

Corporate Strategy and Performance of Oil and Gas Companies in Nigeria (2005 - 2018).

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Abstract: *The increasing operational costs due to oil spills, crude oil theft, illegal refining and sabotage of facilities, kidnapping, onshore and offshore piracy in parts of the Niger Delta, high and unprecedented interest charges due to late payment of subsidies that deplete their profit beyond any one company's control, is of significant concern. Thus, the study explored the effect of corporate strategy on the performance of oil and gas firms in Nigeria to enable them formulate and implement appropriate strategies to continue to make reasonable profits. Ex post facto research design was used. Cross sectional data were sourced from financial statement and annual reports of the oil and gas firms from 2005 to 2018. Profitability was proxy for dependent variable while product diversification, investment diversification and business diversification were proxies for the independent variable. R-square, regression co-efficient, Durbin Watson statistics, F-probability and T-statistics were used to determine the effect of corporate strategy on the profitability of oil and gas firms. Findings of the study revealed that 71 percent and 50.9 percent of the total variations in the profitability of the oil and gas firms is accounted for by the explanatory variables. From the regression coefficient, it was evidenced that product diversification and business diversification have positive effect on the profitability of the oil and gas firms in Nigeria while investment diversification has negative effect on the profitability of the oil and gas firms. From the student t-test, the study found investment diversification as statistically not significant while product diversification and business diversification are statistically significant. The study concluded that product diversification and business diversification have significant positive effect on profitability while investment diversification has a negative significant effect. The study recommended that corporate strategies such as product diversification be integrated with the objective of increasing performance of the oil and gas firms in Nigeria.*

Keywords: Corporate strategy, diversification, product and performance.

Introduction

Adequate returns remain the primary motive of business organizations. This becomes feasible only if management of such firms develops and implements appropriate corporate strategy that cut across the firm to yield above average profitability for the company as well as satisfy other stakeholders' expectations. Beset with fierce competition arising from globalization, uncertainties, risks, and instability in the business environment in recent times, firms always monitor the business environment to take actions, make commitments and take decisions that would enable firms remain in business beyond the foreseeable future even as huge capital resources, high technical expertise, advanced technology, sophisticated equipment, and quality infrastructure remain a bane in the operations of oil and gas companies in the Nigerian petroleum industry. Therefore, companies in the petroleum industry have a choice of direction related to allocating resources among the different businesses of the firm, in transferring resources from one set of businesses to others and in managing with interests in serving a diverse base of customer groups, performing for them a variety of customer functions, and making use of a range of several different technologies (Kazmi, 2008).

Jenetabai (2015) posited that performance is the extent to which a company, as a social system with certain resources, is able to fulfill its goals without being obliged to incapacitate its resources and means or putting excessive strain on its employees. It is important to remark here that this study looks at performance from the financial point of view, thus profitability remains central. This is not unconnected with the reason why Jubril and Yunusa (2018) noted that profitability is the mainstay of business organizations no matter how profit is measured or defined, profit over the long term is the clearest indication of a firm's ability to satisfy the principle claims and desires of employees and stakeholders. Profit is the financial benefit realized from the business activity when the revenues generated exceeds the costs and expenses incurred in the operation of such activities. Simply, the total cost deducted from total revenue yields profit.

The Nigerian oil and gas industry has remained vibrant since the discovery of crude oil in 1956 by the Shell Group (KPMG Nigeria, 2014). Concerted efforts after several years, led to the first commercial discovery at Oloibiri, in Bayelsa State, Niger Delta. Nigeria joined the ranks of oil producers in 1958 when its first oil field came on stream producing 5,100 bpd (OilGasNg, 2019). However, the sector was largely dominated by multinational corporations until the early 1990s when Nigerian companies began to make entry into the industry. Local participation was boosted with the implementation of the Nigeria Content Directives issued by the Nigerian National Petroleum Corporation (NNPC) in 1991 and eventually, by promulgation of the Nigerian Oil and Gas Industry Content

Development (NOGIC) Act (The Act) in 2010. The Act seeks to promote the use of Nigerian companies/resources in the award of oil licenses, contracts and projects.

Nigeria has a maximum crude oil production capacity of 2.5 million barrels per day and has traditionally ranked as Africa's largest producer and sixth largest in the world. Nigeria's petroleum industry is the largest in Africa with proven oil and gas reserves of 37 billion barrels and 192 trillion cubic feet respectively (The African Exponent, 2019).

Ten (10) previous related studies (Iqbal, Hameed & Qadeer (2012), Oyedijo (2012), Li, Wang, Lou, Cheng and Yang (2016), Makhoha, Namusonge and Sakwa (2016), Mulwa and Kosgei (2016), Onur and Ihsan (2016), Rop, Kibet and Bokongo (2016), Manyuru, Wachira and Amata (2017), Ranka, Vladimir and Dragan (2017) and Nwakoby and Ihediwa (2018) were respectively found to have researched on manufacturing, energy, banking, agricultural industry, and insurance industries in Pakistan, China, Turkey, Italy, Netherlands, Republic of Serbia, Nigeria, but none in the oil and gas industry in industry thereby creating a gap in knowledge. Therefore, the study sought to bridge the gap in knowledge by studying corporate strategy and performance of oil and gas companies in Nigeria using ten (10) firms listed on the NSE; analyzing financial data from annual financial statements and reports covering fourteen (14) years, 2005 to 2018.

