

Moderating Role of Market Orientation on the Relationship Between E-Sourcing and Supply Chain Sustainability of Oil and Gas Firms in Rivers State

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Abstract: Based on the need for a more environmentally conscious paperless approach, e-sourcing and supply chain sustainability in the context of oil and gas firms in Rivers State is a complex and important aspect of the oil and gas industry. In this empirical work, the moderating role of market orientation on the relationship between e-sourcing and supply chain sustainability of oil and gas firms in Rivers State was investigated. A correlational investigation was carried out on a population size of nine (9) oil and gas firms in Rivers State listed in the Nigerian Stock Exchange, without any form of manipulation, in a non-contrived setting. Due to the small size of the population, the census method was employed and the entire population adopted as the sample. However, with a stratified random sampling technique, two (2) respondents were drawn from each of the firms for the survey, they include; procurement managers and public relations managers. Hence, the respondents were eighteen (18) employees of the firms. To achieve the objectives of the study, primary data were obtained from the respondents through well-structured copies of questionnaire designed in a five-point Likert scale (strongly agree, neutral, agree, disagree and strongly disagree). The face validity of the study instrument was confirmed by E-procurement experts and retrieved copies of the questionnaire were systematized and subjected to the Statistical Package for Social Sciences (SPSS) version 25.1 to aid data analysis. The Pearson's Product Moment Correlation (PPMC) was used to test the independent and criterion variables while Partial correlation was used to ascertain the level of impact of the moderating variable on the relationship between the independent and criterion variables. The study found that e-sourcing has a positive and significant relationship with supply chain sustainability of oil and gas firms in Rivers State and market orientation is not an important moderator of the relationship between the variables. Therefore, the study recommends that as Oil and gas firms in Rivers State implement market-oriented decisions, they should focus on coordinating their social and environmental responsibility strategies to reduce waste, offer eco-friendly products and protect societal wellbeing.

Keywords: E-Sourcing, Environmental Responsibility, Market Orientation, Social Responsibility, Supply Chain Sustainability.

Introduction

Oil and gas firms in Rivers State are key agents of foreign direct investments within the State, they enhance the adoption of technological innovations, increase economic growth, employment opportunities, manpower development, and philanthropy (Ugbomeh & Atubi, 2010). Thus, there is a growing awareness, among professionals and stakeholders in the industry about the importance of sustainable development; how businesses impact society and the environment. This is evident from sources such as: media, business practices and academic literature (Society of Petroleum Engineers, 2023). While organizations in developed economies are seeking ways to incorporate sustainable strategies and practices into their operations to gain competitive edge (Wahyuningsih, 2015), oil and gas experts in Rivers State have raised concerns about indigenous firms' preparedness to ensure a more sustainable supply chain in the sector (Aka-Wolugbom & Onuoh, 2021). Hence, the need for a more environmentally conscious paperless approach that prioritises sustainability like e-sourcing. Klaus *et al* (2022) indicate that orthodox sourcing often involves physical movement of documents, samples, and goods, leading to increased carbon emissions. But e-sourcing allows for electronic document exchange, communication, and collaboration, which can reduce the need for physical transportation and associated greenhouse gas emissions.

Nevertheless, the awareness and adoption of e-sourcing as an important factor in promoting supply chain sustainability is limited in Rivers State. Ibem, and Laryea, (2017) indicate that the lack of awareness among other factors have been classified as barriers to the growth of profitable collaboration in the electronic market environments. This could be because the Perceived Usefulness (PU) and Perceived Ease of Use (PEU) proposed by the Technology acceptance model (TAM) of e-sourcing systems is not particularly important to oil and gas practitioners in the State (Wilson, 2016). Moreover, Rivers State's core environmental and social challenges result from oil spills, gas flaring, deforestation. It is worthy of note that the facilities necessary for ensuring a secure e-sourcing processes are not widely available, and it is not clear whether those that have them have been using them to secure exchanged data. Cumulatively, only about forty-seven percent (47%) of business practitioners have access to the internet in Nigeria (Olukayode & Adeyemi, 2011). According to Omotesho, (2023), a report in 2021 disclosed that about twenty-three thousand (23,000) people had suffered from respiratory diseases in the past five years because of the black soot. The attendant consequences of these environmental phenomena, which are occasioned by unsustainable human practices, have far-reaching impacts on business performance and society in general.

Several scholars in the past have studied different aspects of supply chain sustainability and e-sourcing in developed economies, but no study on the subject matter exist in Rivers State, implying that many organizations in developing economies still rely on traditional procurement methods, such as manual paperwork and phone-based negotiations. For instance, Sanchez-Flores, Samantha, Sara & Maria, (2020) examined sustainable supply chain management-a literature review on emerging economies and found that the need for further research from different supply chain viewpoints, such as collaboration, sustainable practices innovation, sourcing and supplier development from emerging countries' standpoint and background is dominant. Moath & Kriengsak, (2018) investigated implementing e-tendering to improve the efficiency of public construction contract in Saudi Arabia. The results showed that the distribution and receipt of the bids to, or from, the sub-contractors and suppliers can most easily be influenced by the efficiency of the e-Tendering process. As well as the importance of developing and maintaining 'best practice' for the IT requirements and for the configuration of the whole e-Tendering model. Vicky, Christos & Constantinos, (2016) examined the benefits and barriers of e-sourcing and e-purchasing in the healthcare sector: a case study. And found that although quantifiable benefits were identified, e-Sourcing and e- Purchasing are still at an early stage of maturity in the Greek Healthcare Sector. This study intends to fill this gap of limited adoption and investigate the relationship between E-Sourcing and Supply Chain Sustainability of Oil and Gas firms in Rivers. This is not only a pragmatic response to contemporary challenges but also a proactive approach to securing a sustainable and resilient future for the industry. Figure 1. shows the conceptual framework of the relationship between the study variables.

