

# Effects of Innovation on Performance of Manufacturing SMEs in Nigeria: An empirical study

Ukpabio, Mirabel Godswill (1); Oyebisi, Timothy Oyedepo (2); Siyanbola, Owolabi Willie (3)

1: National Center for Technology Management (NACETEM), Qbafemi Awolowo University, Ife, Nigeria; 2: African Institute of Science Policy and Innovation (AISPI), Obafemi Awolowo University, Ile-Ife Osun State, Nigeria.; 3: Center for Energy Research and Development (CERD), Obafemi Awolowo University, Ile-Ife Osun State, Nigeria

## Abstract

**This paper investigates how innovation affect the performance of manufacturing Small and Medium enterprises (SMEs) in a developing Nation. The subject of innovation and how it influences SMEs performances in developing nations is yet to be comprehensively explored. Besides, only little emphasis has been placed on the possible impact of various dimensions of innovation on SMEs performances. In order to enrich the literature, this paper evaluates the effects of various innovation dimensions on the performance of manufacturing SMEs in Nigeria. A total of 305 samples was obtained from SMEs in the textile/leather/apparel and footwear subsector; wood/furniture and woodworks subsector; and domestic/industrial plastic and rubber subsector in Southwestern Nigeria. Data collected was analyzed using correlation analysis and hierarchical regression analysis. The correlation result shows that all dimensions of innovation (product, process, market, and organizational) had significant positive relationship with firm performance including the control variable ‘firm size’. However, the regression result confirmed that process innovation and organizational innovation influences SMEs performance significantly. Additionally, product innovation had significant impact on innovation with the exclusion of other innovation dimensions from the model and marketing innovation had significant impact on the performance of SMEs with the exclusion of organizational innovation from the model. Overall, innovation accounts for about 55.7% of variation in the performance of the manufacturing SMEs. The study concludes that all dimensions of innovation, and specifically process and organizational innovation are critical elements for the enhancing the performance of SMEs in Nigeria. Therefore, owners and managers of SMEs should pay critical attention to implementation of innovation activities in their firms as it positively impact performance.**

**Keywords:** Innovation, Firms Performance, Manufacturing SMEs, Innovation dimensions

## Introduction

Innovation remains the major strategy and driving force for firms’ growth and survival in any competitive business environment. The introduction of novel products and services has remained the thrust behind the spring-up of new SMEs and the expansion of the existing ones. The growth and development of developing nations lies in the innovative ability of its citizens and SMEs within the nation. The essential role of SMEs in the growth and the development of nations’ economy cannot be gainsaid. SMEs have remained the catalysts for economic development both for the developed and developing nations in terms of employment generation, development of indigenous entrepreneurship, forward integration with large-scale enterprises and added value to gross domestic product (GDP) (Ussahawanitchaki, 2012). Globally, SMEs are responsible for about 75% of employment in any country (Olughor, 2015). Consequently, an essential issue dominating policy debates globally and particularly Africa, has been how to drive economic growth through improving the performance of SMEs (Obeng, 2009; Audrey and Jaraji, 2016). The OECD, in its research, found that SMEs contribute over 55% of GDP and 65% of total employment in high -income countries while it contributes about 95% and of total

employment and about 70% of GDP in middle income countries (OECD, 2004). Conversely, in low-income countries, particularly in the least developed economies, the contribution of SMEs to employment and GDP is less than that of the informal sector, where the great majority of the poorest of the poor make a subsistence level of living. Therefore, an important policy priority in developing countries should be geared towards the reformation of policies that divide the informal and formal sectors, so as to enable the poor to participate in markets and to engage in higher value added business activities.

The establishment of SMEs is highly essential for developing countries as these businesses employ unskilled workers who are excessively dominate these countries (Bhhatia-Panthaki, 2007). Nigeria, like several developing countries, recognizes the importance of SMEs for economic growth and development. SMEs due to their flexibility and ability to promptly and effectively integrate inventions are more innovative than large firms (Li, 2003; Verhees, 2004). Studies have shown that SMEs engages in innovation activities has enhanced performances (Freel, 2000; Westerberg, 2008; Gracia, 2014). Also, the study of SMEs increases stakeholders' awareness of the needs of these enterprises in respect to growth and development. Such awareness allows scientists, owners of enterprises, entrepreneurs and policy-makers to provide the needed support and formulate effective polices for SMEs (Norman, 2008). Nigerian SMEs, though essential to the nation's economy, are faced with numerous challenges such as inadequate and non functional infrastructural facilities, bureaucratic bottlenecks and inefficiency in the administration of incentives and support facilities, lack of easy access to funds/credits, uneven competition arising from import tariffs, lack of access to appropriate technology, absence of R&D, high dependence on imported raw materials, lack of scientific and technological knowledge and know-how, lack of appropriate managerial and entrepreneurial skills and lack of suitable training and development, fluctuating value of the Naira, government policies; political consideration etc. One essential element to overcoming most of the challenges faced by SMEs is innovation.