Statement of the Problem

The motive of every business concern is to perform and make profit from its operations. Well formulated and implemented corporate strategies that determine the choice of activities of firms in the present and into the future is critical to performance measured in financial terms, most expectedly profitability. However, the timely application of appropriate relevant strategic options seem not to be proactive enough given that such decisions, commitments and actions not only affect the survival and growth of the firms but affect the overall corporate goals and objectives of organizations.

The increasing operational costs due to operational spills, crude oil theft, illegal refining and sabotage of facilities, kidnapping as well as onshore and offshore piracy in parts of the Niger Delta beyond any one company's control, is of significant concern. These cost come in the form of clean up, cost of remediation and rehabilitation of spill areas, ransoms, compensation, repairs or maintenance of vandalized pipelines, anti-theft protection mechanisms on key infrastructure, such as wellheads and manifolds. Other costs emanate from media engagements by collaborating with local community leaders, traditional rulers and state governments in the Niger Delta to implement several initiatives and partnerships to raise awareness on the negative impact of crude oil theft and illegal oil refining. Very importantly too, the high and unprecedented interest charges due to late payment of subsidies by the Federal Government of Nigeria to oil marketers.

In the downstream companies there is policy uncertainty, funding and indebtedness to marketers with regards to subsidy payment, absence of a level-playing field, failure of refineries and dilapidated pipelines had perpetuated dependence on importation of petroleum products, thus the rise and fall of foreign exchange and increase in crude oil prices makes the landing cost of the product higher for the companies. Meanwhile, many oil and gas companies struggle to find and retain the qualified workers that they need during boom times, so payroll can quickly rise to add another cost to the overall picture. These costs, in turn, have made oil and gas a very capital-intensive industry.

In October 2016, United States-based ExxonMobil divested its 60 per cent stake in Mobil Oil Nigeria Plc to Nipco Plc, leaving the French energy major Total as the only international oil company operating in the nation's downstream sector. Oando Plc, an indigenous energy group, announced in July 2016 that it had completed the partial divestment of its interest in its downstream business to Helios Investment Partners and the Vitol Group. It sold 60 per cent stake in Oando Marketing Limited, a petroleum product retailing and distribution firm, which was renamed OVH Energy after the acquisition. It is believed that the tough operating environment in the downstream sector was partly responsible for the divestments by foreign and local players. The fuel retail market had been able to survive because they are being helped by other aspects of the business like lubricants, liquefied petroleum gas, and marine business. Currently, the private sector players have been practically crowded out by the state-owned NNPC, which currently supplies over 90 per cent of petroleum products in the country.

The aforementioned costs and serious working capital constraints facing oil and gas companies in Nigeria increase their total production cost thereby deplete the profits that are supposed to accrue to the companies and rewards to other stakeholders. The situation would remain detrimental to the performance of oil and gas companies except oil and gas firms develop and effectively implement robust diversification strategy that would increase their performance.

Hypothesis

H₁: Product diversification, business diversification and investment diversification do not have significant effect on profitability of oil and gas firms in Nigeria.

Review of Related Literature

Corporate Strategy

Business firms like every other organization is intended to achieve success against pre-determined goals and objectives set and as embodied in the organizations' mission and vision such as increase in market share, sales growth, and return on investments. As such, corporate firms device different strategies from inception and its journey towards growth or expansion and stability to achieve above average profitability and maximize contribution to the overall corporate goals and objectives (Kazmi, 2008) and meet other stakeholders' expectations.

Furrer (2013) defined corporate strategy as the way a company creates value through the business activities. This implies that firms can be defined as the way a company creates value through the configuration and co-ordination of its multi-business activities. This infers that firms can be of varying structure and size while producing goods and/or services with several functional aspects operating while sharing resources, transferring competencies and creating specific assets (Fraser, 2008).

For Gallagher (2013) corporate strategy is the selection and development of markets in which a firm competes. This implies that corporate strategy is concerned with what industries (or markets) a firm seeks to compete. This is similar to the view of Foundation of Strategy (2019), Fraser (2008) and Nicholas (2016) who contend that corporate strategy defines the market and the businesses in which an organization chooses to operate in line with its mission and vision (what the company does, why it exists, and what it intends to become). Gallagher (2013) added that corporate strategy is concerned with deploying the available resources to achieve objectives and will affect the overall direction of the organization and establish its future working environment. To this extent, corporate strategy is not only about competing in the present but also preparing for the future. Kazmi (2008) describes corporate strategy as basically about decisions related to: allocating resources among the different business of a firm, transferring resources from one set of business to others and managing and nurturing a portfolio of businesses.

