gain increased dominance and enhanced competitiveness (Matunga et al, 2013). Omogbe and Osifo (2020) emphasized that despite the current trend towards e-procurement system practices as a cost effective way in creating more values to customers/clients, reaching suppliers and business allies in a way to gain market share and competitive advantage, many firms in Nigeria are still trailing behind in its adoption and implementation. The hesitation to adopt electronic procurement system by some firms stems from lack of availability of the facilities necessary for EPS adoption (Matunga et al, 2013). Most firms in Nigeria use computers that lack applications/packages, facilities and capacities for carrying out trusted and secured electronic procurement system couple with poor network service, lack of accountability and openness in the process of procurement for goods (Omogbe & Osifo, 2020). These challenges have seemingly and practically made it difficult for some firms in Nigeria to have appropriate technique in consulting, bidding, payment

and contracting the supply of materials to contractors. The absence of an electronic procurement initiative by some firms in Nigeria has led to poor efficiency in achieving the best treaty of the supply contract in service delivery. Thus, it has caused low suppliers' satisfaction and possibly threatened competitive advantage of the firms.

In recent time, there have been a number of criticisms against the traditional mode of procurement system process by some firms in Nigeria. These procurement mode of practices complaints range from poor handling of procurement information about the procurement process thus leading to excessive corruption, delay in timely supply of materials, unnecessary exploitation of clients/contractors through unsolicited gratifications, issue of poor tendering, delay in payment of suppliers due to the deferment in granting permissions for the supply of materials. In bracing up towards the maximization of productivity, the Nigerian oil and gas firms have to depart from the use of traditional procurement system to electronic procurement system practices. It therefore becomes imperative to examine the electronic procurement practices on sustainable competitive advantage of upstream oil and gas firms in Nigeria and the study fills that gap in knowledge.

A number of studies on the relationship between electronic procurement system practices and organizational competitive advantage have been performed (Vaidya, Sajeev & Callender, 2006; McCue & Roman, 2012; Oribi & Bichanga, 2015; Chegugu & Yusuf, 2017; Oteki, Namusonge, Sakwa & Ngeno, 2018). From the various studies highlighted, attempts were made by some scholars to analyse the influence of EPS in the public sector (Vaidya, Sajeev & Callender, 2006; Chegugu & Yusuf, 2017; McCue & Roman, 2012). In similar manner, most studies examined the influence of electronic procurement system in the foodservice sector (Oteki et al, 2018) and in the textile industry (Yen & Ng, 2013). These numerous studies represent efforts to address diverse and thought-provoking aspects of electronic procurement system initiatives. However, there is dearth of empirical studies in addressing the relationship between electronic procurement system practices and organizational competitive advantage in the upstream oil and gas sector in Nigeria.

This study thus contributes to extant literature by analysing the impact of electronic procurement practices on sustainable competitive advantage of the upstream oil and gas firms in Nigeria by analysing copies of the questionnaire successfully retrieved by employing diagnostic test like principal component analysis, Kaiser-Meyer-Olkin (KMO index) measure of sampling adequacy tests and the Bartlett's test for sphericity, Pearson correlation matrix and as well as the ordinary least squares (OLS) regression.

1.2. OBJECTIVES OF THE STUDY

The broad objective of this study was to analyse the relationship between electronic-procurement practices and sustainable competitive advantage of some

selected Nigerian upstream oil and gas firms in the Niger-Delta region of Nigeria. The specific objectives of the study were to:

- i) determine the extent to which electronic tendering influence sustainable competitive advantage of some selected Nigerian upstream oil and gas firms in the Niger-Delta region of Nigeria;
- ii) examine the extent to which electronic invoicing influence sustainable competitive advantage of some selected Nigerian upstream oil and gas firms in the Niger-Delta region of Nigeria;
- iii) investigate the extent to which electronic payment influence sustainable competitive advantage of some selected Nigerian upstream oil and gas firms in the Niger-Delta region of Nigeria; and
- iv) ascertain the extent to which electronic auctioning influence sustainable competitive advantage of some selected Nigerian upstream oil and gas firms in the Niger-Delta region of Nigeria.

1.3. RESEARCH HYPOTHESES

The following hypotheses in their null forms were tested to guide the direction of the study.

- i) Electronic tendering does not significantly influence sustainable competitive advantage of some selected Nigerian upstream oil and gas firms in the Niger-Delta region of Nigeria.
- ii) Electronic invoicing does not significantly influence sustainable competitive advantage of some selected Nigerian upstream oil and gas firms in the Niger-Delta region of Nigeria.
- iii) Electronic payment does not significantly influence sustainable competitive advantage of some selected Nigerian upstream oil and gas firms in the Niger-Delta region of Nigeria.
- iv) Electronic auctioning does not significantly influence sustainable competitive advantage of some selected Nigerian upstream oil and gas firms in the Niger-Delta region of Nigeria.

2. LITERATURE REVIEW

2.1. CONCEPT OF SUSTAINABILITY OF FIRM'S COMPETITIVE ADVANTAGE

In the views of Reed, Lemak and Mero (2000), competitive advantage is the result of the organization's strategy that creates increased value for a firm, relative to that of its competitors. Competitive advantage is an organization's uniquely ability and capabilities to do something better, faster, cheaper when compared with rival firms in the marketplace (Omogbe & Eniola, 2017). Omogbe and Eniola (2017)

posit that these unique factors encompass capabilities such as innovations, expertise, technology, strategy, skills and knowledge, the ways the employees are managed, ability to manage change, processes that allow a firm to be successful and differentiate itself from its competitors. Consequently, these unique factors help firms to create more economic value than its rivals. The various definitions emphasize that firms use competitive advantage as a leverage to be ahead of likely competitors in the industry. This aids in the offering of customers better and greater value.