As opined by D'Cruz and Rugman (1992), a firm is likely to build a competitive edge given its ability to design, develop and market products or services that are novel and of better quality to that of its competitors. Thus for firms survival and growth, innovation has become a necessity for all firms including SMEs (Kaplan and Waren, 2007). Given the importance of innovation in firms, several studies (Lin and Chen, 2007; Trienekens *et al.*, 2008; Bakar and Ahmad, 2010; Chong *et al.*, 2011; Mohd and Syamsuriana, 2013; Njogu, 2014; Olughor, 2015; Gu and Shao, 2015; Audrey and Jaraji, 2016) have assessed the impact of innovation on firm performance. But most of the previous studies focused on either one or two dimensions of innovation (Johne, 1999; Georgellis *et al.*, 2000; Medina and Rufin, 2009; Espallardo and Ballester, 2009; Zhang and Duan, 2010; Bakar and Ahmad, 2010; Ar and Baki, 2011). However, this study assesses the effect of various dimensions of innovation on the performance of manufacturing SMEs in Nigeria.

## Literature Review

### *Innovation*

Innovation is an increasingly important element of globalization and competitiveness (Gorodnichenko, *et al.*, 2010). As globalization and international competition intensifies, technology becomes more central to firms' performance within the domestic and international market. This study measures AC as an explanatory variable for innovation in firms. The innovativeness of firms may be affected by both internal and external factors. External factors are basically associated with a firm's interaction with its external environment such as other firms, suppliers or buyers (Jorna and Waalkens, 2006). Internal factors include, for instance, a firm's inherited capacities, such as skills, accumulated experience and prior related knowledge of its workforce (Webster, 2004), organizational structure, communication network, R&D efforts, as well as the ability to respond appropriately to the intrinsic motivation of its employees (Jorna and Waalkens, 2006). It has been asserted that innovation plays an essential role in the survival of firms in the business environment. Innovations can in this context be viewed as a multidimensional concept (Neely *et al.*, 2001). Schumpeter, for instance, defines innovation as the introduction of a new good, the introduction of a new production method, opening of a new market, or opening of a new source of supply (Schumpeter, 1934). Similarly, Lundvall (1992), describes innovation as an ongoing process of exclusion, search, and exploration resulting in new products, new techniques, new organizational forms, and new markets. Malerba (2002) refers to innovation as a tradable application of an invention, as a result of invention integration into economic and social Practice. Kuratko and Hodgetts (2004) defined innovation as the creation of new wealth or the alteration and enhancement of existing resources to create new wealth. Oslo Manual (2005) defines innovation to be an activity that produces new or significantly improved goods (products or services), processes, marketing methods or business organization OECD, 2005). Innovation also refers to the process of creating ideas, developing an invention and also introducing a new product, process or service to the market (Thornhill, 2006).

The relationship between innovation and firm performance has been confirmed in both empirical and theoretical studies. For instance, Calantone *et al.* (2002) examined the relationship between learning orientation, firm innovation and firm performance in US firms. Carol and Marvis (2007), examined the relationship between innovation and organizational performance of Taiwanese SMEs in the manufacturing and service sectors. They measured performance in terms of firm sales. Van Auken *et al.* (2008) assessed the relationship between the degree of innovation and performance among a sample of 1,901 Spanish manufacturing SMEs and their study reveal evidence of a positive relationship between three types of innovation (product, process and managerial/systems) and performance. Similarly, Garrido and Camarero (2010) investigated the relationship between learning orientation, innovativeness and performance and finding of the study reveals that learning orientation significantly influences both innovativeness and performance. Also, Terziovski (2010) studied the innovation practice and its effects on performance of Australian SMEs. Their study revealed that innovation strategy is a key driver to performance of SMEs. Quite a number of studies (Carl and Marvis, 2007; Van et al., 2008; Terziovski, 2010; Mensah and Achuah, 2015) have focused on assessment of the relationship between innovation and performance within the SMEs.