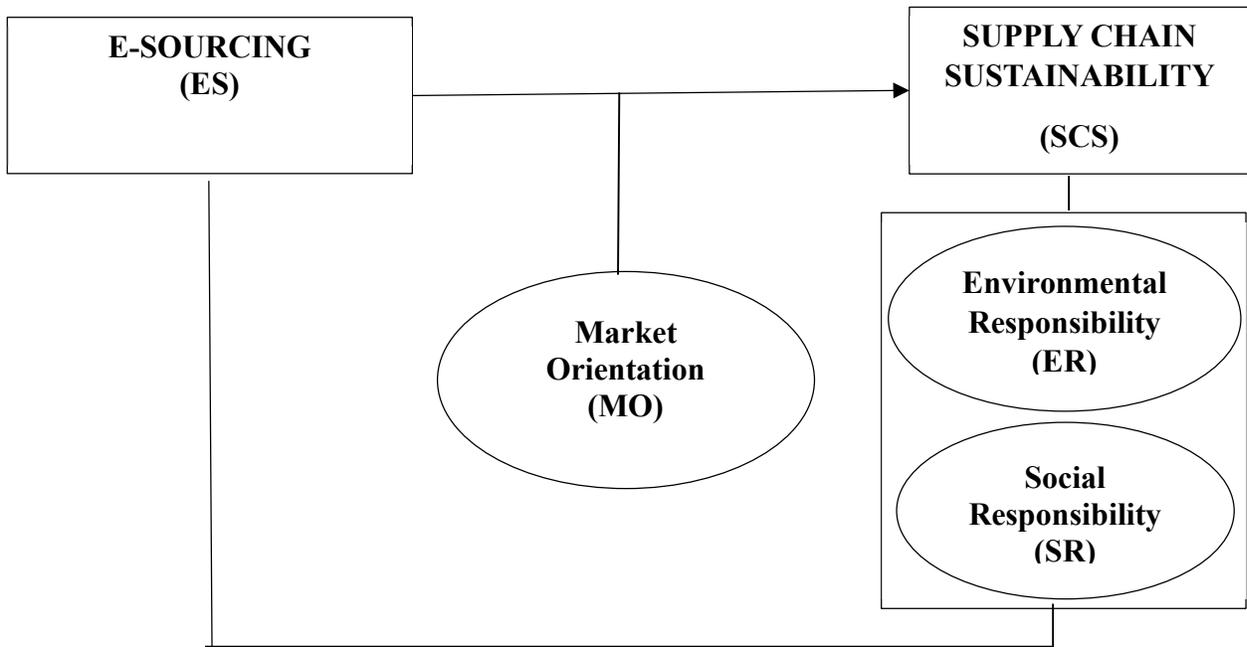


Figure 1: Conceptual Framework of The Relationship Between E-Sourcing and Supply Chain Sustainability of Oil and Gas Firms in Rivers State.

Sources: Researchers' Conceptualization, (2023) as adapted from (Göbl & Greiter, 2014; Dey, Yang, Malesios, Debashree & Konstantinos, 2019).

Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) was introduced by Fred Davis in his doctorate proposal in 1989 as a modification of Ice Ajzen and Mark Fishbein's 1975 Theory of Reasonable Action (TRA). While the Theory of Reasoned Action (TRA) posits that individuals' behavioral intentions are determined by their attitudes towards the behavior and subjective norms, Fred Davis adapted the TRA framework to develop (TAM), focusing on users' acceptance and adoption of information technology. The technology acceptance model (TAM) is an information system theory that explicates how users adopt technological inventions (Subhadin, 2017). The Technology acceptance model (TAM) is an information systems theory that recognized Perceived Usefulness (PU), Perceived Ease of Use (PEU) and external influences as indicators to illustrate how end-users come to accept and use a technology (Davis 1989, cited in Wilson 2016). The technology acceptance model (TAM) has been faulted as a theory due to its dubious heuristic value, inadequate elucidation, and predictive power, triviality and lack of any practical value (Chuttur, 2009). This led to the introduction of Technology acceptance model 2(TAM2), and the Unified Theory of Acceptance and Use of Technology (Yenkatesh, Morris, Davis & Davis, 2003; Davis & Venkatesh, 1996).

