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Supply Risk Management and Financial Performance of Mainstream Oil and Gas Companies in Nigeria

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Department of Banking and Finance, Rivers State University, Port Harcourt, Nigeria | Email: lenvieleesi@gmail.com Abstract: This study was conducted to examine the influence of supply risk management on financial performance of mainstream oil and gas companies in Nigeria. To assess the impact of supply risk management on financial performance and to achieve an in-depth understanding of the research issues, the study adopted a quantitative triangulation based approach. The first phase of the study was deductive connecting a survey questionnaire disseminated to chief executive officers, managing directors, general managers, senior supply chain practitioners and supervisors through individual contacts. The target population integrated all oil and gas firms within Nigeria, while the accessible population involved eleven (11) listed mainstream oil and gas companies in Nigeria, whose list was derived from the Nigerian Stock Exchange as at October, 2020. A survey questionnaire was developed and pilot tested preceding issuance. In sum, 55 respondents (five from each firm) were contacted to complete the survey, which resulted to 37 valid responses, a response rate of 67.3%. The Source of secondary data used were from the audited financial statements of the mainstream oil and gas companies studied, from 2010-2019. Financial performance was measured using return on capital employed (ROCE), net profit margin (NPM) and earnings per share (EPS). The Pearson moment correlation coefficient and linear regressions were used for analysis, and the results revealed that supply risk management has a strong, positive and significant influence on return on capital employed and earnings per share, but a moderate, positive and significant influence on net profit margin. As such, the study recognizes supply risk management as an apparatus that predicts financial performance. The study therefore, concludes that, supply risk management positively and significantly influences financial performance of mainstream oil and gas companies in Nigeria, and recommends that management of mainstream oil and gas companies in Nigeria should access and implement supply risk management programs to enhance financial performance in their organizations.

Key words: Financial performance, Mainstream oil and gas companies, Nigeria, Supply management

INTRODUCTION

The oil and gas sector plays a vital role in the development of the Nigerian economy as it fosters a great impact in the economy via inter-sectoral linkages through provision of energy to industries and machines, employment generation, for the teeming Nigerians,

foreign exchange earnings through export of crude oil etc. In today's emerging environment, sustainable supply chain risks play a vital role in firms' performance more than ever, because risks have a propensity to disrupt sustainable operations, which in due course trims down a firm's performance. Risk is a feasible episode whose inauspicious end results are not easy to agree to or are still objectionable (Tsai, Lai, Lloyd & Lin, 2012). In this day and age, the risk estimation is an essential investigative subject matter since the risks were for all time in attendance in the business goings-on (Olssen, 2007).

The increasing level and reach of supply chain structural design has transported a mixture of risks influencing firm's ability to function incessantly and supply goods and services to the market (Jordan & Bak, 2016). Supply chain risks gained mounting consideration owing to the soaring connectivity of supply chains. Supply chains in fact are ever more functioning in set of connected and worldwide background, where the capacity to assemble and preserve interactions with suppliers is likewise decisive and demanding for businesses (Hallikas & Lintukangas, 2016). However, it is not easy to rationalize the outlays prepared on risk mitigation programs if they are not in a straight line linked to the payoff (Rajagopal, Venkatesanam & Goh, 2017). Thus, recognizing the intrinsic supply chain risks is a nucleus action in view of the fact that it permits managers to identify with risk better and advance the management of supply chain risks (Lin & Zhou, 2011).

Accordingly, supply risk management comes in as a course of action by which companies spot quantify, prioritize and take the edge off the unpleasant consequence of uncertainties (Chapman & Ward, 1997). It is therefore, a useful scheme, engaged upon in order to assuage unnecessary outcomes of disclosures and bring in most advantageous assistance from perilous state of affairs (Essinger & Rosen, 1991). Supply risk management plays a crucial role in successfully operating supply chains in the existence of a multiplicity of uncertainties. Over the years, many scholars have concentrated on supply risk management by contributing in the neighborhood of defining, operationalizing, and extenuating risks. Ghadge, Dani, and Kalawsky (2012) noted that the foundations of business risks are numerous and begins equally inside and outside the business, situating supply risk management as apt and primary component of risk management broadly (Christopher & Lee, 2004). Supply risk management is therefore, the progression of risk management apparatuses in the midst of the partners, to guarantee stability united with elongated period of productivity of the supply chain.