Furthermore, business literature offers various classifications of innovations that have been developed and applied (Schumpeter, 1934; Johannessen *et al.*, 2001; Avermaete *et al.*, 2003). Some authors (Avermaete *et al.*, 2003; Johannessen *et al.*, 2001) discuss innovation from the perspective of output (product, process, organizational, marketing), while others (Damanpour, 1996; Jansen *et al.*, 2006; Abernathy and Clark, 1985) describe the concept in terms of the degree of change (i.e., radical and incremental). Yet another perspective used in capturing the dynamic process of innovation is that of the various stages of innovation (i.e., invention initiative and realized innovation). Innovation is the output of initiatives within a firm. Porter (1990) argues that a firm is a collection of activities that are performed to design, produce, market, deliver, and support its product. However, we classify innovation into four types: product, process, organizational, and marketing innovation (Avermaete *et al.*, 2003; OECD 2005).

### Product Innovation

This can be considered as any good or service that is perceived by an individual or a firm as new (Kotler, 1991). Also, it refers to the introduction of new products or services in order to create new markets or customers, or satisfy existing market or customers (Wang and Ahmed, 2004; Wan *et al.*, 2005). Product innovation entails diverse organizational strategies as well as unique inputs which results in novel outputs (Martinez-Ros and Labeaga, 2009). Production innovation has been investigated in accordance with a wide range of managerial phenomena, including entrepreneurial firms in the emerging countries (Li and Atuahena-Gima, 2001), continuous innovation in mature firms (Dougherty and Hardy, 1996), collaborative networks (Nieto & Santamaria, 2007), R&D spillovers (Audretsch and Feldman, 1996), human resource systems and organizational culture (Lau and Ngo, 2004), and leadership (Gruber, 1992). Product innovation is usually the result of producing and commercialization of new goods (products or services) or with improved performance characteristics. Product innovations assist SMEs to distinguish themselves from their competitors, through proffering solutions to individual or national challenges.

Product innovation remains one of the major roots of competitive advantage to firms (Mohd and Syamsuriana, 2013). This is because when firms engage in innovation, the quality of their goods and services is improved upon and this enhances the performance as well as the competitive advantage of the firm. (Foraker *et al.*, 1996). As noted by Hult *et al.* (2004), product innovation shields a firm from threats and competitors creates opportunity for the innovating firm to enjoy the 'first mover' advantage. Bayus *et al.* (2003) proved that product innovation had positive and significant link with organizational performance. Alegre *et al.* (2006) opined that product innovation dimension was strongly and positively associated with firm performance. Also, Espallardo and Ballester (2009) in their study affirmed that product innovation positively impacts firm performance. Likewise, Varis and Littunen (2010) noted that introduction of product innovation is positively associated with firm performance was also confirmed by. Therefore, this study argues that:

**Hypothesis 1:** Product innovation is positively related to firm performance

### Process innovation

This can be defined as changes in the ways of producing or developing products, including new logistics, new raw material, new production lines, new production processes/methods, and new

technology. This type of innovation does not stand on its own. In many cases, process innovation may be the consequence of product innovation or/and organizational innovation. New processes basically rest on the use of new technologies to increase the efficiency and quality of production. This view on innovation was reflected by the first and second edition of the “Oslo Manual” the OECD’s handbook for innovation surveys (OECD, 1997; OECD and Eurostat, 1997). Process innovation entails the implementation of new or improved production process or adoption of new tools, technology, or knowledge in producing a product (Langley *et al.*, 2005; Oke *et al.*, 2007).

Process Innovation is very essential in the manufacturing process of a firm as it gives a firm an advantage over its competitors. Interestingly, studies have revealed that process innovation is positively related to performance of firms (Vivero, 2002; Mohd and Syamsuriana, 2013; Nham *et al.*, 2016). Also, Anderson (2009) in his study noted that there is a relationship between new technology (used as a proxy for process innovation) and performance of a firm. Recent evidence by Gunday *et al.* (2011) reaffirmed that process innovation is significantly correlated to innovative performance. Hence, this study proposes that:

**Hypothesis 2:** Process innovation is positively related to firm performance

Marketing innovation:

This is the implementation of a new marketing method involving significant changes in product design or packaging, product placement, product promotion or pricing.” (OECD and Eurostat, 2005). Marketing innovation has to do with the market mix and market selection in a bid to meet consumers’ expectations (Mohd and Syamsuriana, 2013). Marketing innovation plays a crucial role in fulfilling market needs and responding to market opportunities (Rodriguez-Cano *et al.*, 2004). Marketing innovation entails devising a better way of meeting the needs of customer, entering a new market, or strategically positioning a firm’s product on the market with the intention of increasing firm’s sales (Gunday *et al.*, 2011).