The Technology acceptance model (TAM) is adopted as a baseline theory for this study. The growing emphasis on sustaining the supply chain has drawn managers' attention to the valued-added feature of internet technology to achieve better information sharing, improve bottom-line costs, efficiency and effectiveness. The technology acceptance model (TAM) has been used in

many studies to predict and understand the adoption of online systems and it provides a more comprehensive model of e-sourcing adoption of oil and gas firms in Rivers State (Aboelmagd, 2010). By applying the (TAM) framework to e-sourcing, oil and gas firms in Rivers State can gain insights into the factors influencing user acceptance and adoption.

Concept of E-Sourcing

In literal terms, the word sourcing means to either acquire something or to find out where something can be gotten or collected from. The concept of e-sourcing or “electronic sourcing” is the process of collecting bids from different suppliers through online portals in order to determine which supplier is the best fit for the business needs and wants (Cook, 2021). Aberdeen, (2002) as cited in Engelbrecht-Wiggans & Katok, (2006) defined e-sourcing as the use of Web-based applications, decision support tools, and related services to restructure and improve the strategic sourcing processes and knowledge management. Busch *et al* (2017), defined e-sourcing as the selection of suitable suppliers to fulfill organizational needs and provide opportunities to different units of business in the organization to cooperate for the activities of sourcing. E-sourcing is a diverse task in which each department has unique requirements for the end users to source suppliers that match the critical procurement and compliance rules. E-sourcing uses web-based applications to carry out firms’ sourcing activities online, enabling quicker, better and more successful tender opportunities. The buying firms electronically process proposals, quotes and bids (through eAuctions) from various suppliers and equate the results before determining on what to buy, from whom and at what price it will be bought at (Annalakshmi, 2021). E-sourcing is the strategic activity conducted by the procurement professional to create, manage and monitor the buying process (Manthou *et al* 2016). E-sourcing is the process of obtaining bids from different suppliers via internet-based portals in order to collect and compare information about several suppliers to select a preferred provider (Medius, 2023).

According to Engelbrecht-Wiggans. & Katok, (2006), e-sourcing is the use of Internet-enabled applications and decision support tools that facilitate competitive and collaborative interactions among buyers and suppliers through the use of online negotiations, reverse (decreasing bid) auctions, and other related tools. The goal of e-sourcing Internet-enabled applications is to locate and engage suppliers to meet business needs. This includes managing electronic request for information (e-RFIs), electronic request for quotations (e-RFQs) and electronic request for proposals (e-RFPs,) communicating with vendors, scoring vendor responses and managing the e-RFx process transparently (Ropp, 2022). E-sourcing has become a significant procurement tool that allows firms to connect, evaluate and shortlist suppliers, regardless of whether they are present at the same location or at the same time to secure better consequences than traditional sourcing. According SpringTide, (2023), through e-sourcing, there is transparent supplier-client relationship, facilitating reduced costs, better communication and a more efficient procurement process. E-sourcing enhances transparency and openness between buyers and suppliers which improves efficiency and effectiveness in the procurement process. The systems provide a portal through which suppliers can see all tender opportunities from a supplier, with deadlines, their current statuses and the final outcomes all clearly presented. Therefore, we inclined to defined e-sourcing as the sourcing process enabled with the appropriate web-enabled, collaborative technology to facilitate the full life-cycle of the procurement process for both buyers and suppliers.

Concept of Supply Chain Sustainability

The concept of supply chain sustainable is a marriage of two vital concepts; “supply chain” and “sustainability”. A supply chain is an integrated system that coordinates a sequence of interconnected business procedures to create demand for goods and services, purchase raw materials and manufacturing part, converts them to finished products, add value to the products, distribute and promote them to marketing intermediaries and customers (Min, 2015). While sustainability, in this context is predicated on the application of the principles of sustainable development (Poi & Moko, 2023; Nwokah & Poi, 2022).). Over the years the concept of supply chain sustainability has developed in response, to an increasing understanding of the social and economic consequences that come with supply chain methods. Supply chain sustainability is the strategic, transparent integration and achievement of an organization’s social, environmental, and economic goals in the systemic coordination of key inter-organizational business processes for improving the long-term economic performance of the individual organization and its supply chains (Carter & Rogers 2008). Ahi and Searcy, (2013) suggest that supply chain sustainability is the creation of coordinated supply chains through the voluntary integration of economic, environmental, and social considerations with key inter-organizational business systems designed to efficiently and effectively manage the materials, information, and capital flows associated with the procurement, production, and distribution of products or services in order to meet stakeholder requirements and improve the profitability, competitiveness, and resilience of the organization over the short and long-term. Supply chain sustainability benefits not only companies’ own interests and those of their stakeholders but also society and the planet at large (Cazeri, Anholon, Ordoñez, & Novaski, 2017). Supply chain sustainability is firms' efforts to consider the environmental and human impact of their products' journey through the supply chain, from raw materials sourcing to production, storage, delivery and every transportation link in between, the environmental responsibility and social responsibility must be considered (Seuring & Müller, 2008; Dey *et al* 2019).