The successful implementation of EPS practices has the ability to create a unique advantage for the firms as a worthwhile business strategy. It ensures a defining capability for organizational sustainable competitive advantage as it will place the firm at superior position. This will make the firm to outperform potential competitors. Consequently, sustainability of competitive advantage thrives in organizations that embrace new innovations such as e-procurement system and management of available resources effectively and efficiently.

2.2. CONCEPT OF ELECTRONIC PROCUREMENT SYSTEM (EPS) PRACTICES

In the views of Minahan and Degan (2001), EPS is the use of the Internet to implement the purchasing process between buyer and supplier. Wu, Zsidişin and Ross (2007) posited that electronic procurement system is the application of computerised system to enable supply of goods on the Internet. Yen and Ng (2003) emphasised that the purchasing process of goods through the Internet may involve enterprise-to-enterprise, enterprise-to-consumer or enterprise-to-government. From the extant literature, we define electronic procurement system as the application that facilitates the process of buyer-supplier exchange of goods and services on the Internet. In other words, electronic procurement system entails the purchasing/selling of goods and services over the Internet. It is a platform that enables organizations link directly with business allies and contractors to allow the process of procurement of materials. To this end, EPS is a business strategy by business enterprises to manage all business dealings, such as bids, inquiries and responses and pricing for products and services. These business relations are related to the supply of materials for the organization. The buying of goods and services on the Internet involve a number of processes, which include searching, information, sourcing, selecting, settlement, negotiation, ordering, receipt and after-sales/management of supplies, among others. However, there are a number of practices that can be performed with the application of EPS in the organization. They include electronic tendering, electronic marketplace, electronic auction/reverse auction and electronic catalogue/purchasing and among others.

Electronic Tendering (E-tendering)

Electronic tendering involves the use of an Internet collaboration platform to provide offerings, queries for information, distribution and receipt of tender

information. It involves a number of processes, which include receipt of tender forms, submission of tender sum and final selection of successful tender for the contracts on the Internet (Matunga et al, 2013). The aim of electronic tendering is to have an improved productivity in the course of tendering. The improved effectiveness and efficiency will be observed in the area of reduction in paper handling, savings in operational cost, and speedy communication and collaboration. The use of less paperwork due to e-tendering results in fewer mistakes and more efficient purchasing process. Hence, electronic tendering is a departure from manual means of handling paper to automated enabled means of communication between two or more parties. One of the major advantages of electronic tendering is the remote accessibility of the system. Thus, making it possible for a tenderer to access the facilities of the tender engine from anywhere in the world without being impeded by geographical location constraints.

Thus, the Internet platform used for tendering should be able to promote acceptable levels of interoperability among the systems (Matunga et al, 2013). To this end, the e-tendering will ease and expedite the process of prequalification, public invitation, submission of tender, close of tender, assessment of tender and award of tender. Hence, any electronic tender system should be able to guarantee legal compliance within a secure environment.

Electronic Auction

An electronic auction is an automated enabled platform that enables suppliers bid online for contracts due to a published specification (Matunga et al, 2013). E-auctions use the Internet to share communications and facilitate collaboration among the parties. The automated enabled platform fosters competition among the suppliers. This ensures that goods and services are supplied at their current market price (MacManus, 2002). Electronic auction is a departure from the traditional competitive bidding to enable decision-making in sourcing for goods and services. One of the major differences between an automated-enabled auction and a traditional competitive bidding process, is that all suppliers can usually see their bids along with the current lowest bid, as well as having the opportunity to re-bid as many times as they wish (McCue & Roman, 2012). However, all bids can be adjusted in real time from a range of variables from other attributes, which allows buyers to view the quoted price, which makes up the total cost of acquisition. Thus, electronic auction is a bidding process that allows participating suppliers submit successively lower priced bids during a specified time period. To this end, electronic auction is aimed at assisting both buyers and suppliers with visibility of bid status and compete dynamically in real-time by allowing an instant response by the various parties.

McCue and Roman (2012) are of the view that if electronic auctioning is properly conducted with a number of participants, it gives room for a more level playing field for suppliers through increased transparency. An electronic auction allows for a bid on price and/or other quantitative attributes such as carriage charge,

quantity discounts, and quality, among others (McCue & Roman, 2012). Hence, electronic auctions can be used to consolidate or renew existing contracts.

However, electronic auction begins with the buyer posting their requirement for goods and services on Web site. Furthermore, a reserve price is generally set, which is a price the suppliers must meet in order to be considered. The buyer then invites suppliers to bid against each other. There is also the forward form of electronic auction. This allows sellers to post single or multiple items in an open ascending price auction. The seller specifies all the requirements, such as quantity, opening bid price and bid increment (Oteki et al, 2018). The seller may set a reserve price; if this price is not met by the end of the auction, the seller is not obligated to sell. Where the reserve price is met then both buyer and seller are obligated to the sale.