Marketing innovation is carried out through marketing activities such as; pricing strategies, product package design properties, product placement and promotion activities, etc (Kotler, 1991). Studies have shown that marketing innovation positively impact sales growth of firms through the increased demand for products, which as a result, yields additional profit to innovative firms (John and Davies, 2000; Sandvik, 2003). Also, Otero-Neira *et al.* (2009) in their study opined that market innovation positively impacts the performance of firms. Likewise, Varis and Littunen (2010) in their study using an estimated model reaffirmed the existence of significant correlation between a marketing innovation and firm performance. Thus, this study argues that:

**Hypothesis 3:** Marketing innovation is positively related to firm performance

Organizational innovation:

Organization innovation involves changes in the ways of organizing and managing a firm, including human resource management and the improvement of the firm’s access to the market

(i.e., expanding new markets) (Avermaete et al., 2003). “It entails the implementation of a new organizational method in the firm’s business practices, workplace organization or external relations.” (OECD and Eurostat, 2005). Organizational innovations has the propensity to enhance firms’ performances by reducing administrative and transaction costs, improving workplace satisfaction (and thus labor productivity), gaining access to non-tradable assets (such as non-codified external knowledge) or reducing costs of supplies (OECD Oslo Manual, 2005). Organizational innovation can increase the performance of firm through decreasing transaction cost and administrative cost thereby improving workplace satisfaction. Also, organizational innovation can be implemented in business practice through the application of new techniques for arranging routines and procedures for carrying out activities. It includes the introduction of new methods for the allocation of responsibilities and decision making among employees.

Nham *et al.* (2016) in their study revealed that organizational innovation positively affects the performance of firms. Their findings showed that the higher the innovation activities of firms, the higher their innovative performance. Also, Della and Solari (2008) in their study of medium-sized Milanese firms found that organizational innovation is related to business performance. Their work revealed firms which achieved high productivity increases were those that combined investments in the new organization of work with advanced technologies. Hence, this study proposes that:

**Hypothesis 4:** Organizational innovation is positively related to firm performance

### **Small and Medium Enterprises (SMEs) in Nigeria**

Conceptually, the definition of SME is nebulous as it varies from country one country to another and even within the same country, it may vary from sector to sector depending on the purpose for which the definition is sort. The National Council of Industry (NCI) in 2003, defined SMEs as firms having between 10 and 100 employees and a total cost of working capital that is between N1million and less than N200million. SMEs act as bedrock for innovations, inventions and problem solving. This usually comes to be in the process of solving the daily problems that confront the owners as entrepreneurs. In Nigeria, the sector has been seen to contribute significantly to entrepreneurship, technology change and growth in productivity. SMEs in Nigeria constitute about 96% of Nigerian businesses (Oyelaran-Oyeyinka, 2007) and accounts for 75% employment rate (Umar *et al.*, 2014) and 50% of industrial output (Nwankwo *et al.*, 2012). More so, SMEs represents about 90% of the manufacturing sector (Oyelaran-Oyeyinka, 2007), and contributes 56.43% to manufacturing GDP (NBS, 2003).

### **Firm Performance:**

Performance measurement and performance management practices have become common place in all businesses. The knowledge of the association between innovation and firm performance offers practical insights for proper management of firms. With this knowledge, managers of SMEs would be capable of optimizing their decision-making processes as it relates to various performance output. This knowledge will also assist them in the maximal allocation of the resources. As noted by Murphy et al. (1996), firm performance is a multi-faceted concept, which include indicator such as; production, finance or marketing (Sohn *et al.*, 2007), or consequential such as relating to growth and profit (Wolff & Pett, 2006). Studies have described firm performance in terms, how organizational objectives are well achieved (Jarvis et al., 2000; Wood, 2006). Firm performance can be assessed by examining how successful an organization is in achieving its goals (Gerba and Viswanadham, 2016). Scholars have argued that performance of firms can be described as the firms' ability to produce suitable outcome and actions (Wood, 2006; Chittithaworn et al., 2011). Gerba and Viswanadham (2016) opined that performance can be in terms of financial and non-financial performance. This includes; return on investment (ROI), sales volume, sales value, profitability, total assets, employment size, capital employed, market share, customer satisfaction, productivity, turnover, delivery time, employees turnover, etc. In this study, performance is measured as total sales value (Carter and Jones-Evan, 2000; Gebreyesus, 2007).