Environmental Responsibility (ER)

Environmental responsibility is defined as a supply chain’ obligation to refrain from destroying the natural environments (Re-waste, 2021). Huckle, (1995) opined that environmental responsibility involves the obligation of policy makers to enact procedures and take actions which protect and improve the environment as a whole, along with their own interests. According to Schaper, (2002), an environmentally responsible firm can be defined as one which seeks to limit or prevent damage to, or to consciously improve, the existing natural environment. The commitment to sustainable production processes frees companies from the release of pollutants. Applying renewable sources in production and re-using materials, whether processing defective or consumed products, are equally essential (Pagell & Wu, 2009). Crucial elements of the environmental dimension of sustainable development include organizational activities such as the selection of partners in the supply chain based on ecological guidelines, and the commitment of employees to environmental protection programs (Cantor, Morrow & Montabon, 2012).

Taking the above studies into consideration, (Kot, 2018) proposed the following systematic set of the environmental essentials of sustainable development in supply chain management for business organizations, they include: environmentally-friendly production processes, actions for reducing the quantity of waste, commitment to production processes that are free from the release of pollutants, applying renewable sources in production, re-use of materials, processing defective and

consumed products, selection of partners in the supply chain based on ecological guidelines and commitment of employees to environmental protection programs. Environmental responsibility is where a supply chain is said to have a duty to improve the area in which it conducts business. Thus, we can infer that environmental responsibility is a strategy that the management of a company decides to follow relating to the level of environmental performance it wishes to attain; the levels ranging from mere compliance with legal requirements to following sustainable development principles.

Social Responsibility (SR)

Social responsibility encompasses ethical decision making in fields such as relationships with employees, community participation, and business management practices through education and talent development (Closs, Speier & Meacham, 2011). In consonance with Closs, Speier & Meacham, (2011), Davis, (1973) opines that social responsibility refers to the firm's contemplation of, and response to, issues beyond the narrow economic, technical, and legal necessities of the firm. It simply begins where the law ends. Social responsibility considers several relationships between human rights and development, including the impact of a firm's activities on individuals and global poverty, dubious business operations, and the consumer's choice within the moral contexts (Blewitt, 2014). The primary aim of social responsibility is the orientation of stakeholders, both internally and externally, to do the right thing ethically in a socially responsible way thereby enhancing human development (Yang & Černevičiūtė, 2017). Davis & Blomstrom, (1975) as cited in Xu & Yang, (2010) indicate that social responsibility refers to the obligation of decision makers to take actions which protect and improve the environment as a whole, along with their own interests. The indirect influence of enterprises on the local community on the macroeconomic scale is equally essential; this influence expresses itself through companies timely and legally paying taxes and associated charges. The transparency of incomes is the base of the tax calculation, and it is also important to apply ethical norms to business and trade, or even invest and/or participate in investments in infrastructure objects that communities use (Roberts, 2003). Therefore, social responsibility is the obligation of both business and society (stakeholders) to take proper legal, moral-ethical, and philanthropic actions to guard and advance the welfare of both society and businesses.

Concept of Market Orientation

The concept of market orientation gained prominence in the late 20th century as businesses recognized the need to shift from a production-centric approach to a customer-centric approach. Market orientation is a business philosophy that focuses on identifying and satisfying customer needs and wants in order to achieve organizational goals. Quoting Youn, Sungmin & Hye, (2019), Poi & Nwokah, (2022) indicate that market orientation is a management thought that encompasses processes of discerning and understanding the needs/want of customers and prospects, discerning and coping with the activities of competitors and maximizing organizational resources in achieving goals and objectives. It involves the systematic collection and analysis of market information, understanding customer preferences and behaviors, and the subsequent development of products and services that meet those needs. Market orientation places the customer at the center of all business activities and emphasizes the importance of building long-term customer relationships (Narver & Slater, 1990). Market-oriented companies invest significant resources in understanding their target markets, competitors, and industry trends. They gather information through market research, customer surveys, focus groups, and other data collection methods (Van Raaij &

Stoelhorst, 2008). According to Gainer and Padanyi, (2002), the key components of market orientation include customer orientation, competitor orientation, and inter-functional coordination. Customer orientation involves understanding and fulfilling customer needs and preferences. Competitor orientation focuses on monitoring and analyzing competitor strategies and actions to identify opportunities and threats. Inter-functional coordination refers to the alignment of different departments and functions within an organization to ensure the delivery of customer value. Market orientation has been widely recognized as a critical factor in business success. Numerous studies have shown the positive impact of market orientation on various performance indicators, such as profitability, sales growth, market share, and innovation. Therefore, market orientation is a strategic approach that prioritizes customer needs and preferences in order to achieve organizational goals. It involves a deep understanding of the market, competitors, and customer behavior, leading to the development of customer-focused products and services. E-sourcing platforms enable organizations to streamline procurement processes, reduce paper usage, and optimize transportation routes. This contributes to environmental sustainability by minimizing the carbon footprint associated with traditional procurement practices (Carter & Ellram, 2003). For instance; electronic procurement reduces the need for physical documentation, lowering the consumption of paper and energy.