The using of Internet enabled platform makes e-auctions to realize real time market pricing for goods and services. This usually results in substantial savings for the buying enterprise. Other benefits according to Vaidya et al (2006) include a reduction in the time to source for goods and services cycle time once the process is ascertained, improved specification of requirements and increased transparency of the process.

Electronic Payment

Electronic payment system is the complete payment processes, instruments, technology structures, procedures, rules, regulations, laws, etcetera that come into play when a payment instruction is made by an end-user (Carr & Smeltzer, 2002). These rules, laws, regulations, devices, technological systems and arrangements put in place by trading partners/stakeholders, government regulation agencies from time to time in all countries ensure that electronic payment systems' effective infrastructural facilities such as the use of electronic digital exchange, personal computer, smart devices, mobile phones, etcetera for monetary interchange are designed and developed (Chegugu & Yusuf, 2017). Thus, electronic payment system is an online enterprise process used for fund transfer between two or more business partners. There are various modes of e-payment systems. They include debit card payment system, credit card payment system, online electronic cash system, electronic cheque system, and smart cards based electronic payment system (Matunga et al, 2013). These modes of e-payment systems are commonly fronted and aided by banks whenever business transactions are made in terms of payments.

Chegugu and Yusuf (2017) stated that electronic payment systems make it easy and economical to promptly pay suppliers on supply delivery. This results in less charges incurred when money is been sent through electronic banking systems. Today, the Internet and the use of Information and Communications Technologies have greatly influenced the acceptance and the usage of electronic payments. Thus, electronic payment system has improved the use of supply chain management. The implementation of the use of website usage by enterprises has to a great degree integrated, much more improved supply chains with full information transparency

and optimal allocation of value-adding processes. Hence, organizations that have fully operationalized their EPS will be able to follow up the process of procurement in determining the payments to be made. Thus, guaranteeing a transparent system that can reduce the cost of operations, which has been flooded with massive corruption in the past when organizations were using manual methods.

Electronic Invoicing

Chegugu and Yusuf (2017) opine that the implementation of electronic invoicing (e-invoicing) reduces the cost of labour for the delivery of hardcopy files as an invoice to suppliers, allies and business partners. They affirm that majority of firms conduct their operations based on information regarding the tenders that the firms conduct; the number of firms that apply the use of e-tendering systems is greater than those that do not have e-procurement process and that most firms prefer to make extra charges based on changes in cost of goods and services.

Walker and Harland (2008) stated that the cost of the deployment of online infrastructural facilities is reduced per business transaction when the volume of transactions increases. Thus, they emphasised on the use of a financially sustainable e-invoicing system. To this end, corporate organizations need to fashion out this critical mass through the use of a value network of business partners and technology system providers to add to the essential desirability for electronic invoicing through the financial supply chain.

2.3. EMPIRICAL REVIEW

Vaidya, Sajeev and Callender (2006) carried out a study on the critical factors that affect EPS adoption success in the public sector. Significant variables of critical success factors were identified in the study. These critical factors that determine the success of adoption of e-procurement are training of stakeholders, supplier adoption, integration of the system, security and verification, re-engineering process, performance measurement, performance of top management, change management program and communication systems. The study revealed that adoption of e-procurement system still remains a major challenge notwithstanding the efforts put by the governments in the reforms towards adoption of e-procurement system. The findings further revealed that management influences are the most significant factors for the achievement of EPS. It recommended that there should be a wider discussion and arrangement as a policy on what defines the pertinent e-procurement system critical success factors in the organizations.

McCue and Roman (2012) examined EPS implementation in United States and Canada. The study made use of survey data from procurement specialists to establish the present position of EPS implementation in United States and Canada. The findings revealed that electronic public procurement was yet to have a substantial transformative change in the countries. Some of the hindrances that led to effective adoption of EPS include inappropriateness of software platforms, organizational resistance, lack of strategic systems' integration and failure to involve

public procurement experts in the design of EPS. The study recommended that in order to capitalize on the gains of transformative nature of Information and Communication Technology in procurement, management, system analysts and procurement specialists must take an active role in both the design of the software and its adoption across political, institutional and behavioural spheres.

Yen and Ng (2013) performed a study on the effects of EPS in the purchasing process on the supply chain by examining the project of textile industry in Hong Kong. They made use of SWOT analysis to describe the influences in each stage of procurement process. Strengths and weaknesses were used as internal efficiency and effectiveness measurement in the purchasing process. Yen and Ng (2013) found that EPS facilitates documentation of the bidding process which in turn enhances transparency, accountability, efficiency and procurement operations.

Matunga *et al* (2013) assessed the extent to which electronic procurement system influences efficient procurement in public hospitals in Kisii, Kenya. The study used a sample of 5 hospitals and made use of e-tendering, e-quotations and e-sourcing as the major EPS variables. It was established that the utmost difficulties confronted when using EPS was lack of capital, inadequate funding, inability to manage change programs and inadequate training of staff on the use of new innovations. The study concluded that public hospitals have implemented some of the EPS irrespective of the challenges associated with its implementation.

