

## **Innovation and Firm Performance: Evidence from Listed Manufacturing Firms (MFs) in Nigeria**

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### **Abstract**

*The performance of manufacturing firms in Nigeria has not been impressive for quite some years despite its significance to the socio-economic growth and development of a country. This paper, therefore intends to investigate the effect of innovation on the performance of manufacturing firms in Nigeria. Firm performance is proxied by return on equity (ROE) and economic value added (EVA). In addition, innovation is proxied by product innovation and process innovation. Accordingly, thirty-six listed manufacturing firms were selected for this paper. Similarly, Panel Regression analysis was employed using Fixed Effect and Random Effect models to analyse the data. STATA version 14 was used to analyse the data. It was found that product innovation and process innovation are significant determinants of manufacturing firm's performance measured by economic value added. The paper, therefore recommended that*

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*manufacturing firms should investment heavily in product and process innovation to enhance performance.*

**Key words:** Product Innovation (PRDI), Process Innovation (PRCI), Firm Performance (FP), Return on Equity (ROE), Economic Value Added (EVA).

## 1.1 INTRODUCTION

Firm performance is the first to be evaluated by investors before making investment decision anywhere around the globe. The world has become smaller in the sense that businesses can be conducted anywhere. Globalization facilitates business activities and high performance and in eliminating the barriers to corporate trade and financial investment, businesses can have a wider opportunity to grow (Bem, David & Emmanuel, 2017). In addition, with the high spread of growth in technology, individual interested and concerned in doing business are encouraged to look for any firm that shows high performance. Therefore, individual responsible for management of firms must improve firm performance through new plan and procedures to facilitate efficient operations and transactions (Wanjiru, 2017). In view of the importance of firm performance to economic and corporate growth and development, this paper investigates the effect of innovation on manufacturing firm performance in Nigeria.

In spite of its significant contributions to the socioeconomic development manufacturing industry has been facing serious challenges in Nigeria such as high rate of enterprise closure, inappropriate financial structure, poor innovation and macroeconomic instability (Babatunde 2018; Fowowe 2017). According to Okolo, Ugwuanyi and Okpala (2016), the manufacturing industry in Nigeria is characterised by high costs of operation, increased cost of input, inadequate financial support, bureaucratic red tapism and poor infrastructure. In Nigeria manufacturing firms relocate to neighbouring countries like Ghana, Kenya and Uganda while some restructured their operations to serve the local market through importation from low-cost manufacturing countries like China, India and Pakistan (Bem, David & Emmanuel, 2017). Similarly, statistics have shown persistent decline in the share of manufacturing

contribution to GDP, profits and capacity utilisation in recent years (Oburota & Ifere, 2017). The manufacturing contribution to GDP in Nigeria continue decrease from 16.51 percent in the first quarter of 2018 to 15.62 percent in the second quarter, 14.07 percent in the third quarter, 14.57 percent in the fourth quarter of 2018 and 16.17 percent in the first quarter of 2019 (NBS, 2019). In a related study Kehinde, Blessing and Adedamila (2014) reported that manufacturing industry contributes 20 percent to GDP in Brazil, 34 percent in China, 30 percent in Malaysia, 35 percent in Thailand and 28 percent in Indonesia. The statistics clearly indicate that manufacturing contribution to GDP in Nigeria which stood at 16.17 percent in the first quarter of 2019 clearly indicate poor performance of manufacturing firms in Nigeria. Nigeria heavily relied on imported goods to service public education, health and other needs. In 2015 Nigeria imported \$809 million worth of drugs. In the same year, donor communities spent additional \$693 million on drugs importation for pandemic diseases like malaria, tuberculosis and HIV (WHO, 2016). In view of the above problem, this paper investigates the effects of innovation on manufacturing firm performance in Nigeria.

A review of manufacturing industry in Nigeria has shown that manufacturing firms are faced with heightened level of competition and shortened product life cycles, thus firm ability to generate innovations allows them to improve performance and maintain competitive advantage (Sahu, Ramaswamy & Choutagunta, 2017). In today's intense competitive environment, innovation has become a requisite objective for all firms (Ndemezo & Kayitana, 2017). The existing products are vulnerable to changes in consumer needs and tastes, new technologies, shortened product life cycles and increased international competition (Lucia & Ionesco, 2018). It is generally accepted that all firms should innovate regardless of their size or sector in order to compete and survive in the market (Sahu, Ramaswamy & Choutagunta, 2017). Thus, it is not a coincidence that countries (like USA, Germany, Japan, China and India) that demonstrate the highest patent activity and research and development investment intensity (each spend more than 3 percent of GDP in R&D) are in the ladder of economic development (Ahmed and Shepherd, 2010). Manufacturing firms in Nigeria are experiencing performance challenges with many reporting profit warnings (Bala, Garba & Ibrahim, 2016). Statistics from World Bank show that

manufacturing firms in Nigeria registered stagnation and decline in profits due to environmental volatility resulting from innovations and new technology (WDI, 2015). This implies that manufacturing firms must adapt to innovation and technological trends for them to compete and survive in the competitive market. However, manufacturing industry in Nigeria are characterised by frequent system failures and poor power supply given the relatively low innovation and technology development in the country. These are some of the challenges obstructing the development of innovations and subsequent decline of manufacturing industry performance in Nigeria (Elumah & Shobayo, 2018). It is against this background, this paper investigates the effect of innovation on financial performance of listed manufacturing firms in Nigeria.