This description highlights resource as central in every organization. Gallagher (2013) described sharing resources as a critical building block of corporate strategy and remarked that size of the firm - small, medium and large and ownership structure are significant. Thus, corporate strategy includes the commitments, decisions and actions required for a firm to achieve strategic competitiveness and earn above average returns.

Corporate strategy decisions include investment in diversification, vertical integration, acquisitions and new ventures: the allocations of resources between the different businesses of the firm and divestment (Foundations of Strategy, n.d). For Gallagher (2013) corporate strategy involves only two primary dimensions, vertical integration where firms engage in activities that were formerly done by their buyers or suppliers and diversification where they enter additional markets. Importantly, corporate strategy is the responsibility of the top management.

The above indicates that corporate organizations small, medium or large use and/or transfer resources within or among its business(es) to produce goods and/or services with the intention to grow in competition from the present into the future to achieve set goals and objectives that satisfy the organization and its stakeholders.

Diversification

Le (2019) described diversification as the increase of market heterogeneity of enterprise products. Purkayastha *et al* (2012) cited in Nwakoby & Iheadiwa (2018) looked at corporate diversification as a firm's strategy of entering and competing in new product markets. Kazmi (2008) sees diversification as involving a substantial change in business definition - singly or jointly in terms of customer functions, customer groups or alternative technologies of one or more of a firm's businesses. The above definitions infer that by diversification, business firms innovate and manifest in producing a variety of products/services and/or operating in different markets while adopting alternative technologies. However, how diversified a firm is can be determined by what portion of its sales are derived from different markets. The larger a percentage of sales are derived from different markets/industries, the more diversified the firm can be said to be (Rumelt, 1974 cited in Gallagher, 2013).

Product Diversification

Product diversification has been used as one of the attributes that aids competitive advantage for organizations through economics of scale and other synergies from using an organization's capabilities and resources across different product lines (Ndubuisi-Okolo, Ogochukwu & Oyakhire, 2020). Research on product diversification and performance linkage has recently gone beyond an examination of product diversity at the corporate level, to a more micro level of study, such as within-industry and within-business (Li Greenwood, 2004; Stern Henderson, 2004). A need to better understand the value-creation mechanisms of product diversification strategy prompted this refocus. In contrast, research on the product line diversification strategy of multinational firms has tended to remain at the corporate level, focusing only on its impact on corporate performance without considering the possible variations of such a strategy in a firm's individual host-country markets. Although multinational firms enjoy a competitive advantage in integrating a global value chain, national environments and institutions remain as powerful constraints on a concerted global strategy, and exert strong influences on the survival of foreign subsidiaries (Kostova Zaheer, 1999).

Business Diversification

Another stream of literature emphasizes the strategic role of the business subsidiary as an influence of performance (Anderson & Anders, 2002). The greater the strategic interdependency between subsidiary and parent, the more likely the subsidiary will be to receive support and resources from the parent to maintain high performance. Subsidiaries that play key strategic roles for their parents, as having regional, product or functional mandates, will have a direct claim to resources within the multinational company, whereas subsidiaries that are auxiliary portfolio investments have fewer opportunities of gaining additional resources from headquarters should a crisis erupt (Subranmaniam & Watson, 2006). Also, the strategic intent/investment motive behind establishing the subsidiary may influence performance. Some subsidiaries may have a strategic intent of accessing local markets, while others may have as their strategic intent to supply export markets and/or other subsidiaries with components (Dunning & Sarianna, 2008). As the latter type of investment impacts the global operation of the multinational company directly, it can be expected to have higher performance than, for example, market seeking investments.

Investment Diversification

Investment diversification is actually a risk management technique which reduces risk of investment by investing in different investment tools (stocks, bonds, mutual funds, real estate, and so on) and increases the chance of making profit. Modern portfolio theory says investors can lessen the exposure to risk by holding more and more stocks. The specific risk of holding individual stock is reduced in this case. Only the market risk cannot be avoided. Since 1960 the world market is being globalized, so international diversification started gaining attention. Investors attempt to reduce risk by investing in more than one nation whose economic cycles are not perfectly correlated. As the economic development and timing of business cycles vary among countries, it can be used as a technique to reduce risk (Yavas & Rezayat, 2006). In the era of globalization, international investment has become so familiar to the investors. Sometimes investors invest internationally even without knowing. Likewise, investors can obtain diversification benefit if one country's stock market is not co-integrated with other country's stock market. Cosset and Suret (1995) averred that investment diversified portfolio is less risky than domestic portfolio because of lower positive correlation among them. Also, they mentioned in their paper that developed countries stock market are more co-integrated than the non-developed or emerging countries.

Firm Performance

Performance (organizational performance) is a contextual concept associated with the phenomenon being studied (Hofer, 1983 cited in Carton, 2004). It is for this reason that there is not a universally accepted definition of the concept even as it is very common in the academic literature (Gavrea, Iliee & Stegorean, 2011).