Relationship Between E-sourcing and Supply Chain Sustainability

E-sourcing platforms help businesses to restructure procurement processes, reduce paper-based transactions and paper usage, and optimize transportation routes. This contributes to environmental sustainability by minimizing the carbon footprint linked with orthodox procurement practices (Carter & Ellram, 2003). Walker and Bramme, (2012) examined the relationship between sustainable procurement and e-procurement in the public sector. A survey of sustainable procurement and e-procurement adoption was conducted with a sample of over (280) public procurement practitioners from twenty (20) countries and with collective responsibility for expenditure totaling \$45 BN. Using multiple regression, the study developed a model to show that e-procurement and communication with suppliers supports various types of sustainable procurement. Results reveal that e-procurement and communication with suppliers may help environmental, labour, health and safety aspects of sustainable procurement. The adoption of e-sourcing systems has also enhanced social responsibility within the supply chain. These electronic platforms often provide transparency and traceability, letting firms to monitor and validate the ethical sourcing of goods (Cox, Chicksand, & Ireland, 2016). Ramkumar & Mamata, (2014) examined the sustainability in supply chain through e-procurement—an assessment framework based on danp and liberatore score. The study identified twenty-six (26) driving factors based on the review of literature and analyze six (6) major dimensions that help in managing sustainable purchasing programs through the use of information and communication technologies. The study found that e-procurement strategies are used as an assessment framework for the sustainability in supply chain. Moreso, Singh and Chan, (2022) examined the impact of electronic procurement adoption on green procurement towards sustainable supply chain performance-evidence from Malaysian ISO organizations. This research was supported by the Technology Acceptance Model (TAM), one of the significant theories of technology adoption. Using SPSS and Smart PLS, the survey data were analyzed quantitatively. The study found a positive and significant relationship between green procurement and the E-procurement technology of the ISO 14001 firms. Consequently, e-sourcing platforms encompass the use of technology to facilitate procurement processes. The perceived ease of use of these platforms directly impact their adoption by supply

chain professionals. When e-sourcing platforms are easily accessible, supply chain professionals are more likely to effectively utilize them. Based on these findings this study therefore, propose the hypotheses as follows:

H₀₁: E-sourcing has no significant relationship with environmental responsibility of the oil and gas firms in Rivers State.

H₀₂: E-sourcing has no significant relationship with social responsibility of the oil and gas firms in Rivers State.

The Moderating Role of Market Orientation on the Relationship Between E-Sourcing and Supply Chain Sustainability

Market orientation plays a fundamental role in influencing how firms implement their e-sourcing systems and integrate sustainability into their supply chain practices. A market-oriented approach emphasizes customer satisfaction Poi & Nwokah, (2022), which, in turn, influences how businesses source materials, choose suppliers, and manage their supply chains. Tseng and Liao, (2015) studied supply chain integration, information technology, market orientation and firm performance in container shipping firms. The purpose of this paper was to use a theoretical framework (i.e. resource-based view) to investigate causal relationships between the supply chain integration, market orientation, information technology (IT) application and firm performance of container shipping firms in Taiwan. The findings show that IT application and market orientation positively influence supply chain integration. It revealed that IT-based and market-oriented firms more easily integrate market information related to partners, departments and customers. Further, supply chain integration and market orientation have a positive effect on firm performance. Liu, Ke and Hua, (2011) examined market orientation, electronic supply chain integration, and firm performance in China: The moderating role of ownership type. Based on the institutional theory and resource-based view, this study investigates how market orientation affects electronic supply chain integration (eSCI), which, in turn, influences firm performance in the emerging economy of China. The results of a survey with 260 firms in China suggest that the dimensions of market orientation have differential impacts on the eSCI, and both dimensions of eSCI have significant effects on firm performance. In addition, the relationships between market orientation and eSCI are moderated by both ownership type in China. More so, Navarro-García, Arenas-Gaitán and Rondán-Cataluña, (2014) investigated the external environment and the moderating role of export market orientation. The study provides insight into these issues through hypothesis testing of a conceptual model using a sample of 212 Spanish exporting companies. The results lead to two major conclusions: (a) in turbulent environments, exporting firms adapting the marketing mix program to the needs of foreign markets obtain a better export performance in highly competitive and psychologically distant markets; (b) although market orientation has a direct and positive effect on export performance, its main role is to support strategic decision making in exporting companies. In addition, market orientation moderates the relationship between marketing mix adaptation and export performance. Finally, the Mac & Evangelista, (2016) investigated the effect of international corporate entrepreneurship and market orientation on firm performance. The results, based on data obtained from a survey of exporters in China, revealed that market orientation could be a double-edged sword, because it can enhance export satisfaction through entrepreneurship, but it can also have negative impact on profit. Hence, we hypothesize that:

H03: Market orientation does not moderate the relationship between e-sourcing and supply chain sustainability of oil and gas firms in Rivers State.