## **2.1 Performance**

Performance measurement is critical for effective management of any firm (Nandom, 2016). The process of improvement is not possible without measuring the outcomes. Hence, organizational performance improvement requires measurements to identify the level to which the use of organizational resources impact on business performance (Wanjiru, 2017; Alomari & Azzam, 2017; Shaikh and Linh, 2017; Nandom, 2016). Firm performance is a concept that attracts considerable interest from government, scholars and policy makers in the diverse areas of finance, marketing, production and strategic management among others (Nandom, 2016). It has also been a major focus of business practitioners in all types of organization since firm performance has great implication to health and survival of business organizations (Alomari & Azzam, 2017). Performance measurement allows for comparison over different time periods. However, Mohammed, Kaid and Hanim (2014) argued that no single measurement has the ability to measure all aspects of firm performance.

Wanjiru (2017) opined that firm performance reflects effectiveness and efficiency of management in utilizing company's limited resources. Firm performance is defined as the outcome of activity which depend on the type of organization to be evaluated as well as the set objectives (Shaikh & Linh, 2017). Researchers in the area of strategic management offered a variety of models for analyzing financial performance. However, little consensus emerged

on what constitute a valid set of performance yardstick. For example, researchers suggest that studies on financial performance should include multiple criteria of analysis. This multidimensional view of performance means that different models or patterns of relationship between corporate performance and its determinants will emerge to show the various sets of relationships between dependent and independent variables in the estimated models (Mohammed, Kaid & Hanim, 2014). This paper therefore, measures firm financial performance using return on equity (ROE) and economic value added (EVA) respectively.

## **2.2 Innovation (INVT)**

Innovation is widely considered one of the most important sources of sustainable competitive advantage in an increasingly changing environment as it results in product and process improvements, makes continuous advances that helps firms to survive, allows firms to grow more quickly, be more efficient, and ultimately be more profitable. Some argued that due to the heightened level of competition, changing consumer needs and tastes, new technologies, and shortened product life cycles, firm ability to generate innovations may be more important than ever in allowing firms to improve performance and maintain competitive advantage (Begonja, Čiček, Balboni & Gerbin, 2016). The role of innovation as a source of growth both at firm level, industry and economy as a whole has attracted the attention of researchers. Sahu, Ramaswamy and Choutagunta (2017) considered innovation to be at the center of economic activities and an indispensable condition for long-term growth. Schumpeter (1936) argued that innovation comprises the elements of creativity, research and development (R&D), new processes, new products or services and advancement in technology. Innovation is the creation of new wealth, alteration and enhancement of existing resources to create new wealth. Innovation is also seen as a process of idea creation, a development of an invention and ultimately the introduction of a new product, process or service to the market (Howell, 2018). According to Ndemezo and Kayitana (2017), Innovation is an organization's capability to produce new value scheme for investors which forces firms to design fresh worth in the form of new products, new processes or novel ways of doing business.

Innovation is the capacity to introduce new procedures, products or ideas in the organization, (Cletus & Andrew, 2016) while Begonja et al., (2016) described it as the art of generating, developing and adapting to new ideas or ways of doing things. Sahu et al, (2017) considered innovation to be successful if it is based on either the effect of changes in the product or process that has accumulated over time or on innovative mixture of techniques, ideas or methods that existed over time. In this direction, Priti, (2018) noted that innovation can be radical or incremental. It is radical when a new technology, process or product is introduced to meets the needs that is not yet accepted. On the other hand, innovation is incremental if it is aimed at improving upon what is in existence. Accordingly, the level of innovation that a firm adopts may depend on its capability to acquire new products, production process or to modify the products that exist and penetrate new markets or segments in established markets (Howell, 2018).

The global market is characterised by intense social, economic and technological changes, innovation tends to address the organisation's ability to respond and adapt to those changes (Burns & Stalker, 1961). Gunday, Ulusoy, Kilic and Alpkan (2016) consider innovation as an organisation's ability to encourage creativity in both process and product produced, regardless of an instantaneous need for change. The concept of innovation stressed the increasing need for modern organizations to proactively address the challenges of the future by undertaking radical innovations that will transform both their surroundings and the marketplace (Lucia & Ionesco, 2018).

### **2.2.1 Types of Innovation**

There are basically four dimensions of innovation, namely: Product, process, market and organization innovation, (Gunday et al, 2016). However, based on literature suggestion two dimensions of innovation will be examined in this paper; product and process innovation.

#### **2.2.1.1 Product Innovation (PRDI)**

Product innovation is the creation of a new product from new materials or the alteration of existing products to meet customer satisfaction (Gunday et al, 2016). It is the introduction of new products or services in order to create new markets or customers, or satisfy current markets or customers (Ul-Hassan, Shaukat, Saqib & Naz, 2013). Product innovation is one of the important sources of

competitive advantage to the firm. Through innovation, the quality of products is enhanced, which in turn improves firm performance and ultimately to firm's competitive advantage (Mohd & Sidek, 2013). According to Tuan, Nhan, Giang and Ngoc (2016), product innovation involve the introduction of a new good or service or significantly improved version regarding its characteristics or intended uses; including significant improvements in technical specifications, components and materials, incorporated software, user friendliness or other functional characteristics.