## **Methodology**

### ***Data Source***

Primary data used in this study was collected from manufacturing SMEs in textile/leather/apparel and footwear subsector; wood/furniture and woodworks subsector; and domestic/industrial plastic and rubber subsectors in Southwestern Nigeria. Specifically, data was collected from manufacturing SMEs that are located along the Lagos-Ota-Agbara-Ibadan industrial axis where about 26.44% of manufacturing SMEs in Nigeria are domiciled. SMEs employing between 10 persons and 200 persons were sampled for this study. The survey was carried out on 305 SMEs using a self-administered questionnaire.

### ***Measures***

#### **Independent Variable**

Innovation as an independent variable in this study was divided into product innovation, process innovation and organizational innovation and market innovation. Product innovation included five items: introduction of new or significantly improved product, introduction of new machines

and equipment, introduction of additional refurbished or second hand equipment, introduction of goods that is new to the market, and introduction of goods that is new to the firm. Process innovation included four items: introduction of new or significantly improved method of manufacturing, purchased/lease of machines/equipments, introduction of supporting activities for manufacturing processes, and engagement in research aimed at producing specific inventions or modifying existing techniques. Organization innovation included six items: introduction of new or improved organizational knowledge management system, made significant changed with firm's relations with other firms or public institutions through alliances, partnership, subcontracting etc, engagement in research with no specific application, development pilot projects and subsequent full-scale production facilities and possession of on-going or abandoned innovation activities. Marketing innovation includes two items: made significant changes product design or packaging, and made significant changes in sales or distribution methods of firms. The respondents were asked, "in the last five years, if their firms have engaged in the above listed innovation activities". Their responses were based on 'yes' =1 and 'no' = 0.

### Dependent Variables

The dependent variable firm performance was assessed using self-assessment of firm performance by the respondents as objective performance measures were not available (Love *et al.*, 2002). The performance indicator for this study was sales revenue (Kellermanns *et al.*, 2010).

### Control Variables

Several control variables which are visible in the business performance literature were also introduced to the model. These variable include; highest level of educational qualification (Fairlie and Robb, 2007; Nichterand Goldmark, 2009), work experience (Mengistae, 2006; Alowaihan, 2004), and firm size (Ozgulbas *et al.*, 2006); Orser, *et al.*, 2000).

### Reliability Test

Cronbach's alpha was used to determine the internal consistency of the innovation constructs. Internal consistency illustrates the degree to which all the items in scale measure the same or construct and thus it is related to the inner-relatedness of the items within the test (Tavakol and Dennick, 2011). As opined by George and Mallery (2003,) a good Cronbach alpha should be 0.7 or greater. However, According to Kline (2000) a Cronbach alpha of 0.6 is acceptable. In this study, scales which have Cronbach's alpha coefficient that is 0.6 and above will be accepted.

### Results and Discussion:

#### Sample Characteristics:

As shown in Table 1, majority of the respondents were males as compared to the females. This indicates that the SME subsector surveyed are dominated more by males. The wood/furniture/woodworks subsector has about 98.7% males. The domestic/industrial plastic and rubber had 66.1% of males. However, the textile/leather/apparel & footwear subsector had a fair gender distribution as 50.5% were males and 49.5% were females. Also, about 90.9% of the firms surveyed were sole proprietorship. In terms of educational qualification, majority of the respondent had senior school certificate (SSCE) and ordinary national diploma (OND) as their highest educational qualification. However, about 21% of the respondents had higher national diploma (HND) as their highest qualification, about 7.0% had B.Sc/B.Tech as highest qualification, about 2.8% had MBA/M.Sc/M.A as their highest qualification, and only one of the respondent had PhD as highest qualification. Majority (60.6%) of the respondents had between 6 and 10 years of work experience and about 22.9% of the respondents had 11 to 15 years of work experience. Interestingly, about 10% of the respondents had over 15 years of work experience. About 90.6% of the respondents surveyed were within the ranks of chief executive officer, director and manager.