Chegugu and Yusuf (2017) examined the impact of EPS practices on the performance of organizations in public hospitals in the county government of Uasin Gishu, Kenya. Specifically, the study investigated the impacts of electronic tendering, electronic invoicing and electronic payment on the performance of organizations. The study made use of the survey research design using a sample size of 367 respondents. The study revealed that there is increased competitiveness in the tendering bid for the hospital and the implementation of electronic invoice will clearly indicate charges from purchasers to suppliers. Furthermore, the study revealed that electronic payment makes it cheap to punctually pay suppliers on supply delivery due to fewer charges incurred upon sending money through electronic banking systems. The study recommended that all hospitals should automate the practice of invoicing so as to promote accountability and transparency in record management. This enables quicker tracking of records and identification of payments to be made to suppliers.

From the review of empirical studies, the foremost gap in this study is centred on geographical space. Most of the studies have been investigated in different developed nations. The study on the influence of electronic procurement practices on sustainable organizational competitive advantage is needed in developing countries because the necessity for the use of innovations that will increase the efficiency and effectiveness of the organizations. Thus, this study was carried out in Nigeria, which is a developing country. Second, the study on the influence of electronic procurement practices on sustainable organizational

competitive advantage was focused in different industries in different parts around the world. Therefore, this study was focused on the oil and gas industry of Nigeria. Therefore, the context of the influence of electronic procurement practices on sustainable organizational competitive advantage in the upstream oil and gas firms in Nigeria has not been given much attention by previous studies. This study made a mark as been able to specifically found out the relationship between electronic invoicing, electronic auction, electronic tendering, and electronic payment with sustainable organizational competitive advantage particularly in the oil and gas firms in Nigeria.

2.4. UNDERPINNING THEORETICAL FRAMEWORK FOR THE STUDY

The theoretical framework for this study is based on the dynamic capability theory (DCT). The DCT is an adoption model for understanding and examining electronic procurement practices and sustainable organizational competitive advantage of the oil and gas firms in Nigeria. The theory proposes that the process that leads to competitive advantage of the firm stems from the effective and efficient usage of the enterprise's particular resource and capability assets (Penrose, 1995). Consequently, the dynamic capabilities framework incorporates managerial decisions regarding the adoption of e-procurement system practices for capability development. Basically, the theory identified the principles of transparency, accountability and efficiency; decline in expenditure; enhancement in the use of resources of the firm through labour discipline; flexibility in decision making; competition in the organization through decentralization and emphasis on result through policies and procedures (Tece, Pisano & Shuen, 2007).

The theory correctly links e-procurement system practices and organizational sustainable competitive advantage. As a conceptualization of effective e-procurement system practices, dynamic capability theory is a persistent drive in ensuring greater accountability, transparency, effectiveness and efficiency in resource allocation of the firm. Against this backdrop, knowledge of the influencing practices of e-procurement system adoption that will lead to sustainable competitive advantage of the upstream oil and gas industry in the Niger-Delta region of Nigeria becomes critical. Hence, the study examined electronic procurement system practices and sustainable organizational competitive advantage of the Nigerian upstream oil and gas industry in the Niger-Delta region of Nigeria premised on the dynamic capability theory.

2.5. OIL AND GAS SECTOR IN NIGERIA

There has been high level of dependence on oil for revenue in Nigeria since oil was discovered in Oloibiri, Bayelsa State by Shell Corporation in 1956 and other parts of Niger-Delta areas such that Nigeria is seen as mono product economy (Iyoha & Itsede, 2004). The oil and gas industry has different structures and is broadly divided into; upstream sector, midstream sector and downstream sector. The

upstream sector activities include; Oil Exploration & Development and Gas Exploration & Development, the Midstream sector is involved in Oil Transportation & Gas Transmission, Gas Processing, Liquefied Natural Gas/Compressed Natural Gas/Gas to Liquid (LNG/CNG/GTL), Derivative Processing/Production and Oil Refining. While the Downstream Sector is concerned with Gas Distribution /Sale, Petroleum product distribution & Storage, Petroleum Product Retail.

The major forms of oil and gas arrangements in Nigeria's upstream sector from the records of DPR (2015) are as follows: Joint Venture (JV); Production Sharing Contracts (PSCs); Service Contract (SC); and Marginal Field Concession (MFC).

The Joint Venture Companies (JVC) is the standard agreement between the national oil companies, that is, the Nigerian National Petroleum Corporation (NNPC) and Multinational Oil Companies (MOCs). Under this arrangement, both NNPC and the MOCs contribute to funding of oil operations in the proportion of their Joint Venture (JV) equity holdings and generally receive crude oil produced in the same ratio. Major operators in the JVs with the NNPC are Shell, ExxonMobil, ChevronTexaco, TotalFinaElf and Agip. It is however important to note that the JV model is currently being phased out in the oil and gas industry, due mainly to the inability of the NNPC to fund its share of JV costs.

As a result of the increasing funding pressure from the JVs, the Federal Government of Nigeria (FGN) adopted the PSC model in 1993 as the preferred petroleum arrangement with MOCs. Apart from awards restricted exclusively to indigenous companies, awards for upstream operations are now made on PSC basis. Under this arrangement, the concession is held by NNPC. NNPC engages the MOCs or the indigenous companies as contractors to conduct petroleum operations on behalf of itself and NNPC. The contractors take on the financing risk. If the exploration is successful, the contractors are entitled to recover its costs on commencement of commercial production. If the operation is not successful, the contractors bear the loss.