### **2.2.1.2 Process Innovation (PRCI)**

Process innovation refers to the process of reengineering and improving internal operations of business organizations. This process involves many aspects of firm's functions, including technical design, R&D, manufacturing, management and commercial activities (Ndemezo & Kayitana, 2017). Atalay, Anafarta and Sarvan (2013) argued that process innovation is concerned with the creation or improvement in techniques and the development in process or system. For instance, improvement in technology, skills, techniques, system and procedure used in the process of transforming input to output. According to Palangkaraya, Spurling and Webster (2015), process innovation is concerned with the creation of new or improved techniques, tools, devices, and knowledge in making products. Process innovation is the implementation of new or significantly improved production or delivery method. This includes significant changes in techniques, equipment and/or software (Begonja, Čiček, Balboni & Gerbin, 2016). Process innovations is intended to decrease unit costs of production or delivery, increase quality, produce or deliver new or significantly improved products. Process innovation means improving the production and logistic methods significantly or bringing significant improvements in the supporting activities such as purchasing, accounting, maintenance and computing (Priti, 2018).

## **2.3 Innovation and Firm Performance**

Several studies examined the effect of innovation on performance of manufacturing firms. Howell (2018), examined the process of indigenous innovation and its impact on firm performance in the People's Republic of China. Using a sample of seventy thousand firms, the study found that innovation and learning spillovers positively

increase firm output and financial performance. In another related study Lucia and Ionesco (2018), investigated the impact of innovation on company performance in emerging economies. The study revealed that innovation composite index has a positive and strong impact on company performance. Ndemezo and Kayitana (2017) examined the impact of innovation on financial performance of Rwandese manufacturing firms. Using the listed manufacturing firms in Rwanda, the study established a significant positive effect of innovation on performance of manufacturing firms. Similarly, Cletus and Andrew (2016), examined the effects of innovation types on the intensity and propensity to exports by manufacturing firms in Cameroon. The study revealed that market and organizational innovations significantly increase the intensity and propensity to export while product innovation has a significant and positive effect on quantity exported and not on export likelihood. However, it is important to note that these studies were conducted in some countries other than Nigeria. It is against this background, paper investigates the effect innovation on the financial performance of manufacturing firms in Nigeria.

### **3.1 Methodology**

This paper adopts ex-post facto research design because it relies on secondary data obtained after the occurrence of an event which the researcher has no control over. This paper verifies and synthesizes evidences from the past to establish fact that defend or refute the research hypotheses. The paper focuses on MFs financial performance during the nineteen-year period (2000-2018), ex-post factor research design is appropriate because the phenomenon under investigation has taken place. The choice of the period is informed by the need to fill the existing literature gap in term of methodology, time lag and policy gap on the performance of listed manufacturing firms (MFs) in Nigeria. The data analysis technique used for this paper is Panel Regression using Fixed Effect and Random Effect models. The data was obtained from the audited financial statements of the firms through the NSE Factbook, National Bureau of Statistics (NBS) and Central Bank of Nigeria (CBN) statistical bulletin. The population comprised of all the sixty-one manufacturing companies listed on the Nigeria Stock Exchange. In line with the classification of sectors in the security market, this paper will only consider listed



manufacturing firms under the following categories: Conglomerates, Consumer goods, Industrial goods and HealthCare subsectors. Table 3.1 shows the population of the study.

**Table 3.1: Sample Size of the Study**

| S/NO | Name of Company                      | Subsector        | Year of Listing |
|------|--------------------------------------|------------------|-----------------|
| 1    | A.G. Leventis Nigeria Plc.           | Conglomerates    | 1978            |
| 2    | Chellarams Plc.                      | Conglomerates    | 1977            |
| 3    | John Holt Plc.                       | Conglomerates    | 1974            |
| 4    | PZ Nigeria Plc.                      | Conglomerates    | 1968            |
| 5    | SCOA Nigeria Plc.                    | Conglomerates    | 1977            |
| 6    | UAC Nigeria Plc.                     | Conglomerates    | 1974            |
| 7    | Unilever Nigeria Plc.                | Conglomerates    | 1973            |
| 8    | 7up Bottling Co. Nigeria Plc.        | Consumer Goods   | 1986            |
| 9    | CADBURY Nigeria Plc.                 | Consumer Goods   | 1965            |
| 10   | Champion Breweries Plc.              | Consumer Goods   | 1983            |
| 11   | DN Tyre & Rubber Nigeria Plc.        | Consumer Goods   | 1961            |
| 12   | Flour Mills Nigeria Plc.             | Consumer Goods   | 1979            |
| 13   | GUINNESS Nig. Plc.                   | Consumer Goods   | 1965            |
| 14   | International Breweries Nig. Plc.    | Consumer Goods   | 1995            |
| 15   | NASCON Allied Industries Plc.        | Consumer Goods   | 1992            |
| 16   | NESTLE Nigeria Plc.                  | Consumer Goods   | 1979            |
| 17   | Nigerian Breweries Plc.              | Consumer Goods   | 1973            |
| 18   | Nigerian Enamel Ware Plc.            | Consumer Goods   | 1979            |
| 19   | Northern Nig. Flour Mill Plc.        | Consumer Goods   | 1978            |
| 20   | Union Dicon Salt Plc.                | Consumer Goods   | 1993            |
| 21   | Vitafoam Nigeria Plc.                | Consumer Goods   | 1978            |
| 22   | BERGER Paints Plc.                   | Industrial Goods | 1959            |
| 23   | BETA GLASS Plc.                      | Industrial Goods | 1986            |
| 24   | Cement Company of Northern Nig. Plc. | Industrial Goods | 1993            |
| 25   | Chemical & Allied Products Plc.      | Industrial Goods | 1979            |
| 26   | DN Meyers Plc.                       | Industrial Goods | 1979            |
| 27   | First Aluminium Nig. Plc.            | Industrial Goods | 1992            |
| 28   | Greif Nigeria Plc.                   | Industrial Goods | 1979            |
| 29   | Lafarge Africa Plc.                  | Industrial Goods | 1979            |
| 30   | Premier Paints Plc.                  | Industrial Goods | 1995            |
| 31   | Evans Medicals Nigeria Plc.          | HealthCare       | 1979            |
| 32   | Glaxo Smithkline Co. Nigeria Plc.    | HealthCare       | 1977            |
| 33   | May & Baker Nig. Plc.                | HealthCare       | 1994            |
| 34   | Morison Industries Nigeria Plc.      | HealthCare       | 1978            |
| 35   | Neimeth International Pharm. Plc.    | HealthCare       | 1979            |
| 36   | Pharma-Deko Nigeria Plc.             | HealthCare       | 1979            |