Table 2 shows firms' investment in innovation activities such as in-house R&D, external R&D, machinery/equipment acquisition, and training. In terms of average amount invested, firms' highest investment was in machinery/equipment acquisition (₦ 2,071,133.97) followed by external R&D (₦ 1,700,000.00). However, firms' investments in in-house R&D and training seems to be low.

Furthermore, table 3 shows the percentage of firms that had introduced each innovation type as well as the maximum and minimum number the innovation type introduced by the firms. Results shows that about 90.2% of the firms had introduced product innovation and about 87.9% of them had introduced process innovation. About 86.2% had introduced organizational innovation and 87.2% of the firm had introduced marketing innovation. Maximum number of product innovation introduced was 20. The maximum number of process innovation and marketing innovation stood at 5 while the highest number of organizational innovation introduced by firms was 9. However, the least number of each type of innovation introduced by the firms was 1. More so, about 83% of the firms had introduced only 1 process innovation. About 57% of the firms had introduced only 1 product innovation and about 43% had introduced at least 2 product innovations. About 79% of the firms had introduced only 1 marketing innovation and about 84% of the firm introduced only 1 organizational innovation type.

Table 1: Sample Characteristics

Variables	Frequency	Percent
Gender		
Male	199	65.9
Female	102	34.1
Form of Ownership		

Sole Proprietorship	260	90.9
Partnership	7	2.4
Cooperative society	11	3.8
Others	6	2.1
Highest Educational Qualification		
No formal education	5	1.7
Primary school Certificate	2	0.7
SSCE/GCE	98	34.3
OND	92	32.2
HND	60	21.0
B.Sc/B.Tech	20	7.0
M.Sc./MBA/M.A	8	2.8
Ph.D	1	0.3
Subsector Type		
Textile/leather/apparel & footwear	186	61.0
Wood/furniture/woodworks	78	25.6
Domestic/industrial plastic & rubber	41	13.4
Work Experience		
1 – 5 years	10	6.5
6 – 10 years	103	60.6
11 – 15 years	39	22.9
Over 15 Years	17	10.0

Table 2: Investment in Innovation Activities of Manufacturing SMEs in Nigeria

Activities	N	Minimum Amount invested (in Naira)	Maximum Amount Invested (in Naira)	Average Amount invested (in Naira)
In-house R&D	86	11,000	6,500,000	507,720.93
External R&D (or outsourced R&D)	13	200,000	7,500,000	1,700,000.00
Machinery/equipment Acquisition	209	30,000	240,000,000	2,071,133.97
Training	38	10,000	1,700,000	256,447.42

*Source: Author*

Table 3: Innovations Introduced by Manufacturing SMEs

Innovation Types	Percentage of Innovators	Minimum	Maximum
Product innovation introduced within the last 5 years	90.2	1	20
Process innovation introduced within the last 5 years	87.9	1	5
Marketing innovation introduced in the last 5 years	87.2	1	5
Organizational innovation introduced in the last 5 years	86.2	1	9

Source: *Author*

A reliability test was carried out on the variables to determine the reliability of the variables. The result revealed a Cronbach Alpha of 0.778 for product innovation (5 items), 0.715 for process innovation (4 items), 0.608 for organizational innovation (6 items) and 0.952 for marketing innovation (2 items) which in theory is considered good (Nunally, 1978; George and Mallery 2003; Kline; 2003; Devellis, 2012). This indicates the degree to which the variables measures a unidimensional latent construct which suggests that the variables used for the study have relatively high internal consistency.

The correlation statistics in Table 4 shows that a significant positive relationship exists between the innovation dimensions and firm performance. Innovation dimension such as; process innovation ( $r = 0.384$ ), process innovation ( $r = 0.476$ ), marketing innovation ( $r = 0.388$ ), and organizational innovation ( $r = 0.361$ ). This implies that the SMEs must continually engage in innovation to boost their performances. More so, process innovation was the innovation dimension with the highest correlation value. Also, Control variables such as; firm size ( $r = 0.688$ ) and highest educational qualification ( $r = 0.217$ ) had significant positive association with firm performance. However, the control variable ‘work experience’ ( $r = 0.159$ ) was found to be positively associated with firm performance though the relationship was not significant.