Under this model, the Contractor undertakes exploration, development and production activities for and on behalf of NNPC or the concession holder, at its own risk. The concession ownership remains entirely with the NNPC/ holder and the Contractor has no title to the oil produced. The Contractor is reimbursed cost incurred only from proceeds of oil sold and is paid periodical remuneration in accordance with the formulae stipulated in the contract. The Contractor has the first option to buy back the crude oil produced from the concession. The Contractor is assessed to tax on its service fees under the Companies Income Tax Act as amended (CITA) at 30%; while the concession holder (or the NNPC) is assessed to tax under the PPTA.

The Federal Government (FG), in furtherance of its Nigerian Content agenda, encourages MOCs to surrender their marginal fields for assignment to indigenous concession holders. To provide special incentives to marginal field operators, the FG promulgated the Petroleum (Amendment) Act No. 23 and the Marginal Field Operations (Fiscal Regime) Regulations 2005 on the development of

marginal fields. Generally, a Marginal Field is defined as any field that has reserves booked and reported annually to the DPR and has remained unproduced for a period of over 10 years.

3. METHODOLOGY

This study is an ex-post facto and field survey type of research. The justification for the use of the survey research design is that the research is conducted at a particular point in time. This method was also chosen in order to refer to phenomena as they exist in real life. Also, it is relatively economical in terms of time and resources. This study focused on oil and gas firms in the upstream sector operating in the nine states of the Niger Delta zone which comprises of Abia, Akwa-Ibom, Bayelsa, Cross River, Delta, Edo, Imo, Ondo and Rivers for purpose of obtaining information about the firms' electronic procurement practices system. These upstream oil and gas consist of both indigenous and multinational firms. The choice of the Niger-Delta region of Nigeria as a geographical coverage is necessitated upon by the high number of upstream oil and gas firms in the locality. Furthermore, Niger-Delta region of Nigeria is the area where oil and gas is being explored. Administrative offices of the various oil and gas firms across the nine states were examined. The choice of these states is that most of the upstream activities (in term of; Geodesic survey; Civil works such as site surveys and preparation of drilling locations; Seismic data acquisition; Drilling operations; Geological activities; Crude oil transportation and storages; Exploration and production activities in Nigeria are carried out in these states. Consequently, the choice of upstream sector is that electronic procurement practices system is mostly pronounced in firms that constituted the sector.

The issues specifically examined included sustainability of organizational competitive advantage as the dependent variable; while electronic procurement practices system was proxied with four constructs or variables such as electronic tendering, electronic invoicing, electronic payment and electronic auctioning as the independent variables.

The study population of interest is all the employees and management staff of the procurement department of the respective upstream oil and gas firms in the Niger-Delta region of Nigeria. The employees and management staffs were used because they make policy decisions pertaining to procurement and demands for supplies for the oil and gas firms. Due to their knowledge and experiences, they are assumed to be conversant with the management of the oil and gas firms' operations and procurement procedures and therefore, can easily provide the needed information for the study. The population of this study cuts across both multinational and national firms operating in the upstream sector operating in the Niger Delta States. A total of forty (40) firms constitute the population size of 515 management and senior staff in the procurement department and units. These oil and gas firms in the upstream sector include joint venture companies with Nigerian National

Petroleum Corporation (NNPC) which consists of Shell, Mobil, Chevron, NAOC, TEPNG, Pan- Ocean NPDC and Total; production sharing companies made up of Addax, Conoco Phillips, New Cross, Esso, Ocean Energy, Snepco, Sahara, Fes-Napims, Oando, Teepco and Stardeep; Independent (Sole Risks) companies (National Oil Companies) which include Seplast, First Hydro Carbon, Shoreline, ND Western, Naconde, Consolidated Oil, Monipulo, Atlas, Continental Oil, Cavendish, Express Petroleum, Dubri Oil and Allied Camac. and those in Marginal Fields which include Midwestern, Energia Ltd, Oriental Energy, Niger Delta Petroleum, Platform Petroleum, Inaltersmith, Pillar, Britannia and Prime Exploration. The distribution is shown in Table 1: below:

Table 1. *Distribution of population size*

S/N	Upstream Firms Categories	Number of Firms	Population Size of Management Staff
1	Joint Venture Companies (JVCs)	9	149
2	Production Sharing Companies (PSC)	8	136
3	Independent (Sole Risk) (NOC)	13	112
4	Marginal Fields (MF)	10	118
	Total	40	515

Source: NNPC Annual Report (2018)/Researchers' Survey (2021).

The sample size for the study of two hundred and four (224) respondents was arrived at through the use of number estimation formula as suggested by Yamane (1967). It is calculated below.

$$n = \frac{N}{1 + N(e)^2}$$

Where: n = sample size; N = population size (finite population); e = desired level of significance; (in this case is 5%)

$$n = \frac{515}{1 + 515(0.05)^2}$$

$$n = 224$$

Table 2. *Breakdown of sample size*

S/N	Upstream Firms Categories	Population Size of Management Staff	Sample Size of Management Staff
1	Joint Venture Companies (JVCs)	149	65

2	Production Companies (PSC) Sharing	136	59
3	Independent (Sole Risk) (NOC)	112	49
4	Marginal Fields (MF)	118	31
	Total	515	224

Source: Researchers' Survey (2021).

The convenience sampling technique was used to administer the copies of the questionnaire to the respondents. Out of the chosen sample size of 224 given copies of questionnaire; 220 respondents' copies of questionnaire were valid, and the responses used for data analysis, interpretation and presentation, making the response rate 98.2 per cent.