*Source: NSE Fact Book, 2019*

However, in order to ensure availability and reliability of data the paper employed a two-point filter to draw an appropriate sample for the study. The filters are:

- i. That company must be listed for the entire period of the study (2000 to 2018);

- ii. That company must have data that is reliable and relevant to the variables of interest in the study (i.e. availability of data).

The first filter is to ensure that the same group of listed companies is used throughout the period of study so as to satisfy the requirement of a longitudinal or panel study. The second filter is to avoid the inclusion of a redundant sample in the study. Therefore, the sampling frame used in this study will consist of the sixty-one MFs listed on the floor of Nigeria Stock Exchange (i.e. entire Population of the study). However using the two-point filter, a total of fifteen (15) companies are removed from the population of the study.<sup>2</sup> Similarly, a total ten (10) companies are removed from the population of the study because they are inactive either throughout the study period or for some period of the study.<sup>3</sup>

### 3.2 Measurement of Variables

Table 3.1 presents the measurements used to operationalize variables in order to facilitate the application of the panel linear regression model.

**Table 3.1 Summary of Measurement, Operationalization of Variables and Sources**

| Variables                                      | Proxies                    | Measurement  | Source  |
|--|----------------------------|--|---|
| <b>Dependent Variables</b><br>Firm Performance | Return on Equity (ROE)     | Earnings before Interest, Tax, Depreciation and Amortization divided by Total Equity.    | Elumah and Shobayo (2018), Teshome, Debela and Sultan (2018), Molnar, Wang and Chen (2017). |
|  | Economic Value Added (EVA) | Net operating profit after tax minus total capital employed multiply by cost of capital. | Obeidat and Darkal (2018), Costin (2017), Zeyad (2016).                                     |
| <b>Independent Variables</b><br>Innovation     | Product Innovation (PRDI)  | Ratio of Intangible Assets to Total Assets.  | Lucia and Ionesco (2018), Sahu, Ramaswamy and Choutagunta (2017), Cletus and Andrew (2016). |
|  | Process Innovation (PRCI)  | Ratio of Research and Development (R&D) Expenditure to Total Assets                      | Howell (2018), Priti, (2018), Ndemezo and Kayitana (2017).                                  |

<sup>2</sup> Transnational Co. Plc.; Big Treat Nigeria Plc.; Dangote Flour Mills Plc.; Dangote Sugar Refinery Plc.; HONEYWELL Flour Mill Plc.; MCNICHOLS Plc.; Multi-trex Integrated Foods Nig. Plc.; Tantalizers Nigeria Plc.; Austin LAZ & Company Plc.; CUTIX Plc. Dangote Cement Plc.; NOTORE Chemical Ind. Plc.; Paints and Coatings Manufacturers Nig. Plc.; Portland Paints & Products Nigeria Plc.; Fidson Health Nigeria Plc.

<sup>3</sup> P.S. Mandrides & Co. Nigeria Plc. UTC Nigeria Plc. Vono Products Nigeria plc. African Paints Nigeria Plc. Ashaka Cement Plc. Ipwa Plc. Nigerian Ropes Plc. Nigerian Sewing Machine Manufacturers Co. Plc. Nigerian Wire & Cable Plc. African Glass Industries Plc.