A surplus of studies have unearthed that some investigations pondered on general supply chain risks (Qiang *et al.*, 2014; Tang & Tomlin, 2008; Brun *et al.*, 2006; Christopher & Lee, 2004) and specific risk types (Ellinger *et al.*, 2015; Tang *et al.*, 2012), signifying a deficiency of research on the correlation between risk management and performance (Sun *et al.*, 2012; Berg *et al.*, 2008) with the majority of the writing anchored on conceptual rather than empirical studies (Hallikas & Lintukangas, 2016; Thekdi & Aven, 2016).

Equally, a number of studies have empirically examined the linkage between supply risk management and financial performance (Muzzammil *et al.*,2019; Kumar *et al.*, 2018;

ElAbdellaoui & Moflih, 2017; Nair, Purohit & Choudhary, 2014), and have publicized that investment in supply risk management is positively associated with financial performance. However, to the best of the researchers knowledge, none of these studies have been carried out on supply risk management and financial performance using supply risk management as the independent variable to assess how this disclosure could affect the metrics of financial performance (return on capital employed, net profit margin and earnings per share) though a quantitative triangulation based approach in their analysis. In order to fill these gaps, this paper presents a comprehensive study anchored on data collected through primary source (questionnaire) and secondary source (time series data from 2010-2019), and by means of this quantitative triangulation investigates supply risk management and financial performance of mainstream oil and gas companies in Nigeria.

Research Objective

The main objective of this study is to evaluate the impact of supply risk management on the financial performance of mainstream oil and gas companies in Nigeria. More specifically, to investigate relationship between supply risk management and financial performance of mainstream oil and gas companies in Nigeria.

Research Question

Does supply risk management relate with the metrics of financial performance of mainstream oil and gas companies in Nigeria?

LITERATURE REVIEW AND HYPOTHSES DEVELOPMENT

Supply Risk Management

There is no harmony on the characterization of "supply risk" and "supply chain risk management" (Diehl & Spinler, 2013; Sodhi & Tang, 2009). Supply risk is a renowned observable fact and the topic has achieved recognition for the period of the past two decades (Chen, 2018; Zhao *et al.*, 2013; Peck, 2005 Chopra & Sodhi, 2004; Christopher & Lee, 2004). Therefore, supply risk has become the essential part of Supply chain risk management literature. Supply risk can be defined as "the probability of anincident associated with inbound supply from individual supplier failures or the supply market occurring, in which its outcomes result in the inability of the purchasing firm to meet customer demand or cause threats to customer life and safety" (Zsidisin, 2003:222).

Risk management is the course of action whereby decisions are made to acknowledge and identified or evaluated risk or the realization of action to diminish the penalty or the likelihood of incidence of an unpleasant occasion (Cheng,yip & Yeung, 2012). Risk management refers to strategies, methods and supporting utensils to spot and manage risk to an tolerable level (Alhawri, Talet & Masour, 2012). Supply risk management is a prearranged and synergic progression throughout the supply chain, which hunts for to optimize the entirety of strategies, processes, human resources, technology and knowledge

which aims are to direct, keep an eye on and appraise supply chain risk and to uphold stability and make best use of profitability (Sun, Matsu &Yin, 2012).

Fundamentally, companies need to assess the results of supply risk management, since the evaluation of performance permits firms to appraise the outcome of practices embarked upon (Berg *et al.*, 2008). The appreciation of connected supply risk would permit managers, to espouse specific approach for definite risk (Ho *et al.*, 2015). Organizations encounter uncertainties which are capable of influencing the company's objectives negatively and positively at all stages in operations all the way through the supply chain. Hoffmann *et al.* (2013: 200) rightly declared that "the development ofsupply risk management procedures and capabilities is proposed to increase supply risk management performance" Thus, the existence of an appropriate risk discovery and measurement structure in a business has, the capability of managing risks.

Financial Performance

Financial performance describes in monetary terms, the profit or loss position of any business concern. Measures of financial performance under this study are Return on Capital Employed (ROCE) Net Profit Margin (NPM) and Earning Per Share (EPS). In general term, it is believed that supply chain risk management has a linear relationship with the metrics of financial performance.

Returns on Capital Employed (ROCE)

Return on capital employed indicates the efficiency and profitability of a firm's capital investment. Return on capital employed is calculated as follows: return on capital employed (ROCE)=PBIT (Net Income)/capital Employed. Where capital employed=Total assets-Current Liabilities=Equity+Non current liabilities

Share Capital+Reserve+Long term Loans

Record acquired from the Nigerian stock exchange illustrates how each of the listed oil and gas companies preserved its return on capital employed for a period of ten years (2010-2019). Figures from their annual report and accounts are shown hereunder.