Methodology

A correlational investigation was carried out without any form of manipulation in a non-contrived setting to ascertain the relationship between e-sourcing and supply chain sustainability of the oil and gas firms in Rivers State. The target population of this study was nine (9) oil and gas firms in Rivers State listed in the (Nigerian Stock Exchange, 2023). Due to the small size of the population, the census method was employed and the entire population adopted as the sample. However, with a stratified random sampling method, two (2) respondents were drawn from each of the firms for the survey, they include; procurement managers and public relations managers. Hence, the respondents were eighteen (18) employees of the firms. To achieve the objectives of the study, primary data were gathered from the respondents (Aryal, 2020) through well-structured copies of questionnaire designed in a five-point Likert scale (strongly agree, neutral, agree, disagree and strongly disagree). The face validity of the study instrument was confirmed by E-procurement experts and retrieved copies of the questionnaire were systematized, and subjected to the Statistical Package for Social Sciences (SPSS) version 25.1 to aid data analysis. The Pearson’s Product Moment Correlation (PPMC) was used to test the null hypotheses one and two (H_{01} H_{02}) associated with the independent and criterion variables while Partial correlation was used to ascertain the level of impact of the moderating variable on the relationship between the independent and criterion variables. Results of the reliability test is presented in Table 1 below:

Table 1: Reliability Statistics

S/N	Dimension	Item	Cronbach’s Alpha
1	E-Sourcing	3	.908
3	Environmental Responsibility	3	.915
4	Social Responsibility	3	.904
5	Market Orientation	3	.911

SPSS Output (2023)

The result of the Reliability test in Table 1 above shows a Cronbach Alpha coefficient of 0.908, 0.915, 0.904 and 0.911 respectively; excellent internal consistency for E-sourcing, Supply chain sustainability and Market Orientation.

Table 2: Questionnaire Analysis

Numbers	Questionnaire	Percentage (%)
No. Sent out	18	100%
No. Returned	17	85%
No. Not Returned	1	15%

Source: Field Survey Data (2023)

Table 2 shows that a total of 18 copies of questionnaire were distributed, out of which 17 (85%) were retrieved while 1 (15%) was not retrieved.

Bivariate Examination

Hypotheses Testing

The various hypotheses proposed for this study is subjected to statistical tests using the Pearson Correlation Coefficient Statistical Tool.

Table 3: Description of the Degree of Relationship between Variables

Correlation Coefficient (r)	Description/Interpretation
± 0.80 – 1.0	Very Strong
± 0.60 – 0.79	Strong
± 0.40 – 0.59	Moderate
± 0.20 – 0.39	Weak
± 0.00 – 0.19	Very Weak

In Table 3 above, the positive (+) sign in the value of r indicates a direct/positive relationship while negative (-) sign in value of r indicates an indirect/negative or inverse relationship. Therefore, the sign of the r value explains the direction of association or nature of relationship between the variables.

Decision Rule

Reject the null hypothesis (H_0) if $PV < 0.01$ for 2-tailed test and conclude that significant relationship exists.

H_{01} : E-sourcing has no significant relationship with environmental responsibility of the oil and gas firms in Rivers State.

Table 4: Correlation Analysis on E-Sourcing and Environmental Responsibility Correlations

		E-Sourcing	Supply chain Responsibility
Pearson R	E-Sourcing	Correlation Coefficient 1.000	.860**
		Sig. (2-tailed) .	.000
		N 17	17
	Environmental Responsibility	Correlation Coefficient .860**	1.000
		Sig. (2-tailed) .000	.
		N 17	17

** . Correlation is significant at the 0.01 level (2-tailed).

Source: (SPSS Output 2023)

Table 4. above shows that a Pearson correlation coefficient ($r = 0.860^{**}$), this value is very high, implying that a very strong relationship exists between e-sourcing and environmental responsibility. The positive sign of the correlation coefficient indicates a positive relationship. The probability value is $(0.000) < (0.01)$ level of significance; hence the researcher rejects the null

hypothesis and concludes that there is a significant relationship between e-sourcing and environmental responsibility of oil and gas firms in Rivers State.

H₀₂: E-sourcing has no significant relationship with social responsibility of the oil and gas firms in Rivers State.

Table 5: Correlation Analysis on E-Sourcing and Social Responsibility Correlations

		E-Sourcing		Social Responsibility
Pearson r.	E-Sourcing	Correlation Coefficient	1.000	.950**
		Sig. (2-tailed)	.	.000
		N	17	17
	Social responsibility	Correlation Coefficient	.950**	1.000
		Sig. (2-tailed)	.000	.
		N	17	17

** . Correlation is significant at the 0.01 level (2-tailed).

Source: (SPSS Output 2023)

Table 5 above shows that a Pearson correlation coefficient (r) = 0.980** which is high, implying that a very strong relationship exists between E-Sourcing and Social responsibility. The positive sign of the correlation coefficient indicates a positive relationship. The probability value is (0.000) < (0.01) level of significance; hence the researcher rejects the null hypothesis and concludes that there is a significant relationship between E-Sourcing and Social responsibility of oil and gas firms in Rivers State.

Multivariate Results

H₀₃: Market orientation does not moderate the relationship between e-sourcing and supply chain sustainability of oil and gas firms in Rivers State.

Table 6: Correlations Analysis on Market Orientation Moderating Between E-Sourcing and Supply Chain Sustainability

Control Variables			Electronic sourcing	supply chain sustainability	Market Orientation
-none ^a	Electronic sourcing	Correlation	1.000	.916	.963
		Significance (2-tailed)	.	.000	.000
		df	0	15	15
	Supply chain sustainability	Correlation	.916	1.000	.871
		Significance (2-tailed)	.000	.	.000
		df	15	0	15
	Market Orientation	Correlation	.963	.871	1.000
		Significance (2-tailed)	.000	.000	.
		df	15	15	0
Market Orientation	Electronic sourcing	Correlation	1.000	.584	
		Significance (2-tailed)	.	.018	
		df	0	14	
	Supply chain sustainability	Correlation	.584	1.000	
		Significance (2-tailed)	.018	.	
		df	14	0	

a. Cells contain zero-order (Pearson) correlations.