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| <b>Control Variables</b> |                              |  |  |
|--------------------------|------------------------------|--|--|
|                          | Firm Age (AGE)               | Natural logarithm of the number of years from the time of its incorporation.     | Nawaz (2017), Palaniappan (2017), Nam and Mishra (2016).   |
|                          | Firm Size (SIZE)             | Natural logarithm of total assets of the firm.                                   | Hussein (2017), Nwarogu and Iormbagah (2017), Hasan, Kobeissi, Liu and Wang (2016).                                |
|                          | Growth (GRW)                 | Measured by the annual percentage change in total assets.                        | Molnar, Wang and Chen (2017), Wanjiru (2017), Felix and Amalachukwu (2016), Manna, Nath and Gupta (2016).          |
|                          | Liquidity (LIQ)              | Measured by the ratio of cash and cash equivalent to total assets.               | Vy Le and Thi Bich (2017), Phuong (2015), Kim, Kim and Qian (2015), Vätavu (2015), Kausar, Sajid and Awais (2014). |
|                          | Management Efficiency (ME)   | Measured by dividing Total Revenue by the Total Assets.                          | Marius and Bucata, (2017), Ndolo, (2015), Shehada and Alkhaldi, (2015).  |
|                          | Gross Domestic Product (GDP) | Real Gross Domestic Product (GDP) measured by annual growth rate of the economy. | Babatunde (2018), Emir and Cengiz (2017), Okey (2017), Zelga, (2017).  |
|                          | Inflation Rate (INFL)        | Inflation Rate (INFL) is measured by annual Inflation Rate.                      | Babatunde (2018) Okey (2017), Oseibonsu (2016), Abraham (2016), Mwende (2016).                                     |

Source: Research Review 2019

### 3.3 Model Specification

In order to investigate the effect of corporate financial structure and innovation on financial performance of listed manufacturing firms in Nigeria, the following econometric model is used to depict the relationship between the dependent variables and explanatory variables:

$$FP = f(PRDI, PRCI, GDP, INFL, AGE, SIZE, GRW, LIQ, ME)..... (1)$$

Where:

- FP = Firm Performance
- PRDI = Product Innovation,
- PRCI = Process Innovation,
- GDP = Gross Domestic Product
- INFL = Inflation
- AG = AGE,
- SZ = Size
- GRW = Growth rate
- LIQ = Liquidity
- ME = Management Efficiency

The above equation (1) can further be transform into specific econometric models as follows:

$$ROE_{it} = \beta_0 + \beta_1PRD_{it} + \beta_2PRC_{it} + \beta_3GDP_{it} + \beta_4INFL_{it} + \beta_5AGE_{it} + \beta_6SIZE_{it} + \beta_7GRW_{it} + \beta_8LIQ_{it} + \beta_9ME_{it} + \varepsilon_{it} \dots\dots\dots(2)$$

$$EVA_{it} = \beta_0 + \beta_1PRD_{it} + \beta_2PRC_{it} + \beta_3GDP_{it} + \beta_4INFL_{it} + \beta_5AGE_{it} + \beta_6SIZE_{it} + \beta_7GRW_{it} + \beta_8LIQ_{it} + \beta_9ME_{it} + \varepsilon_{it} \dots\dots\dots(3)$$

Where:  $\beta_0$  = Intercept,  $\beta_1$ –  $\beta_9$ = Coefficients of the explanatory variables, ROE = Return on Equity, EVA = Economic Value Added,  $\varepsilon$  = error term, subscript i and t represent firm and time respectively.

Similarly, to enhance robustness of the regression results and ensure that assumptions of panel linear regression model were not violated, some diagnostic tests were conducted. The Shapiro-Wilk test for normality was used and the results indicate normal distribution of the data. Similarly, the Variance Inflation Factor (VIF) was used to detect problem of Multicollinearity and results showed no problem of Multicollinearity in the data. The Breusch-Pagan test for Heteroscedasticity was also employed and no presence of Heteroscedasticity was detected in the both models. Finally, Hausman test was conducted to make a choice between Random and Fixed Effects result. However, the test results favoured the Fixed Effects for both models (The results of all diagnostic tests are available upon request).

### 4.1 Results and Discussions

This section presents the empirical results of the study for both descriptive and inferential statistics. Table 4.1 presents the descriptive statistics for the dependent, independent and control variables used in the study.

**Table 4.1: Descriptive Statistics**

| Variable | Obs | Mean  | Std. Dev. | Min      | Max    |
|----------|-----|-------|-----------|----------|--------|
| ROE      | 684 | .1915 | .467      | -2.97    | 5.19   |
| EVA      | 684 | 1.10  | 2.04      | -7680655 | 1.29   |
| PRDI     | 684 | .060  | .117      | .00009   | .864   |
| PRCI     | 684 | .206  | .704      | -.094    | 11.11  |
| GDP      | 684 | 94.44 | 45.88     | 27.77    | 183.01 |
| INFL     | 684 | 11.83 | 6.91      | .686     | 183.01 |
| AGE      | 684 | 9.54  | 147.05    | 2.73     | 3850   |
| SIZE     | 684 | 15.59 | 2.06      | 8.68     | 20.27  |
| GRW      | 684 | 3.16  | 7.64      | -4840440 | 6.39   |
| LIQ      | 684 | 1.07  | .687      | -2.60    | 4.42   |
| ME       | 684 | 1.28  | 1.68      | .0008    | 19.15  |

Source: STATA Output, (2019)

From the results in Table 4.1 the analysis shows that GDP has the highest mean ( $M = 94.44\%$ ), with the deviation from the mean at 45.88%. The minimum value for the ROE was a loss of 2.97 percent while the maximum ROE value was an increase of 5.19 percent. Similarly, the minimum value for EVA was a loss of ₦768,065,500 while the maximum value was an increase of ₦1.29 billion. This indicates that the minimum return on equity of the firms was a loss of 2.97 percent while the maximum return on equity was an increase of 5.19 percent. Similarly, the minimum economic value added was a loss of ₦768,065,500 while the maximum value added during the period under review was ₦1.29 billion.