Model Specification

The model for the study is developed based on the theoretical framework, which is expressed as sustainable organizational competitive advantage being a function of e-tendering, e-invoicing, e-payment and e-auctioning. It is therefore stated functionally as:

$$SOCA = f(ETEN, EINV, EPAY, EAUC) \dots \dots \dots (1)$$

Therefore,

$$SOCA = \beta_0 + \beta_1 ETEN + \beta_2 EINV + \beta_3 EPAY + \beta_4 EAUC + \varepsilon \dots \dots \dots (2)$$

Where: SOCA = Sustainable Organizational Competitive Advantage; ETEN = E-tendering; EINV= E-invoicing; EPAY = E-payment; and EAUC = E-auctioning.

$\beta_1, \beta_2, \beta_3, \beta_4$ = coefficients of elasticity displaying degrees of explanation power about sustainable organizational competitive advantage; β_0 = constant term; and ε = error term.

And *a priori* expectations: $\beta_1, \beta_2, \beta_3, \text{ and } \beta_4 > 0 \dots \dots \dots (3)$

Validity and Reliability of the Research Instrument

The questionnaire for this study consisted of three main sections, namely the profile of the company, respondents and specific questions designed to measure the organizational competitive advantage constructs. The instrument used for the data collection was a closed ended questionnaire designed for the subjects. It employed five points modified form of Likert type scales with 1 = strongly disagree (SD), 2 = disagree (D), 3 = undecided (U), 4 = agree (A), 5 = strongly agree (SA) to measure all the items.

To ensure validity of the questionnaire designed, the draft copy of the research instrument was presented to two senior colleagues in the research area to critically examine the applicability of the statements, make amendments and

necessary corrections pertinent to the research work, for final correction and vetting after which, all suggested corrections were duly effected.

Reliability of the research instrument was carried out in order to find out whether the measures of the research instrument would yield the same results on other occasions. The reliability of the instrument was established by pilot testing the instrument on (30) selected respondents among employees and management staff of the different oil and gas firms in the Niger-Delta region of Nigeria. Feedbacks were reviewed and questions were then harmonized. The final form of the research instrument comprised of thirty-five (35) closed ended questions for the inferential statistics. The Lee Cronbach Alpha coefficient statistical test as an analytical measure was conducted to establish the internal consistency of the items of the structured questions. Dwivedi (2008) notes that the general agreed lower and acceptable limit for the Cronbach’s alpha coefficient is 0.70, although, the requirement may be lowered to 0.60 in the case of exploratory research. Coefficient of 0.70 and above is regarded as good and very reliable (Sekaran, 1992). All the measures in the survey must exceed this minimum threshold; otherwise such measure would either be rephrased to enhance its reliability or excluded from further data analysis (Scheepers & Janssen, 2008). The outcome of the reliability test is presented in Table 3.

Table 3. Reliability Test

VARIABLE NO. OF ITEMS	CRONBACH’S ALPHA
Sustainable Organizational Competitive Advantage 15	0.838
Electronic Tendering 5	0.757
Electronic Invoicing 5	0.795
Electronic Payment 5	0.794
Electronic Auctioning 5	0.754

Source: Researchers’ computation based on the field survey 2021 using SPSS 22.0

The reliability test showed that sustainable organizational competitive advantage has the highest Cronbach’s Alpha value of 0.838 for the internal consistency of its construct items. And the other constructs equally passed the Cronbach’s Alpha test as seen from the Table 3. This means that the Cronbach’s Alpha for the variables were more than 0.70 and as such are considered to be good for internal alpha which is between 0 and 1. This means scales in this reliability analysis were well-established and the results are acceptable and can be used for further exploratory research to elicit the needed information from the respondents.

The collected data were analysed through descriptive and inferential statistics. All data were coded and the test analyses were done at 5 per cent level of significance using the Statistical Package for the Social Sciences (SPSS) version 22.0.

4. FINDINGS

4.1 DIAGNOSTIC TESTS AND ESTIMATION OF ORDINARY LEAST SQUARES (OLS) REGRESSION RESULTS

The various diagnostic tests carried out in this study include Pearson correlations; Kaiser Meyer-Olkin (KMO) and Bartlett’s Tests which were analysed as follow:

Table 4. Mean, Standard Deviation and Pearson Correlations

Variables	Mean	Standard Deviation	SOCA	ETEN	EINV	EPAY	EAUC
SOCA	4.365	0.725	1				
ETEN	4.356	0.842	0.386**	1			
EINV	3.876	0.759	0.042	0.585**	1		
EPAY	4.134	0.968	0.035	0.101*	0.411**	1	
EAUC	4.124	0.864	0.079	0.180**	0.422**	0.455**	1

Source: Author’s Compilation (2021) (SPSS 22)

Table 4 showed associations among variables and to check if there is presence of multi-collinearity. It was observed that when sustainable organizational competitive advantage (SOCA=1) was at perfect unit value, electronic procurement practices proxied electronic tendering (ETEN=0.386**); electronic invoicing (EINV=0.042); electronic payment (EPAY=0.035) and, electronic auctioning (EAUC=0.079) were positively associated with sustainable organizational competitive advantage at 1 per cent (1-tailed). Consequently, there was no presence of multi-collinearity since none of the variables was perfectly correlated or above 0.80 (80%) with sustainable organizational competitive advantage as suggested by Bryman and Cramer (2005) for case of multi-collinearity. The results further implied that the variable data were suitable for regression purposes, hence we proceeded to check for sampling adequacy using Kaiser Meyer-Olkin (KMO) and Bartlett’s test of sphericity as indicated in Table 5 below.