Against this backdrop, the study reviewed some definitions of the concept of organizational performance from the management perspective. Kaplan and Norton (1992) cited in Gavrea *et al* (2011) provided a set of descriptions and definitions among others to illustrate the concept of organizational performance. Nangih (2017) described performance as a measure of how well an organization has fared. It is an indicator or measure used to assess an organization in terms of the achievement of its objectives. Carton (2004) made it clearer by defining performance in the specific context of organizational financial performance as a measure of the change of the financial state of an organization, or the financial outcomes that result from management decisions and the execution of those decisions by members of the organization.

Simply put, Felizardo, Felix and Thomaz (2017) defined performance as doing what will lead to measured value outcome tomorrow. Aluko (2003) defined performance as execution or accomplishment of work tasks or goals to a certain level of desired satisfaction and that organizational performance is defined in terms of the ability of an organization to satisfy the desired expectations of three main stakeholders comprising; owners, employees and customers. An institution that persistently makes loss or below average return will ultimately deplete its capital base, which in turn put equity and debt holders at risk. Moreover, since the ultimate purpose of any profit-seeking organization is to preserve and create wealth for its owners the bank's return on equity (ROE) needs to be greater than it costs of equity in order to create shareholder's value. Dauda (2010) highlighted organization performance as determined by

the demand for its products or services. Many organizations put in place methods and strategies that could enable them attract customers and improve the quality and quantity of their product.

From the foregoing, performance in the context of this study is financial performance which has to do with the achievement of goal and objectives from the operations and activities of the business in monetary returns to the different stakeholders. This is in line with the view of Nangih (2017) who added that profitability is one of the mostly used measures of performance. Rolstadas (1998) cited in Criveanu (2016) believes that performance of an organizational system is a complex relationship involving seven (7) performance indicators that must be followed: effectiveness, efficiency, quality, productivity, quality of work, innovation and profitability. Similarly, the Organizational Assessment framework of the World Conservation Union (2004) posited that there are four aspects of performance: effectiveness, efficiency, relevance and financial viability (profitability). Suffice to say that the assertions above capture quality, effectiveness, efficiency, relevance and financial viability (profitability), productivity, quality of work and innovation of resources in organizations goal achievement as among major dimensions of organizational performance in line with the views of Jenatabai (2015) and Ahmed and Ahmed (2014). But for the purpose of this study, financial performance of the companies was based financial information.

Measures of Firm Performance

Accounting measures are best known to judge the performance of any firm. Accounting performance measure like ROA has an advantage because it is backward looking (Jong, Gispert, Kabir and Renneboog, 2002). ROA gives an idea as to how efficient management is at using its assets to generate earnings (Khatab, Masood, Zaman, Saleem and Saeed, 2011). It is often computed by dividing Profit after tax by total assets. Alternatively, it can be calculated by dividing Earnings before Interest and Tax (EBIT) by total assets. This accounting based performance measure can be tagged as forward looking because profit for the period is measured against sales for the current period. Profit margin is calculated as profit after tax divided by turnover or net sales. The essence is that it provides information on the percentage of profit that sales are able to generate. Return on Equity (ROE) measures available income to shareholders. Return on Equity (ROE) is calculated as Net Income of the company divided by Total Shareholders' Equity (Net Income/Shareholders' equity).

Central to the above is profitability dimension as the relevant and associated measure which this study used which is one of the mostly used measures of performance (Nangih, 2017). Profitability means the ability of a firm to earn income over and above of its operating cost (direct and indirect). For this study, Profit after Tax (PAT) a major component of ROE, ROA and Profit Margin is used to measure profitability.

Diversification strategy and profitability

Diversification is one significant method that firms use to maintain their competitiveness and enhance this profitability (Chen and Yu, 2012 cited in Raei, Tehrani and Farhangzadeh, 2015). Jubril (2018) remarked that profitability is the mainstay of business organization, no matter how profit is measured or defined, profit over the long term is the clearest indication of a firm's ability to satisfy the principle claims and desires of employees and stakeholders. However, it is argued that diversified industrial companies are less sensitive to investment opportunities than specialized companies (Berger and Ofek, 1995 and Shin and Stulz, 1998 cited in Li, Wang, Lou, Cheng and Yang, 2016). This allusion is to the fact that managers driven by need for power and to increase their value to companies would care less about efficient resources allocation. Cheng and Yu cited in Nwakoby and Ihediwa (2018) observed that increase in the performance of firm is due to business diversification when the marginal benefits are greater than the marginal costs of diversification. This suggests that there is more likelihood for adequate managerial and financial capacity to easily diversify into other industries because diversification is considered as investment benefit. To that extent, performance is a likely determinant of diversification decision.

For Iqbal *et al* (2012) diversification is a strategy that management uses to get more opportunities from the current market; to get high return in shape of profit. Grant, Jamine and Thomas (1988) cited in Oyedijo (2012) remarked that profitability increases with diversity but only up to the limit of complexity. Whereas Varaderajam and Ramanujan (1987) suggested that the management of the process of diversification may be a more important influence on performance than the type or mode of diversification. Oyedijo (2012) from a contingency perspective said that the likely success or otherwise of diversification may be greatly dependent and determined by the circumstances of an organization such as the level of industry growth, market structure, the firm size, the resources situation of the organization and the firm's institutional environment. However, several conclusions have been reached from previous studies that diversification improves corporate performance although unrelated diversification is negatively correlated with firm performance (Grinyer, Peter & Massond, 1988). Firms pursuing related diversification built around firms' strengths in their basic activities have been found to be generally more profitable and more successful than firms that pursue a strategy of unrelated diversification.