The result of the partial correlation presented in Table 6 indicates that market orientation with (r) = .963** is positively related to E-Sourcing (r) = .916**, p>.000, also, market orientation with (r) = .871** is positively related to supply chain sustainability (r) = .871, p> 000.

However, after controlling for market orientation, we observe that the relationship is insignificant r (.584**) =, p> 018 indicating that market orientation does not significantly relates to e-sourcing, and supply chain sustainability. This implies that market orientation does not significantly moderates between e-sourcing and supply chain sustainability. It is safe to state that market orientation has no significant effect on the relationship between e-sourcing and supply chain sustainability. Hence, the null hypothesis 3 (H₀₃) is accepted.

Discussion of Findings

The analysed data and tested hypotheses revealed that:

There is a significant relationship between e-sourcing and environmental responsibility in the studied oil and gas firms in Rivers State. In Table 4, the Pearson correlation coefficient (r) = 0.860**, this value is very high, implying that a very strong relationship exists between e-tendering and environmental responsibility. This result is consistent with the position of Walker and Bramme,

(2012) who revealed that e-procurement and communication with suppliers may help environmental, labour, health and safety aspects of sustainable procurement. This position was also established by (Ramkumar & Mamata, 2014) when they reported that e-procurement strategies are used as an assessment framework for the sustainability in supply chain. Which ultimately lead to sustainability in the supply chain.

Also, in Table 5 revealed a significant and positive relationship between e-sourcing and social responsibility, the Pearson correlation coefficient ($r = 0.950^{**}$), indicates that a very strong relationship exists between e-sourcing and social responsibility in the studied oil and gas firms in Rivers State. These findings are in agreement with Singh and Chan, (2022) who examined the impact of electronic procurement adoption on green procurement towards sustainable supply chain performance-evidence from Malaysian ISO organizations. The study found a positive and significant relationship between green procurement and the E-procurement technology of the ISO 14001 firms.

Also, Table 6 revealed an insignificant moderating effect of market orientation on e-sourcing and supply chain sustainability the Pearson correlation coefficient ($r = (0.584^{**})$), with $p > 0.18$ indicating that market orientation does not significantly relates to e-sourcing, and supply chain sustainability. This result validates the findings of Mac & Evangelista (2016), they revealed that market orientation could be a double-edged sword, as it can increase export satisfaction but have a negative impact on profitability. Finally, the findings are in tandem with the principles of the Technology acceptance model (TAM), as the adoption and successful implementation of any e-sourcing system in oil and gas firms in Rivers State is dependent on its perceived usefulness and perceived ease of use (Subhadin, 2017). When the e-sourcing system has a user-friendly interface and intuitive features, it contributes positively to perceived ease of use.

Conclusion and Recommendations

The emphasis on e-sourcing and supply chain sustainability is crucial for the long-term success of Oil and Gas firms in Rivers State, where environmental concerns are substantial, adopting sustainable practices becomes a strategic imperative. This involves curtailing carbon footprints, encouraging ethical practices, and engaging in community development initiatives. The results, based on data obtained from a survey of procurement managers and public relations managers of oil and gas firms in Rivers State indicate that e-sourcing has a positive and significant relationship with supply chain sustainability of oil and gas firms in Rivers State. In other words, improving e-sourcing strategies will minimize the need for physical transportation, thus cutting down the carbon footprint associated with procurement activities, facilitate better demand forecasting, which can further reduce waste in the supply chain and make positive impact on the environment, society, and their long-term business success. Furthermore, the study indicate that market orientation is not an important moderator of the relationship between the variables. This conclusion is based on the fact that all the components of e-sourcing have positive and significant relationships with all the elements of supply chain sustainability. Also, market orientation has no significant moderating impact on the relationship between e-sourcing and supply chain sustainability. Therefore, the study recommends that as Oil and gas firms in Rivers State implement market-oriented decisions, they should focus on coordinating their social and environmental responsibility strategies to reduce waste, offer eco-friendly products and protect societal wellbeing.