Table 1: DEPENDENT VARIABLE-RETURN ON CAPITAL EMPLOYED (ROCE) FOR 11 OIL & GAS FIRMS FROM 2010- 2019

S/N	Firms	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
1	Forte Oil PLC	0.13	3.44	0.37	0.44	0.35	0.42	0.46	0.14	0.08	0.36
2	Dando PLC	0.10	0.03	80.0	0.3	1.12	1.22	1.54	2.91	0.29	0.23
3	Fotal Nig. Plc	0.65	0.58	0.31	0.61	0.43	0.58	0.86	0.42	0.39	0.01
4	Mobil Nig. Plc	1.47	1.33	0.62	0.54	0.62	0.63	0.56	0.41	0.41	0.26
5	Conoil Plc	0.26	0.26	0.07	0.25	0.10	0.20	0.23	0.13	0.14	0.09
6	Mrs Plc (Fmr:Texac	0.16	0.08	0.02	0.07	0.04	0.07	0.10	0.04	0.07	0.12
7	Eterna Oil & Gas Plc	0.25	0.33	0.22	0.15	0.22	0.14	0.24	0.24	0.17	0.02
8	Capital Oil Plc	0.14	0.01	0.03	0.48	0.14	0.07	0.69	0.06	0.10	0.87
9	Rak Unity Pet. Plc	0.05	0.04	0.09	0.01	0.21	0.16	0.14	0.08	0.08	0.05
10	apaul Oil & Maritime	0.05	0.06	0.32	0.01	0.01	0.98	1.48	0.42	0.19	0.27
11	Seplat Pet. Dev. Co Plc	0.07	0.96	1.01	0.13	0.19	0.05	0.11	0.06	0.16	0.14

Net Profit Margin NPM

The profit margin relates to the net profit for the period to the sales revenue during the period. The net profit margin before interest and taxation represents the profit from trading operation before the interest costs are taken into consideration. Net profit margin is used to measure up to one output of the business (profit) with another output (sales revenue). It varies noticeably between types of business. Net profit margin is calculated as:

Net profit margin from operation of eleven listed oil and gas companies are shown below. The record was acquired from the Nigerian stock market.

Table 2 DEPENDENT VARIABLE-NET PROFIT MARGIN (NPM) FOR 11 OIL & GAS FIRMS FROM 2010-2019

S/N	Firms	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
l	Forte Oil PLC	2.18	1.89	0.83	3.90	1.68	4.41	2.46	1.47	0.47	6.58
2	Dando PLC	1.24	1.69	5.95	4.00	4.68	6.69	2.74	7.90	3.75	6.09
3	Total Nig. Plc	3.39	2.19	2.14	2.24	2.20	1.95	5.09	2.78	2.59	0.09
1	Mobil Nig. Plc	6.66	6.57	3.56	4.42	8.03	7.59	8.67	6.00	5.67	4.48
5	Conoil Plc	1.36	1.90	0.48	1.92	0.65	2.78	3.34	1.37	1.47	1.43
5	Mrs Plc (Fmr:Texac	2.47	0.86	0.26	0.72	0.81	1.07	1.34	1.29	1.41	2.63
7	Eterna Oil & Gas Plc	4.37	2.65	1.06	0.72	1.52	1.36	1.42	1,19	0.45	0.02
3	Capital Oil Plc	2.24	4.13	1.21	1.60	6.23	5.46	3.51	1.17	9.23	8.15
)	Rak Unity Pet. Plc	0.17	0.16	0.15	0.16	1.41	0.80	0.51	0.29	0.31	0.42
10	apaul Oil & Maritime	1.47	1.23	7.98	0.48	0.48	1.28	3.35	5.56	1.64	1.73
11	Seplat Pet. Dev. Co Plc	15. 51	11.84	17.47	63.70	35.89	12.08	47.77	75.53	22.88	32.94

Source: Firms Annual Report & Accounts Net profit Margin is the percentage of Revenue remaining after all operating expenses, interest NPM=(Net Income/Revenue) x 100

\& preferred stock dividend have been deducted from a company's total revenue.