Studies carried out by Collins and Montgomery (1997), Mckinsey (2001a) and Mckinsey (2001b) indicated that the most profitable firms are those that have diversified around a set of core resources and capabilities that are specialized enough to confer a meaningful competitive advantage in an attractive industry, yet adaptable enough to advantageously applied across several others. They further said the least profitable are broadly diversified firms whose strategies are built around very general resources (for example money) that are applied in a wide variety of industries but are seldom instrumental to competitive advantage in those settings. Wernerfelt and Montgomery (1988) explained the differences in performance by pointing to the increased efficiency firms realize from transferring and leveraging competencies to widely varying markets. Unrelated diversification may increase market related risks, but it can achieve efficient capital management.

On the other hand, related diversification can lead to higher corporate performance when compared to unrelated diversification. Hill (1994) noted that by pursuing a strategy of related diversification, firms can focus on core organizational capabilities and exploit the interrelationships between business lines to achieve economies of scope by sharing physical business resources and economies of scale through increased co-ordination and the sharing of marketing, information and technological know-how and capabilities across related industries all of which result in lower production, selling, servicing and distribution costs, better market coverage, stronger brand image and company reputation and lower order processing costs.

The study was anchored on the Resource-based theory of competitive advantage by Barney (1991). Barney is credited with developing this view of strategy as a firm is a bundle of resources – tangible and intangible – that include all assets, capabilities, organizational processes, information, knowledge, etc. These resources could be classified as physical, human and organizational resources. The physical resources are the technology, plant and equipment, geographic location, access to raw materials, etc. The human resources are the training, experience, judgment, intelligence, relationships, etc. present in the organization. The organizational resources are the formal systems and structures as well as informal relations among groups (Barney, 1991). The theory also says that resources of an organization can ultimately lead to strategic advantage for it if they possess four characteristics, that is, if those resources are valuable, rare, costly to imitate and non-substitutable. The resources-based theory of strategic management holds that firms possess resources of which those that are valuable and rare enable them to achieve strategic advantage. Other resources that cannot be imitated or substituted lead to superior long-term performance and a sustainable strategic advantage (Barney, 1995). The relevance of this theory to the study stems from that oil and gas companies’ resources are valuable, scarce, costly to imitate and non-substitutable which has enabled them sustainable strategic advantage and superior long-term performance.

Methods

Quasi experimental research design was used for the study. This approach combines theoretical consideration (a prior criterion) with the empirical observation and extract maximum information from the available data. The population of this study included oil and gas firms in Nigeria but used a sample of ten (10) oil and gas firms listed on the Nigerian Stock Exchange which have data spanning from 2005 to 2018. See list: Oando Plc, MRS Plc, Conoil Plc, Forte Oil Plc, Total Plc, Mobil Oil Nigeria Plc, Eterna Oil and Gas Plc, Rak Unity, Petroleum Plc, Ja Paul Oil and Maritime Plc and Eterna Oil and Gas Plc

Purposive sampling method was used in selecting them. The reason for the sample size is for accessibility, efficiency, representativeness, reliability and flexibility. Particularly again, the parameters are financial data obtained from Nigeria Stock and Exchange (NSE); published annual audited financial statements and report. Thus, the research method used in this work is quantitative. Data was analyzed using E-Views version 9.0. Financial statements and reports of the companies for fourteen (14) years were collected for analysis from the NSE.

Model Specification

Pooled Effect Model

$$LPAT_{it} = f(\beta_1LPD + \beta_2LID + \beta_3LBD + \dots \varepsilon_{it} \dots\dots\dots(1)$$

Fixed Effects

The fixed effects focus on whether there are differences by using a fixed intercept for each of the different cross-sectional structures. If we assume that the dummy variable for oil and gas firms is 1 or 0, then D_i , which is the dummy variable for firm i , can be expressed as:

$$D_i = \begin{cases} 1, & i=1 \\ 0, & \text{otherwise} \end{cases} \quad D_2 = \begin{cases} 1, & i=2 \\ 0, & \text{otherwise} \end{cases} \quad \dots \quad D_N = \begin{cases} 1, & i=N \\ 0, & \text{otherwise} \end{cases} \dots\dots\dots(2)$$

The regression of total samples can be expressed as:¹

$$Y_{it} = \sum_{i=1}^N \beta_{oi} D_i + \beta_i D_s + \beta_2 D_{ma} + \beta_3 s_1 + \beta_{oi} D_4 s_2 + \varepsilon_{it} \dots\dots\dots(3)$$

The dummy variables are expressed as follows: if $j = i$, then $Di = 1$; otherwise $Di = 0$.²

Data was further investigated of fraud effect and analyzed whether the independent variables affect the dependent variable; this regress the effect of the independent variables on the dependent variables.

$$LPAT_{it} = f(\beta_1 LPD + \beta_2 LID + \beta_3 LBD + \dots \varepsilon_{it} \dots\dots\dots(4)$$

Because the fixed effects account for both cross-sectional and time-series data, the increased covariance caused by individual-firms differences is eliminated, thereby increasing estimation-result efficiency.