Table 5. Kaiser Meyer-Olkin (KMO) and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.599
Approx. Chi-Square		670.170
Bartlett's Test of Sphericity	Df	15
	Sig.	.000

Source: Author’s Compilation (2021) (SPSS. 20)

The Kaiser Meyer-Olkin (KMO) which is concerned with testing of sampling adequacy and Bartlett’s Test of Sphericity proved to be significant following the result of the estimated chi-square value of 670.170 and significant at

1 per cent. This implied that sampled upstream oil and gas firms and required observations were adequate to justify the study. Also, collated questionnaire data were quite reduced using the principal component analysis (PCA) for the use of ordinary least squares (OLS) regression. Hence, we proceed to the use of ordinary least squares (OLS) regression in the next section.

Multiple Regression and Test of Hypotheses

Table 6. Ordinary Least Squares (OLS) Regression Estimation

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Standard Error	Beta		
(Constant)	-.325	.072		-4.517	.000
ETEN	.159	.027	.226	5.989	.000
EINV	.210	.060	.160	3.534	.000
EPAY	1.136	.071	.937	15.937	.000
EAUC	.066	.040	.093	1.650	.114
R=0.768^a; R Square=0.591 Adjusted R Square=0.588; Standard Error of the Estimate=0.2892983 F-Stat=205.972; Durbin-Watson=1.554					

Source: Author’s Compilation, (2021) (SPSS V.20)

$$SOCA = -0.325 + 0.159ETEN + 0.210EINV + 0.136EPAY + 0.066EAUC$$

(-4.517) (5.989) (3.534) (15.937) (1.650)

Table 6 showed the ordinary least squares regression method results of the variables examined. Reported below the model in parentheses against coefficients were t-statistics. The results revealed that all the independent variables used to proxy electronic procurement practices like; electronic tendering (ETEN), electronic invoicing (EINV), electronic payment (EPAY) and electronic auctioning (EAUC) indicated positive coefficients and were also statistically significant except electronic auctioning that indicates no significant relationship.

The coefficients result in respective basis showed that electronic tendering (ETEN) with a positive coefficient value of 0.159 units with sustainable organizational competitive advantage (SOCA), implied that a unit increase in electronic tendering (ETEN) would lead to increase in sustainable organizational competitive advantage by 16 per cent. Also, electronic invoicing (EINV) which indicated positive coefficient value of 0.210 units with sustainable organizational competitive advantage suggested that a unit increase in electronic invoicing would lead to increase in sustainable organizational competitive advantage (SOCA by 21 per cent. Furthermore, electronic payment (EPAY) with positive coefficient value of 1.136 units with sustainable organizational competitive advantage (SOCA), revealed that a unit increase in electronic payment would lead to increase in sustainable organizational competitive advantage (SOCA) by 113.6 per cent. It was also

indicated that electronic auctioning (EAUC) with positive coefficient value of 0.066 units with sustainable organizational competitive advantage (SOCA), implied that a unit increase in electronic auctioning would lead to increase in sustainable organizational competitive advantage (SOCA) by 7 per cent.

However, it is deduced that the electronic procurement practice system stood at a high positive correlation coefficient of 0.768 (77 per cent), with sustainable organizational competitive advantage (SOCA). The coefficient of determination ($R^2 = 0.591$), implied that the explanatory variables in the model accounted for 59 per cent systematic variations in the dependent variable (sustainable organizational competitive advantage (SOCA)) while 49 per cent were captured by the error term. Also, the adjusted coefficient of determination ($R^2=0.588$) indicated that about 59 per cent of the variations are well explained after adjusting the degree of freedom by the independent variables. The overall test (F-statistic, which is the goodness-of-fit measure) that indicated value of 205.972 units and at significant level of 1 per cent, compared with standard error of regression with minimal value of 0.2892, suggested that the overall result is statistically significant. The Durbin-Watson statistic with value of 1.55, implied absent of autocorrelation in the result which is a further indication that results are suitable for prediction and policy judgement.

4.2 DISCUSSION OF FINDINGS

First, it was observed in Table 4 that overall mean index was 4.356 and greater than the standard deviation of 0.842 indicating that respondents were of the opinion that E-tendering has relationship with sustainable organizational competitive advantage. The electronic tendering in Table 4.7 which showed positive coefficient value of 0.159 units, conformed to our a priori expectation, such that a unit increase in electronic tendering (ETEN) would lead to increase in sustainable organizational competitive advantage by 16 per cent. The hypothesis tested indicated that electronic tendering as an electronic procurement practices system was statistically significant, suggesting that it is a strong influencing factor of sustainable organizational competitive advantage. The outcome revealed that electronic tendering has significant positive relationship with sustainable organizational competitive advantage of some selected upstream oil and gas companies in the Niger-Delta region of Nigeria. This finding concurred to extant studies of Chegugu and Yusuf (2017) who found that e-tendering enhances competitiveness for the benefit of the organization. Also, Yen and Ng (2013) revealed that e-procurement facilitates documentation of the tendering process which in turn enhances transparency and accountability and improve efficiency in the organisation.