The Net Profit reflects a company's overall ability to turn income into profit

Earnings Per Share (EPS)

Earnings per share is the profit ascribed to equity shares based on the profit for the period tax and after deducting minority interest (if consolidated accounts) and preference dividends but before taking into account, extra ordinary items (EOI), divided by the number of ordinary shares issue and ranking for dividend. An earnings per share is calculated as follows:

Earnings Per Share: Profit after tax-prof. Dividend

Issued number of ord. shares ranking for dividend

The earnings per share for the eleven listed oil and gas firm are displayed below.

Table 3. DEPENDENT VARIABLE-EARNINGS PER SHARE (EPS) FOR 11 OIL & GAS FIRMS FROM 2010-2019

S/N	Firms	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
1	Forte Oil PLC	-2.54	20.02	0.61	4.25	2.42	4.39	2.48	0.97	0.48	2.55
2	Dando PLC	11.32	8.29	1.26	0.23	-20.76	-4.22	0.30	1.13	1.97	0.65
3	Гotal Nig. Plc	16.01	11.23	13.76	15.71	15.58	11.92	43.58	23.62	23.45	-0.60
4	Mobil Nig. Plc	12.93	12.14	8.56	9.65	17.73	13.51	22.61	22.61	25.87	17.59
5	Conoil Plc	4.02	4.32	1.03	4.42	1.20	3.33	4.09	2.27	2.59	1.49
6	Mrs Plc (Fmr:Texac	7.27	2.42	0.81	2.50	2.94	3.68	5.77	4.54	-4.15	-5.59
7	Eterna Oil & Gas Plc	0.47	0.80	0.73	0.54	0.97	0.97	0.97	1.59	0.87	-0.04
В	Capital Oil Plc	0.03	0.01	0.01	-0.05	-0.05	-0.03	-0.12	-0.78	0.67	-0.69
9	Rak Unity Pet. Plc	0.02	0.02	0.03	0.03	0.95	0.94	0.74	0.54	0.52	-070
10	apaul Oil & Maritime	0.13	0.14	-0.92	0.01	-0.43	-1.11	-3.47	-1.70	-0.96	0.98
11	Seplat Pet. Dev. Co Plc	5.50	2.40	49.80	2.13	0.85	21.25	-44.09	143.96	79.04	0.38

Empirical Review

Muzzammil *et al.*, (2019) examines the relationship between sustainable supply chainrisks, supply chain integration, and firm's financial performance by means of 296 survey observations alongside with financial data of published annual statements to approximate the quantitative causal-effects of three dimensions of sustainable supply chain risks on supply chain integration and financial performance. The outcome reveals that sustainable internal business process risks, sustainable supply risks, and sustainable demand risks have a negative relationship with supply chain integration. Additionally, the study found that all the three supply chain integration practices have a positive impact on firms' financial performance.

Kumar *et al.* (2018) investigated the impact of supply and manufacturing risk management on business performance in Chinese manufacturing supply chains, using a two phased multi-method approach, which incorporated a survey questionnaire and then a semi-structured interview to practitioners in Chinese manufacturing supply chains. The study recorded 103 valid survey responses accompanied by six semi-structured interviews. It was revealed that, supply risk and manufacturing risk management are equally vital for business performance, high correlation between business and manufacturing risk management performance exists, conversely no significant influence of supplier dependency, systematic purchasing, maturity of production and supply chain, and human resources was established.

El Abdellaoui and Moflih (2017) evaluate the relationship or effects of supply chain macro and micro risks on logistics performance in Morocco by means of a questionnaire survey embarked upon between January 2017 and April 2017 to institute a database of 276 Moroccan ICS (Industrial, Commercial and Services) companies. The principal component analysis, correlation tests and regression tests are used for data analysis. The study found that the risks associated with supply chain upstream, downstream, infrastructure and transport are negatively related to logistics performance. Nonetheless, micro risks have a significant and influence on logistics performance.

Nair *et al.* (2014) studied risk management and business performance of IIB. While risk management had seven distinct dimensions, business performance was measured in terms of financial and non-financial performance of the IIB. The study used the grounded theory approach. Multiple regression analysis was used to institute causal relationships between the variables of research interest. The result indicated that risk assessment analysis, risk management practices, risk identification, and credit risk assessment are the definite dimensions which influence business performance.