Random Effects

Random effects focus on the relationship with the study sample as a whole; thus, the sample is randomly selected, as opposed to using the entire population. The total sample regression (a function of the random effect) can be expressed as:

$$LPAT_{it} = \sum_{j=1}^N \beta_0 + f(\beta_1 LPD + \beta_2 LID + \beta_3 LBD + U \dots\dots\dots(1)$$

If this is represented with random variables, then $\beta_{oj} = \bar{\beta}_0 + \mu_j$, which indicates that the difference occurs randomly, and the expectation value of β_{oi} is $\bar{\beta}_0$.⁵(2)

Where

LPAT = Log of profit after tax of the oil and gas firms

LPD = Log of product diversification measured as income from other sources rather than oil and gas

LID = Log of investment diversification measured as investment in other assets

LBD = Log of business diversification measured as income from subsidiaries

Hausman Test

The Hausman test is the most commonly used method for evaluating fixed and random effects. If variables are statistically correlated, then the fixed-effects estimation is consistent and efficient, where the random-effects estimation is inconsistent, the fixed-effects model should be adopted. Conversely, if the variables are statistically uncorrelated, then the random-effects estimation is consistent and efficient, where the fixed-effects estimation is consistent but inefficient, and the random-effects model should be adopted (Yair Mundlak, 1978).

Analysis and Discussion of Findings

The study adopted Panel Data Multiple Linear Regressions using Ordinary Least Square (OLS) method. The Panel Data Method of data analyses involves the Fixed Effect, the Random Effect and the Hausman Test. This approach, which is a quantitative technique, includes tables and the test of the hypothesis formulated by using ordinary least square regression analysis at 5% level of significance. To arrive at a result that will not lead to spurious regressions, the study tested for stationarity at different levels in the variables

making up the model. Other tests carried out on the model included test of Normality, Durbin Watson Test of Serial Correlation, Test of Heteroskedasticity and Test of model specification..

Decision rule

A-prior Expectation of the Result

The explanatory variables are expected to have positive and direct effects on the dependent variables. That is, a unit increase in any of the variables is expected to increase performance of the oil and gas firms. This can be expressed mathematically as $a_1, a_2, a_3 > 0$.

Findings

This section presents research findings and interpretation of findings made from the study on the effects of corporate strategy on the performance of oil and gas firms in Nigeria.

Table 1: Pooled Effect Regression Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LPD	0.011711	0.053610	0.218455	0.8274
LID	0.047691	0.047122	1.012070	0.0131
LBD	-0.048608	0.044404	-1.094665	0.2754
C	6.496456	0.425913	15.25301	0.0000
R-squared	0.116817	Mean dependent var		6.572941
Adjusted R-squared	0.002979	S.D. dependent var		0.767119
S.E. of regression	0.768260	Akaike info criterion		2.336420
Sum squared resid	87.94337	Schwarz criterion		2.415647
Log likelihood	-174.7361	Hannan-Quinn criter.		2.368603
F-statistic	0.849510	Durbin-Watson stat		0.722257
Prob (F-statistic)	0.468923			

Source: E-View output

Analysis of Results

F-Test: The F-calculated value is 0.849510 and probability of 0.468923 considering the P-value, the chosen level of significance $\alpha = 0.05$ [5%] is less than the P-value of F-statistic. It is concluded that the regression plane is not statistically significant. This means that the joint influence of the explanatory variables on the dependent variable is statistically significant.

Coefficient of Multiple Determination (R^2): The computed coefficient of multiple determination of 0.116817 and 0.002979 from the pooled effect from the pooled, 11.6 percent and 0.4 percent of the total variations in the performance of the oil and gas firms is accounted for, by the explanatory variables while the remainder is attributable to the influence of other factors not included in the regression model.

Durbin Watson statistics (DW): The computed DW is 0.722257 from the pooled results shows that at 5% level of significance with three explanatory variables and 132 observations, the bulleted DW for dL and du are 0.861 and 1.562 respectively. The value of computed DW is greater than the lower limit. Therefore, there is no evidence of positive first order serial correlation.

Regression coefficient: From the regression coefficient, it is evidence that product diversification and investment diversification have positive effect on the performance of the Nigeria oil and gas firms while business diversification has negative effect on the performance of the oil and gas firms.

T-statistics: from the student t-test, the study found product diversification and business diversification are statistically not significant while investment diversification is statistically significant.