#### **4.2 Variance Inflation Factor (VIF) Analysis**

There was no problem of Multicollinearity detected in all the variables under investigation as  $VIF = 2.20, 1.53, 1.49, 1.37, 1.28, 1.23, 1.16, 1.04$  and  $1.01$  respectively while the mean VIF was 1.37.

#### **4.3 Correlation Analysis**

The correlation analysis shows that product innovation has weak and positive correlation with process innovation, weak and negative correlation with firm size and growth, moderate and positive correlation with inflation, moderate and negative relationship GDP, firm age and liquidity, strong and positive correlation management efficiency. Similarly, the result shows that process innovation has moderate and negative correlation with GDP, firm age and liquidity, moderate and positive correlation with inflation, weak and negative relationship with firm size and growth, significant positive correlation with management efficiency. In addition, gross domestic product has weak and negative correlation with inflation, moderate and negative correlation with management efficiency, weak and positive relationship with firm age, moderate and positive correlation with firm size, moderate and positive correlation with growth while it has significant positive correlation with liquidity. Furthermore, inflation is moderately and negatively correlated with firm age, size, growth and liquidity but moderately and positively correlated with management efficiency. Firm age has moderate and positive relationship with firm size and growth, significant positive relationship with liquidity, significant and negative correlation with management efficiency. The result also shows that firm size has

insignificant positive correlation with growth, moderately and positively related with liquidity and significantly but negatively correlated with management efficiency. On the other hand, growth is significantly and positively correlated with liquidity and management efficiency. The result further indicated that liquidity is moderately and positively correlated with management efficiency.

**Table 4.2: Linear Regression Correlated Panels Corrected Standard Errors Results**

| Variable        | ROE (Panel-corrected) |          |          | EVA (Panel-corrected) |          |          |
|-----------------|-----------------------|----------|----------|-----------------------|----------|----------|
|                 | Coefficient           | St. Err. | p-value  | Coefficient           | St. Err. | p-value  |
| Constant        | -.233                 | .276     | 0.398    | -4.98                 | 7715386  | 0.000*** |
| PRDI            | .3038                 | .205     | 0.139    | 1.39                  | 5321452  | 0.009**  |
| PRCI            | -.0025                | .016     | 0.876    | 3042763               | 560011   | 0.000*** |
| GDP             | -.000                 | .000     | 0.119    | -26210.44             | 15635.54 | 0.094*   |
| INFL            | .004                  | .002     | 0.131    | 130271.5              | 94818.95 | 0.169    |
| AGE             | 6.06                  | .000     | 0.738    | -1276.784             | 7858.63  | 0.871    |
| SIZE            | .019                  | .015     | 0.228    | 3645945               | 485325.6 | 0.000*** |
| GRW             | 8.19                  | 1.66     | 0.621    | .124                  | .016     | 0.000*** |
| LIQ             | -.037                 | .027     | 0.173    | -2418971              | 666916.4 | 0.000*** |
| ME              | .126                  | .012     | 0.000*** | 1645287               | 366824.8 | 0.000*** |
| Autocorrelation | No Autocorrelation    |          |          | No Autocorrelation    |          |          |
| R-squared       | 0.2488                |          |          | 0.4526                |          |          |
| Prob> chi2      | 0.0000                |          |          | 0.0000                |          |          |
| Wald chi2(8)    | 238.05                |          |          | 240.55                |          |          |
| Observations    | 684                   |          |          | 684                   |          |          |

Source: STATA Output, (2019)

\* = significant at 10% level, \*\* = significant at 5% level and \*\*\* = significant at 1% level.

From table 4.4 it can be observed that R<sup>2</sup> for model 1 (ROE) was 0.2488. This indicates that innovation variables collectively explained the variance in manufacturing firm performance measured by return on equity by 24.88 percent. This implies that, all things being equal, increased investment in innovation is likely to increase the return on equity of manufacturing firms in Nigeria by 24.88 percent. However, the Prob > Chi2 = 0.0000 indicated that ROE model is statistically highly significant in explaining the variance in manufacturing firm performance at 1% level. The result also shows that product innovation has a coefficient of .3038 with p-value of 0.139 while process innovation has a coefficient of -.0025 with p-value = 0.876 indicating that PRDI has a positive correlation with performance whereas PRCI is negatively correlated with performance. This implies that a unit increase in product innovation would bring about increase

in manufacturing firm performance by 30.38 percent. This finding is in agreement with that of Howell (2018), Lucia and Ionesco (2018), Priti (2018), Sahu, Ramaswamy and Choutagunta (2017) who found that product innovation has significant positive effect on firm performance. On the contrary, the results also show that a unit decrease in process innovation could result in a decrease in manufacturing firm performance by 2.58 percent. However, this correlation is statistically insignificant as the p-values indicated lack of sufficient evidence to support the findings. This finding contradicts that of Howell (2018); Ionesco (2018); Ndemezo and Kayitana (2017); Cletus and Andrew (2016) who established significant positive effect of innovation on firm performance. The results also indicated that GDP, inflation, firm age, size, growth and liquidity are statistically insignificant in predicting manufacturing firm return on equity with p-value = 0.119, 0.131, 0.738, 0.228, 0.621 and 0.173 respectively. However, Management efficiency is statistically significant in explaining the variance in manufacturing firm performance at 1% level with a p-value of 0.000.