REFERENCES

- Aka-Wolugbom, A. L. & Onuoh, B. C. (2021). Cultural readiness for change and supply chain performance of oil and gas companies in Nigeria. *Research Journal of Management Practice*, 1(4), 98-121.
- Chuttur, M. Y. (2009). Overview of the technology acceptance model: Origins, developments and future directions. *Working Papers on Information Systems*, 9(37), 9-37.
- Cleave, P. (2019). *Advantages of Using Likert Scale Questions*. Retrieved from: <https://blog.smartsurvey.co.uk>. Accessed on 27th July, 2022.
- Davis, F. D., & Venkatesh, V. (1996). A critical assessment of potential measurement biases in the technology acceptance model: three experiments. *International Journal Of Human-Computer Studies*, 45(1), 19-45.
- Dey, P.K., Yang, G., Malesios, C., Debashree, D.& Konstantinos E. (2019). *Performance Management of Supply Chain Sustainability in Small and Medium Sized Enterprises Using a Combined Structural Equation Modelling and Data Envelopment Analysis*. Retrieved from: <http://www.wilsoncentre.org/index.cfm> on 14th June 2022.
- Engelbrecht-Wiggans, R. & Katok, E. (2006). E-sourcing in procurement: Theory and behavior in reverse auctions with noncompetitive contracts. *Management Science*, 52(4),581–596.
- Gainer, B., & Padanyi, P. (2002). Applying the marketing concept to cultural organisations: an empirical study of the relationship between market orientation and performance. *International Journal of Nonprofit and Voluntary Sector Marketing*, 7(2), 182-193.
- Göbl, M. & Greiter, T. (2014). E-Sourcing platforms as reasonable marketing tools for suppliers, *Journal of Applied Leadership and Management*, ISSN 2194-9522, Hochschule Kempten - University of Applied Sciences, Professional School of Business & Technology, Kempten, 3, 38-46.
- Göbl, M.& Greiter, T. (2014). E-Sourcing platforms as reasonable marketing tools for suppliers. *Journal of Applied Leadership and Management*,3, 38-46.
- Jaworski, B. J., & Kohli, A. K. (1993). Market orientation: Antecedents and consequences. *Journal of Marketing*, 57(3), 53-70.
- Klaus, E. M., Jiatao Li, K. D. B. & Ruey-Jer, B.J. (2023). International business in the digital age: Global strategies in a world of national institutions. *Journal of International Business Studies*, 54, 577–598.
- Mac, L. & Evangelista, F. (2016). The relative impact of market orientation and entrepreneurship on export performance: Do we really know enough? *Journal of Global Marketing*, 29(5), 266-281.
- Min, H. (2015). *The Essentials of Supply Chain Management: New Business Concepts and Applications*, United States of America, Pearson Education Ltd.
- Narver, J. C., & Slater, S. F. (1990). The effect of a market orientation on business profitability. *Journal of Marketing*, 54(4), 20-35.
- Nwokah, N. G. & Poi, E. L. (2022). Innovation diffusion and sustainable development of deposit money banks in south-south Nigeria: The moderating role of entrepreneurial marketing. *International Journal of Marketing and Communication Studies*, 6 (1), 21-36.

- Nwulu, S. (2022). *Analysis Of Internet-Mediated Marketing Practices And Socio Security Of Youths In Rivers State*. BW Academic Journal, 2021(2021). Retrieved from <https://bwjournal.org/index.php/bsjournal/article/view/230> on 7th July, 2023.
- Omotesho, T. (2023). *Why Port-Harcourt Residents Have Shorter Life Expectancy*. Retrieved from: <https://www.zikoko.com/citizen/why-port-harcourt-residents-have-shorter-life-expectancy/> on 23rd June, 2023.
- Panya, K. O., Ochiri, G., Achuora, J., & Gakure, R. W. (2021). Sustainable supply chain management and its effects on the performance of sugar sub-sector in Kenya.
- Poi, E.L. & Moko, D. (2023). Sustainable shipping practices and supply chain performance of shipping firms in south-south Nigeria. *International Academy Journal of Management, Marketing and Entrepreneurial Studies*, 9(2),28-43.
- Poi, E.L. & Nwokah, N.G. (2022). Inventory management and customer satisfaction of petroleum marketing firms in Rivers State: The moderating role of market orientation. *Advanced Journal of Accounting, Marketing and Management*, 8(2), 1-16.
- Re-Waste, (2022). *What is Corporate Environmental Responsibility?* Retrieved from: <https://rewaste.ca/general/what-is-corporate-environmental-responsibility/> 23rd October, 2022.
- Ropp, M. (2022). *E-Procurement: The History, Future and Our 6-Top E-Procurement Tools*. Retrieved from: <https://rfp360.com/e-procurement/> on 2nd March, 2023.
- Singh, P. K., & Chan, S. W. (2022). The impact of electronic procurement adoption on green procurement towards sustainable supply chain performance-evidence from Malaysian ISO Organizations. *Journal of Open Innovation: Technology, Market, and Complexity*, 8(2), 61.
- Society of Petroleum Engineers (2023) *Sustainability In The Oil And Gas Industry*. Retrieved from: https://petrowiki.spe.org/Sustainability_in_the_oil_and_gas_industry_on_22nd_October_2023.
- SpringTide (2023). *Why E-Sourcing?* Retrieved from: <https://www.springtideprocurement.com/e-sourcing/why-e-sourcing/> on 6th March, 2023.
- Subhadin, R. (2017). App adoption and switching behavior: applying the extended tam in smartphone app usage. *Journal of Information Systems and Technology Management*, 14 (2), 239-261.
- Ugbomeh, B. A., & Atubi, A. O. (2010). The role of the oil industry and the Nigerian State in defining the future of the Niger Delta Region of Nigeria. *African Research Review*, 4(2).
- Wilson, O. (2016). *Basics of Mobile Marketing Strategy*. Business Science Reference, an imprint of IGI Global.
- Yenkatesh, V., Morris, M. G., Davis, G.B. & Davis, F.D.(2003).Users' acceptance of information technology: Towards a unified view. *MIS Quarterly*, 27(3) 425-478.