Table 2: Fixed Effect Regression Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LPD	0.048612	0.055468	0.876395	0.3823
LID	-0.053194	0.047326	-1.123999	0.0030

LBD	0.075288	0.054344	1.385392	0.0012
C	6.187276	0.498416	12.41387	0.0000
Effects Specification				
Cross-section fixed (dummy variables)				
R-squared	0.386544	Mean dependent var		6.572941
Adjusted R-squared	0.329170	S.D. dependent var		0.767119
S.E. of regression	0.628302	Akaike info criterion		1.995452
Sum squared resid	54.87218	Schwarz criterion		2.272747
Log likelihood	-138.6521	Hannan-Quinn criter.		2.108094
F-statistic	6.737309	Durbin-Watson stat		1.147004
Prob(F-statistic)	0.000000			

Source: E-View output

Analysis of Results

F-Test: The F-calculated value is 6.737309 and probability of 0.000000 considering the P-value, the chosen level of significance $\alpha = 0.05$ [5%] is less than the P-value of F-statistic. It is concluded that the regression plane is statistically significant. This means that the joint influence of the explanatory variables on the dependent variable is statistically significant.

Coefficient of Multiple Determination (R^2): The computed coefficient of multiple determination of 0.386544 and 0.329170 from the pooled effect, 38.6 percent and 32.9 percent of the total variations in the performance of the oil and gas firms is accounted for, by the explanatory variables while the remainder is variable is attributable to the influence of other factors not included in the regression model.

Durbin Watson statistics (DW): The computed DW is 1.147004 from the fixed results shows that at 5% level of significance with three explanatory variables and 132 observations, the bulleted DW for dL and du are 0.861 and 1.562 respectively. The value of computed DW is greater than the lower limit. Therefore, there is evidence of positive first order serial correlation.

Regression coefficient: From the regression coefficient, it is evidence that product diversification and business diversification have positive effect on the performance of the Nigeria oil and gas firms while investment diversification has negative impact on the performance of the oil and gas firms.

T-statistics: From the student t-test, the study found product diversification and business diversification are statistically not significant while product diversification is statistically significant.

Table 3: Random Effect Regression Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LPD	0.033355	0.053214	1.626818	0.0017
LID	-0.034072	0.045990	-0.740845	0.4600
LBD	0.040988	0.050188	1.816689	0.0014
C	6.353162	0.489644	12.97506	0.0000
Effects Specification				
			S.D.	Rho
Cross-section random			0.488814	0.3771
Idiosyncratic random			0.628302	0.6229
Weighted Statistics				
R-squared	0.710861	Mean dependent var		2.141522
Adjusted R-squared	0.509055	S.D. dependent var		0.627517
S.E. of regression	0.630240	Sum squared resid		59.18308
F-statistic	6.545330	Durbin-Watson stat		1.035667
Prob(F-statistic)	0.000040			
Unweighted Statistics				
R-squared	0.717255	Mean dependent var		6.572941
Sum squared resid	93.67441	Durbin-Watson stat		0.700889

Source: E-View output

Analysis of Results

F-Test: The F-calculated value is 6.545330 and probability of 0.000040 considering the P-value, the chosen level of significance $\alpha = 0.05$ [5%] is less than the P-value of F-statistic. It is concluded that the regression plane is statistically significant. This means that the joint influence of the explanatory variables on the dependent variable is statistically significant.

Coefficient of Multiple Determination (R^2): The computed coefficient of multiple determination of 0.710861 and 0.509055 from the random effect from the pooled, 71 percent and 50.9 percent of the total variations in the performance of the oil and gas firms is accounted for, by the explanatory variables while the remainder is attributable to the influence of other factors not included in the regression model.

Durbin Watson Statistics (DW): The computed DW is 1.035667 from the fixed results shows that at 5% level of significance with three explanatory variables and 132 observations, the bulleted DW for dL and du are 0.861 and 1.562 respectively. The value of computed DW is greater than the lower limit. Therefore, there is evidence of positive first order serial correlation.

Regression Coefficient: From the regression coefficient, it is evidence that product diversification and business diversification have positive effect on the performance of the oil and gas firms in Nigeria while investment diversification has negative effect on the performance of the oil and gas firms.

T-Statistics: from the student t-test, the study found product diversification and business diversification are statistically significant while investment diversification is statistically insignificant.

Table 3: Test of the Appropriate Model

Effects Test	Statistic	d.f.	Prob.
Cross-section F	8.377463	(10,139)	0.0000
Cross-section Chi-square	72.168063	10	0.0000
Correlated Random Effects - Hausman Test			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	3.964501	3	0.2653

Source: E-View output

Following the various methods of panel data analysis, the question of which is the most appropriate or suitable methods arises. Therefore, some means of selecting the most suitable method among the different approaches especially between the fixed effect model (FEM) and random effect model (REM) is needed. But when such a correlation exists, the Fixed Effects Model would be more suitable because the random effect model would be inconsistently estimated. From the table above, the probability of the Hausman test is greater than 0.05, therefore, the study adopted the random effect model.

Test of Hypothesis

The test of hypothesis is based on the random effect results.

H_1 : There is no significant effect of product diversification, business diversification and investment diversification on performance of oil and gas firms in Nigeria.