In the second model, the result shows that  $R^2 = 0.4526$ . This implies that the model explains the variance in the economic value added of manufacturing firms by 45.26%. The result further indicated that the EVA model is statistically significant in predicting manufacturing firms performance at 1% level of significance ( $\text{Prob} > \text{Chi}^2 = 0.0000$ ). Similarly, the result shows that product innovation has a coefficient of 1.39 while process innovation has a coefficient of 3042763; are statistically significant in predicting manufacturing firm performance all at 1% level of significance. This implies that a unit increase in product innovation would bring about increase in firm performance by 1.39% while increase in process innovation could, things being equal increase manufacturing firm performance by ₦304,276,300. However, GDP is statistically significant in determining performance at 10% level while inflation and firm age are statistically insignificant. Furthermore, firm size, growth, liquidity and management efficiency are statistically insignificant in influencing manufacturing firm performance at 1% level of significance.

## **5.1 Conclusion and Recommendations**

In line with the research findings, it was concluded that innovation is statistically significant in predicting manufacturing firm's

performance measured by economic value added but statistically insignificant when measured by return on equity. The factor that account for this finding is that, the forma is accounting based measurement which relies on historical data while the latter is market based measurement that relies on the current happenings in the market. The paper therefore, concluded that investment in innovation could enhance firm performance as measured by economic value added. Similarly, it was concluded that gross domestic product, firm size, growth, liquidity and management efficiency are also statistically significant in predicting firm performance while inflation and firm age are statistically significant determinants of firm's performance. The paper, therefore recommended that manufacturing firms should heavily investment in product and process innovation to enhance productivity.

## REFERENCES

1. Ahmed, P.K. and Shepherd C.D. (2010). *Innovation management: Context, Strategies, Systems and Processes*, Pearson Education Limited, Harlow.
2. Alomari, M. W. & Azzam, I. A. (2017). Effect of Micro and Macro Factors on the Performance of the Listed Jordanian Insurance Companies. *International Journal of Business and Social Science* 8(2), 66-73.
3. Artz, K.W., Norman, P.M., Hatfield, D.E. and Cardinal, L.B. (2010). A longitudinal study of the impact of R&D, Patents, and Product Innovation on Firm Performance. *Journal of Product Innovation Management*, 27(5), 725-740.
4. Bala, H., Garba, J. & Ibrahim, I. (2016). Corporate Liquidity and Profitability of Listed Food and Beverages Firms in Nigeria. *Net Journal of Social Sciences*, 4, 10-22.
5. Barney, J.B. (1991). The Resource Based View of Strategy: Origins, Implications, and Prospects. *Journal of Management*, 17, 97–211.
6. Barney, J.B. (2001). *Gaining and Sustaining Competitive Advantage*. Second edition. Reading, MA: Addison-Wesley.
7. Bem, U.J., David T.I. & Emmanuel A.I. (2017). Corporate Environmental Reporting and the Financial Performance of



- Listed Manufacturing Firms in Nigeria. *International Journal of Advanced Academic Research in Social & Management Sciences*, 3, (8), 15-25.
8. Cletus, D.F. & Andrew, V.W. (2016). Innovation and Export Performance: An Empirical Insight on the Effect of Innovation on Manufacturing Firms in Cameroon. *Applied Economics and Finance Vol. 3, (4), 123-133*.
  9. Costin, D.M. (2017). Economic Value Added: A General Review of the Concept. *Ovidius University Annals, Economic Sciences Series, Volume XVII, (1), 168-173*.
  10. Elumah, L. O. & Shobayo, P. B. (2018). Performance Analysis of Nigerian Brewery Industry. *Binus Business Review*, 9(March), 47-53. <https://doi.org/10.21512/bbr.v9i1.4047>.
  11. Fahy, J. (2000). The Resource-Based View of the Firm: Some stumbling blocks on the road to understanding sustainable competitive advantage. *Journal European Industrial training*, 24(2), 94-104.
  12. Hasan, I., Kobeissi, N., Liu, L. & Wang, H. (2016). Corporate Social Responsibility and Firm Financial Performance: The Mediating Role of Productivity. *Journal of Business Ethics*. <https://doi.org/10.1007/s10551-016-3066-1>.
  13. Howell, A. (2018). Innovation and Firm Performance in the People Republic of China: Structural Approach with Spillovers. *Asian Development Bank Institute (ADB), Working Paper Series, No.805*.
  14. Kehinde, O. A., Blessing, O.O. & Adedamola, F. A. (2014). The Global Financial Meltdown and Its Effects on Manufacturing Sector: The Nigerian Perspective. *Journal of Economics and Sustainable Development*, 5(6), 78-90.
  15. Lucia, G. & Ionescu, A. (2018). The Innovation - Corporate Performance Relationship in Emergent Countries. *Journal of Social and Behavioral Sciences*, 238, 124-132. <https://doi.org/10.1016/j.sbspro.2018.03.015>
  16. Marius, A.R. & Bucata, G. (2017). Factors Influencing Sustained Managerial Efficiency. *Journal of Defense Resources Management*, 8, 1, (14).
  17. Mills. J., Platts, K. & Bourne, M., (2003). Applying resource based theory: Methods, outcomes and utility for managers.