Based on the review above, the following research model was formulated:

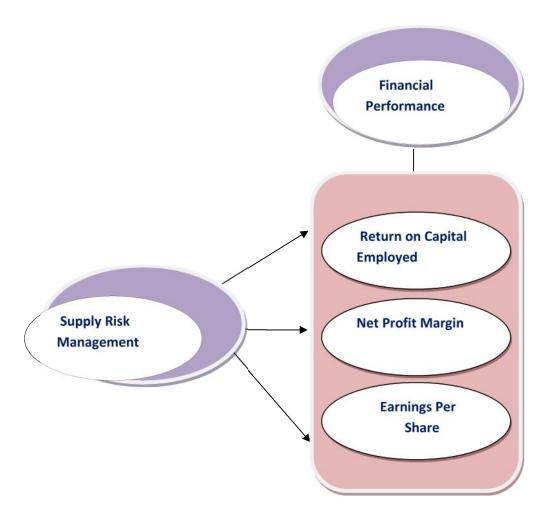


Figure 1: Research Model of Supply Risk Management and Financial Performance

Source: Designed by the Authors, 2021.

Based on the **research model**, the following hypotheses were raised:

Ho₁: Supply risk management does not significantly influence return on capital employed of listed oil and gas companies in Nigeria.

Ho₂: Supply risk management does not significantly influence net profit margin of mainstream oil and gas companies in Nigeria.

Ho₃: Supply risk management does not significantly influence earnings per share of mainstream oil and gas companies in Nigeria.

RESEARCH METHODOLOGY

To assess the impact of supply risk management on financial performance and to achieve an in-depth understanding of the research issue (Mangan *et al.*, 2004), this study adopts a quantitative triangulation method based approach. The first phase of the study was deductive connecting a survey questionnaire disseminated to chief executive officers, managing directors, general managers, senior supply chain practitioners and supervisors through individual contacts. The target population integrated all oil and gas firms within Nigeria, while the accessible population involved eleven (11) listed mainstream oil and gas companies in Nigeria, whose list was derived from the Nigerian Stock Exchange as at October, 2020. The questionnaire was furthermore developed following the study of Wieland & Wallenburg (2012) and Hallikas & Lintukangas (2016). The survey questionnaire was pilot tested preceding issuance. A survey questionnaire was developed pilot tested preceding issuance. In sum, 55 respondents (five from each firm) were contacted to complete the survey, which resulted to 37 valid responses, a response rate of 67.3%The Source of secondary data used were from the audited financial statements of the mainstream oil and gas companies studied, from 2010-2019.