Tables 1, 2 and 3: Test of Hypothesis

Table 1: Test of Product diversification

	R^2	0.710861
Adjusted	R^2	0.509055
Probability		0.0017
Significant level		5% = 0.025 (two tail)
D.W		1.035667
No of observation		132

Source: E-view 9.0

Decision

With probability coefficient of 0.0017 less than 0.05, the researcher therefore rejected the null hypothesis and accepted the alternate which says that business diversification has a significant effect on the profitability of oil and gas firms in Nigeria.

Table 2: Test of Business Diversification

	R^2	0.710861
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<i>Adjusted</i>	R^2	0.509055
<i>Probability</i>		0.0000
<i>Significant level</i>		5% = 0.025 (two tail)
<i>D.W</i>		1.035667
<i>No of observation</i>		132

Source: E-view Output

Decision

With probability coefficient of 0.0000 less than 0.05, the researcher rejected the null hypothesis and accepted the alternate which says that business diversification has a significant effect on the profitability of oil and gas firms in Nigeria.

Table 3: Test of Investment Diversification

<i>Adjusted</i>	R^2	0.710861
<i>Probability</i>	R^2	0.509055
<i>Significant level</i>		0.4600
<i>D.W</i>		5% = 0.025 (two tail)
<i>No of observation</i>		1.035667
		132

Source: E-view Output

Decision

With probability coefficient of 0.4600 greater than 0.05, the researcher accepted the null and rejected the alternate hypothesis which says that investment diversification does not have a significant effect on the profitability of oil and gas firms in Nigeria.

The estimated regression model from the random effect found that the independent variables can predict 71 percent variation on the profitability of the oil and gas firms. This implies that significant proportion of movement in the performance of the oil and gas firms can be traced to variation on corporate strategies formulated by the management of the oil and gas firms. The hypothesis explored the effect of product diversification strategy and profitability of the oil and gas firms and found that product diversification has positive and significant effect on profitability of the oil and gas firms. The beta coefficient of 0.033355 and probability of 0.0017 justifies that a unit increase on the variables will lead to 0.3 percent increase on the profitability of the oil and gas firms. This finding confirms the a-priori expectation of the results and justifies various strategies formulated by management of the oil and gas firms to increase profitability. The finding is supported by the findings of Oyedijo (2012) that the financial performance and growth of firms in Nigeria are significantly affected by the mode of diversification used, the findings of Ranka, Vladimir and Dragan (2017) that the relation between risk-adjusted returns measured both by return on assets and return on equity and line-of-business diversification and performance measured by entropy is significant and positive and the findings of Rop, Kibet and Bokongo (2016) that much work was needed to promote diversification of bank portfolios.

For business diversification it showed that there is positive and significant effect on profitability of the oil and gas firms. The beta coefficient of 0.040988 and probability of 0.0014 justifies that a unit increase on the variables will lead to 0.4 percent increase on the profitability of the oil and gas firms. This finding confirms the a-priori expectation of the results and justifies various strategies formulated by management of the oil and gas firms to increase profitability. The finding is supported by the findings of Nwakoby and Ihediwa (2018) that the financial performance of Nigerian firms is significantly affected by the product. Statistical significant correlation between financial performance and related diversification contradict the findings of Odeleye and Olunkwa (2016) that contribution of agriculture and manufacturing sectors to export is negative; signifying that export diversification has negative effects on Nigeria's economic growth. The finding further confirms the findings of Onur and Ihsan (2016) that there is correlation between total entropy and a performance criterion ROA and ROS in Italy and Netherlands.

However, investment diversification has a negative and insignificant effect on profitability of the oil and gas firms. The beta coefficient of -0.034072 and probability of 0.4600 justifies that a unit increase on the variables will lead to 0.3 percent decrease on the profitability of the oil and gas firms. This finding is contrary to the a-priori expectation of the results and contrary to various strategies formulated by management of the oil and gas firms to increase performance. The negative effect of investment diversification on the profitability of oil and gas firm can trace uncertainties in the business environment. The findings confirm the findings of Manyuru, Wachira and Amata (2017) that industrial diversification reduces firm value, but geographical diversification does not have a significant impact on firm value. The findings of Mulwa and Kosgei (2016) that income and asset diversification negatively and significantly affects commercial banks' ROA while geographical diversification positively and significantly affects ROA and ROE.

Conclusion

From the findings, the study concluded that product diversification and business diversification have positive effect on the profitability of oil and gas firms in Nigeria by implication performance while investment diversification has a negative and insignificant effect on the performance of oil and gas firms in Nigeria.

Recommendations

- i. Corporate strategies such as product diversification should be integrated with the objective of increasing performance of the oil and gas firms. Product diversification should be directed toward achieving performance.
- ii. From the findings, the oil and gas firms management decision should formulate policies toward business diversification rather emphasize more on investment diversification but against multi product strategy.
- iii. Policies of the oil and gas firms should be directed toward reducing investment diversification and directed toward product and business diversification among the oil and gas firms.

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