Second, it was deduced in Table 4 that electronic invoicing had overall mean index of 3.876 that electronic invoicing selection significantly influence sustainable competitive advantage of some selected upstream oil and gas companies in the Niger-Delta region of Nigeria. This was manifested in the test of hypothesis which indicated that electronic invoicing is statistically significant meaning that it is a strong influencing factor of electronic procurement in relation to sustainable

organizational competitive advantage. Electronic invoicing selection showed positive coefficient value with sustainable organizational competitive advantage, which is in line with our apriori expectation, implying that a unit increase in electronic invoicing selection could increase sustainable organizational competitive advantage. The finding is consistent with the views of Oteki et al. (2018) who revealed that there is significant relationship between electronic invoicing and organisational performance in terms of competitive advantage. In addition, Chegugu and Yusuf (2017) indicated that e-invoicing facilitates fast means of making procurement and this promotes competitive advantage on the organisation. Similarly, Walker and Harland (2008) showed that formulation of a financially viable e-invoicing solution can enhance competitive advantage to the organization.

Third, it was also found in Table 4 that overall mean and standard deviation index of electronic payment stood at 4.134 and 0.968 respectively indicating that majority of the respondents were of the agreed perceptions that electronic payment has relationship in fostering sustainable organizational competitive advantage. Electronic payment which indicated positive coefficient value of 1.136 in Table 4.8, implied that a unit increase in electronic payment system could bring about increase in sustainable organizational competitive advantage by about 114%. The hypothesis tested showed that electronic payment is statistically significant, indicating that it is a strong determinant of electronic procurement in relation to sustainable competitive advantage. This is consistent with views and findings of Chegugu and Yusuf (2017) who found that e-payment makes it cheap and quick for prompt payment to suppliers on supply delivery which can bring about competitive advantage to the organisation. Matunga et al. (2013) showed that organisations using various modes of e-payments like debit card payment system, credit card payment system, online electronic cash system, electronic cheque system and smart cards based electronic payment system can have competitive advantage

Finally, Table 4 indicated overall mean and standard deviation index of electronic auctioning were 4.124 and 0.864 respectively suggesting that most of the respondents were of the agreed view that electronic auctioning has relationship with sustainable organizational competitive advantage. Electronic auctioning which showed positive coefficient value of 0.066, implied that a unit increase in electronic auctioning could bring about increase sustainable organizational competitive advantage. The result is in line with our apriori expectation. The result of hypothesis tested revealed electronic auctioning is statistically insignificant, suggesting that it does not significantly influence, but has positive relationship with sustainable competitive advantage of some selected upstream oil and gas companies in the Niger-Delta region of Nigeria. This implied that electronic auctioning as an electronic procurement practices is a weak influencing factor of sustainable competitive advantage. This finding corroborated with Matunga et al (2013) who showed that an e-auction where suppliers bid online against each other for contracts against a published specification considering price and/or other quantitative attributes such as carriage charge, quantity discounts and quality among others can

bring about competitive advantage to the organisation. McCue and Roman (2012) stated that electronic auctioning could pave way for competitive advantage to an organisation in terms of negotiating significant spot purchases and receiving pricing on frequently tendered communications or service.

5. CONCLUSION

The thrust of this study is on electronic procurement practices and sustainable organisational competitive advantage in selected oil and gas companies with emphasis on upstream industry in Niger Delta of Nigeria. The issues of electronic procurement system practices in relation to sustainable organisational competitive advantage have attracted considerable attention among researchers and business practitioners in developed and developing countries of the world. Paradigm shift from traditional to digital era necessitates electronic procurement system practices in order to enhance sustainable organisational competitive advantage. The dynamic capability theory upon which this study is anchored has proved that electronic procurement system practices in an organization is relentless drive toward the direction of ensuring greater transparency in resource allocation, decentralization of management authority and performance management which are crucial in sustainable organisational competitive advantage. There is not much divergence in extant studies in terms of views and opinion regarding electronic procurement system practices and sustainable organisational competitive advantage in organization.

Outcome of this study revealed that electronic procurement system practices proxied by electronic tendering, invoicing and payment all have significant positive relationship with sustainable organisational competitive advantage implying that they are critical factors. It also showed that electronic procurement system practices substituted with electronic auctioning has no significant influence but has positive relationship with sustainable organizational competitive advantage suggesting that it is a weak influencing factor. Thus, this study concludes that electronic procurement system has relationship with sustainable organizational competitive advantage among selected upstream oil and gas companies in Niger Delta of Nigeria.

5.1. RECOMMENDATIONS

- (i) Management of organisations should encourage the practice of electronic tendering as to promote transparency and credibility in approval of qualified bidders for contracts. With electronic tendering, management should be able to ensure proper screening of tenders or bidders and give approval to those suppliers that have the capacity to carry out supply without hindrances.
- (ii) All organisations especially those in oil and gas should automate the practice of invoicing so as to ensure proper stock or inventory management. Similarly, electronic invoicing is very important in tracking of supplies on the way and as well as monitoring and controlling supplies in the organisation.

(iii) All payments should be carried out using electronic payment as this will provide a safe and cheaper means of business transactions and as well as reduce the risk of carrying bulky money to the bank to pay creditors for goods purchased.

(iv) Management of organisations should implement electronic auctioning practices in disposing products or assets that are pencilled down for sale. With electronic auctioning, those interested will receive fair treatment without bias and unnecessary due influence or favouritism.

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