- International Journal of Operations and Production Management*, 23(2), 148-166.
18. Mohammed, E. A., Kaid, A.A. & Hanim, F.F. (2014). The Measurements of Firm Performance's Dimensions. *Asian Journal of Finance & Accounting* 6, (1), 24-49.
  19. Molnar, M., Wang, B. & Chen, W. (2017). Corporate Governance and Firm Performance in China. *OECD Economics Department Working Paper No.1421*. <http://dx.doi.org/10.1787/0d6741fd-en>.
  20. Nandom, I.Y. (2016). Bank-Specific and Macroeconomic Determinants of Commercial Banks Profitability in Ghana. *International Finance and Banking*, 3, (2), 89-99.
  21. National Bureau of statistics (2019). Nigerian Manufacturing Sector: Summary of Report 4-13.
  22. Ndemezo, E. & Kayitana, C. (2017). *Innovation and Firms' Performance in the Rwandese Manufacturing Industry: A firm Level Empirical Analysis*. College of Business and Economics, School of Business, University of Rwanda.
  23. Ndolo, P.S. (2015). *The Relationship between Operational Efficiency and Financial Performance of Firms Listed at the Nairobi Securities Exchange*. Unpublished Thesis submitted for award of M.Sc Degree in Finance, School of Business University of Nairobi, Kenya.
  24. Obeidat, M.I. & Darkal N. (2018). Accounting versus Economic Based Measures of Performance and the Share Market Value: The Evidence of the Industrial Listed Firms at Abu Dhabi Stock Exchange. *WSEAS Transactions on Business and Economics*, Volume 15, 363-374.
  25. Oburota, C.S. & Ifere, E.O. (2017). Manufacturing Subsector and Economic Growth in Nigeria. *British Journal of Economics, Management & Trade*, 17(3): 1-9.
  26. OECD & Eurostat (2005). Oslo Manual Third Edition: Guidelines for Collecting and Interpreting Innovation Data, Paris.
  27. Okolo, C. V., Ugwuanyi, O. S. & Okpala, K. A. (2016). Exchange Rate Volatility, its Determinants and Effects on the Manufacturing Sector in Nigeria. *International Journal of Economics and Management Engineering*, 10(12), 4001-4009.

28. Palaniappan G., (2017) "Determinants of Corporate Financial Performance relating to Board Characteristics of Corporate Governance in Indian Manufacturing Industry: An empirical study. *European Journal of Management and Business Economics*, 26, (1), 67-85.
29. Priti, S. (2018). Enterprise Value and Intellectual Capital: Study of BSE 500 Firms. *Journal of Accounting and Finance Research*, 7(2), 123-133. <https://doi.org/10.5430/afr.v7n2p123>.
30. Ringim, K.J., (2012). *Effect of Business Process Re-engineering Factors on Information and Technology Capabilities on Organizational Performance*. Unpublished Doctoral Thesis, University Utara Malaysia.
31. Rubera, G. & Kirca, A. (2012). Firm Innovativeness and its Performance Outcomes: A Meta-analytic Review and Theoretical Integration. *Journal of Marketing*, 76, (3), 130-147.
32. Rumelt, R. (1984). Toward a Strategic Theory of the Firm. In R. Lamb (Ed.), *Competitive Strategic Management*. Englewood Cliffs, NJ: Prentice-Hall.
33. Sahu, S. K., Ramaswamy, S. & Choutagunta, A. (2017). *Export Performance, Innovation and Productivity in Indian Manufacturing Firms*. Working Paper No. 159, Madras School of Economics, India.
34. Shaikh, J. M. & Linh, D. T. (2017). Determine Impacts of Stock Market Listing on Corporate Performance of Agri-Foods Companies in Vietnam. *Journal of Corporate Accounting & Finance*, 61-74. <https://doi.org/10.1002/jcaf>.
35. Shehada, M. & Alkhaldi, F. (2015). Measuring the Efficiency and Effectiveness of the Human Resources Training Function at Orange Jordan. *International Journal of Quantitative and Qualitative Research Method*, 3, (2), 1-12, [www.eajournals.org](http://www.eajournals.org).
36. Teshome, E., Debela, K., & Sultan, M. (2018). Determinant of Financial Performance of Commercial Banks in Ethiopia: Special Emphasis on Private Commercial Banks. *African Journal of Business Management*, 12(1), 1-10. <https://doi.org/10.5897/AJBM2017.8470>.
37. Therrien, P., Doloreux, D. & Chamberlin, T. (2011). Innovation Novelty and Commercial Performance in the

- Service Sector: A Canadian firm level analysis. *Journal of Technovation*, 31, 655-665.
38. Wade, M., & Hulland, J. (2004). The resource- based view and information system research: Review, extension and suggestions for future research. *MIS Quarterly*, 28, 81-90.
  39. Wanjiru, J. N. (2017). *Board Gender Diversity and Financial Performance of Commercial Banks in Kenya*. Unpublished M.Sc Thesis, School of Business, University of Nairobi, Kenya.
  40. WDI (2015). *World Bank Development Indicators*. Washington, DC: The World Bank.
  41. Wernerfelt, B. (1984). A Resource-based View of the Firm. *Strategic Management Journal*, 5, 171–80.
  42. WHO (2016). Annual Reports on Drugs accessibility and Nutrition in Africa.
  43. Zeyad, I.R. (2016). EVA and the Impact of the Macroeconomic Variables: Evidence from the Jordanian Manufacturing Companies. *Asian Journal of Finance & Accounting*, 8, (1), 13-22.