Model Specification

Based on Linear regression model, the models are stated as follows:

```
ROCE
= f (SRM) ------ (1)

NPM
= f(SRM) ......(2)

EPS
= f(SRM) .....(3)

ROCE
= a_0 + a_1 SRM + e

NPM
= b_0 + b_1 SRM + e

NPM
= c_0 + c_1 SRM + e
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Where:

 a_{0-C_0} is the intercepts

 a_{1} – a_{3} is the slope of the dependent variables when tested for Return on Capital Employed (ROCE)

 $_{b1-b3}$ is the slope of dependent variables when tested for Net Profit Margin (NPM) $c_{1-C3\,is}$ the slope of dependent variables when tested for Earnings Per Share (EPS) e is the error term

Results

The statistical analysis was divided into two parts following the research model. Part one (see Table 4) investigated the correlation between supply risk management and financial performance in the analysis of research question. Part two investigated the influence of supply risk management on financial performance (see Table 5).

Analysis of Research Question

The researchers sought to ascertain the relationship between supply risk management and the metrics of financial performance of mainstream oil and gas companies in Nigeria. The Pearson's Product Moment Correlation (PPMC) technique was adopted for the research question in order to show the association between variables. Correlation point toward the degree of linear association between two variables. The association was investigated by testing the significance between supply risk management and the metrics of financial performance.

Table 4: Correlation Analysis showing the direction and strength of the relationship between supply risk management and financial performance metrics

Correlations

Variables	Pearson Correlation	P value (sig.)
ROCE	.646 **	0.000
NPM	.557 **	0.000
EPS	.767 **	0.000

^{**}Correlation significant at the 0.01 levels (2-tailed).

The correlation coefficient between return on capital employed and supply risk management was found to be 0.646 at a P<0.01 level, correlation coefficient between return on net profit margin and supply risk management was found to be 0.557 at a P<0.01 level and the correlation coefficient between earnings per share and supply risk management was found to be 0.767 at a P<0.01 level. Therefore, it can be concluded that supply risk management has a substantial and close correlation with financial performance. This indicates that companies implementing efficient risk management are predisposed to have positive financial performance.

STATISTICAL TEST OF HYPOTHES

Regression Analysis

Table 5. Result of regression model

Variables	Model	I Mod	lel II	Model III
С	.589	.670	2.89	
R	0.646	0.577	0.767	,
R ²	62.6%	53.7%	74.79	%
F-stat	277.668	243.357	7 14.3	368
T- stat	28.968	3.387	7.71	3

Source: SPSS 22.0 window output, 2021

In the linear regression analysis, supply risk management is analyzed as an independent variable, while return on capital employed; net profit margin and earnings per share are analyzed as the metrics of financial performance, the dependent variable of the study. The regression coefficient of supply risk management on return on capital employed is 0.646,

significant at P< 0.01, indicating that supply risk management has a positive and significant influencing relationship on return on capital employed. Correspondingly, the regression coefficient of supply risk management on net profit margin is 0.577, significant at P< 0.01, indicating that supply risk management has a positive and significant influencing relationship on net profit margin. The results also mirror a positive and acceptably significant influencing relationship between supply risk management and earnings per share. The ANOVA explains the fitness of the model as shown by the F-ratio Model 1 as 277.668, Model 11 as 243.357 and Model 111 as 14.36, which are very significant at p < 0.05. It has a t-statistics of 28.968, 3.387 and 7.713 respectively. This implies that there is significant evidence to extrapolate that supply risk management is linearly related to return on capital employed, net profit margin and earnings per share. This proposes that the model is measured to be fit and that supply risk management has substantial influence on return on capital employed, net profit margin and earnings per share.

Discussion

The result of regression analysis shows there is a positive and significant influence of supply risk management on metrics of financial performance. Consequently, the result of the test shows strong, positive and significant influence on return on capital employed. This is evidenced by the results in Table 5 with beta value of .646 and p value of 0.0000 leading us to reject the null hypothesis of no significant influence of the independent variable on the dependent variable. Consistent with our expectation *aprior*, this finding suggests that supply risk management can positively influence return on capital employed. This finding agrees with the findings of Muzzammil *et al.*, (2019) who found that, sustainable internal business process risks, sustainable supply risks, and sustainable demand risk have positive and significant influence on financial performance.

The study's findings also suggest that supply risk management has moderate, positive and significant influence on net profit margin. This is evidenced by the results in table 5, particularly the associated value of the beta of .577 and p value of 0.0000 which is lesser 0.05, leading us to reject the null of no significant influence of the independent variable on the dependent variable. Hypothetically, any strategy that increases return on capital employed should also increase net profit margin, as net profit margin is a positive function of capital employed. Thus, our *aprior* expectation is that supply risk management has positive relationship with net profit margin. This finding is also consistent with findings of Nair *et al.* (2014) who revealed that risk assessment analysis, risk management practices, risk identification, and credit risk assessment influences business performance.

The results also show that supply risk management has a strong, positive and significant influence on earning per share. This is evidenced by the results in table 5. Explicitly, the beta associated with supply risk management is found to be positive and is associated with a probability that is very much lower than the standard levels of significance (beta = 767, p-value = 0.000), leading us to reject the null of no null of no significant influence of the independent variable on the dependent variable. One striking thing about this finding is that it absolutely agrees with our apriori expectation. We expected a positive and significant relationship between supply risk management, given that when companies go

for supply risk management activities, they project their companies as risk management compliant, by this means enhancing their operations and increasing earnings per share. This finding is consistent with Kumar *et al.* (2018) who found revealed that, supply risk and manufacturing risk management influence business performance.

CONCLUSION AND RECOMMENDATION

This study appraised the degree to which supply risk management affect financial performance of mainstream oil and gas companies in Nigeria by means of a quantitative triangulation analysis, which makes apparent that in attendance are generous substantiations that supply risk management as investigated by this existing study optimistically connected with financial performance through the outcome of the statistical analysis, thus, presenting a good judgment to assert that supply risk management has the force to set in motion financial performance, and its nonexistence predicts economic regression in the long run, as it will tantamount to a consequence slowing down financial performance. The study therefore, concludes that, supply risk management positively and significantly influences financial performance of mainstream oil and gas companies in Nigeria, and recommends that the management of mainstream oil and gas companies in Nigeria should make accessible and implement supply risk management programs to endear financial performance in their organization.

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International Journal of Economics, Finance and Entrepreneurship

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