Table 4: Mean, Standard Deviation and Correlation of Innovation and Performance Variables

	Mean	S.D	1	2	3	4	5	6	7	8
Firm Performance	3.56	3.28	1							
Product innovation	1.66	0.781	.384**	1						
Process innovation	1.31	0.710	.476**	.394**	1					
Marketing innovation	1.41	0.793	.388**	.358**	.482**	1				

Organizational innovation	1.26	0.896	.361**	.094	.186*	.410**	1			
Firm size	13.33	6.673	.688**	.373**	.303**	.231**	.212*	1		
Highest educational qualifications	4.02	1.113	.217*	.230**	.112	.206*	.170	.228*	1	
Work experience	10.79	4.127	.159	.208*	.255**	.260**	.091	.113	.109	1

\*Correlation significant at the 0.1 level (2 tailed), \*\* Correlation significant at the 0.05 level (2 tailed), \*\*\*P ≤ 0.01 (2 tailed), N=305.

Source: Authors

Furthermore, the study assessed the impact of innovation on firm performance using hierarchical regression analysis. Results shows that in model 1, firm size ( $\beta = 0.493$ ,  $p < 0.01$ ) and product innovation ( $\beta = 0.155$ ,  $p < 0.10$ ) had significant positive impact on firm performance and the explanatory power ( $R^2$ ) of the model was 38.8% with a significant F-value of 20.637. In model 2, with the introduction process innovation into the model, firm size ( $\beta = 0.416$ ,  $p < 0.01$ ) and process innovation ( $\beta = 0.338$ ) had significant positive impact on firm performance. However product innovation, higher educational qualification and work experience had insignificant positive impact on firm performance. The explanatory power ( $R^2$ ) of the model was also increased to 48.1% with increase in F-value to 22.988. In model 3, marketing innovation was introduced into the model. Results show that process innovation ( $\beta = 0.294$ ), marketing innovation ( $\beta = 0.165$ ), and firm size ( $\beta = 0.375$ ,  $p < 0.01$ ) had significant positive impact on firm performance. Also, product innovation and higher educational qualification increased from  $\beta = 0.069$  to  $\beta = 0.091$  and from  $\beta = 0.051$  to  $\beta = 0.055$  respectively. Besides, the explanatory power ( $R^2$ ) of the model increased to 53.1% with a significant F-value of 21.510. In model 4, with the introduction of organizational innovation into the model, process innovation ( $\beta = 0.282$ ), organizational innovation ( $\beta = 0.171$ ) and firm size ( $\beta = 0.353$ ,  $p < 0.01$ ) had significant positive impact on firm performance. This result is consistent with Ar and Baki (2011) as their study revealed that process innovation had significant positive impact on firm performance. Interestingly, product innovation and market innovation did not have significant impact on firm performance. This is consistent with Mohd and Syamsuriana (2013) as their study revealed that marketing innovation had insignificant positive impact on performance. Moreover, the explanatory power ( $R^2$ ) of the model increased to 55.7% with a significant F-value of 19.725. These results therefore imply that innovation accounts for about 55.7% of the variation in the performance of the manufacturing SMEs. Therefore, manufacturing SMEs in Nigeria should engage more in process innovation and organizational innovation in order to boost their performances.

Table 5: Results of Hierarchical Regression Analysis

Independent Variables	Model 1	Model 2	Model 3	Model 4
Work experience	.111	.070	.031	.039
Higher educational qualifications	.079	.051	.055	.041
Firm size	.493***	.416***	.375***	.353***
Product innovation	.155*	.069	.091	.104
Process innovation	-	.338***	.294**	.282**
Marketing innovation	-	-	.165*	.109
Organizational innovation	-	-	-	.171*
F	20.637***	22.998***	21.510***	19.725***
R	.623	.694	.729	.746
R <sup>2</sup>	.388	.481	.531	.557
Adjusted R <sup>2</sup>	.370	.460	.506	.528

\*  $p < 0.05$ , \*\*  $p < 0.01$ , and \*\*\*  $p < 0.001$  are significant at the 0.05, 0.01 and 0.001 level respectively.

Source: Authors

## Conclusion

This study assessed the effect of innovation on firm performance in manufacturing SMEs in Nigeria. The study sampled a total of 305 SMEs in textile/leather/apparel and footwear subsector; wood/furniture and woodworks subsector; and domestic/industrial plastic and rubber subsector in Southwestern Nigeria. The data was analyzed with the use of hierarchical regression analysis. Results revealed that process innovation and organizational innovation positively impacts firm performance significantly. Also, the size of the firm was seen to be very critical as it relates the impact of innovation on firm performance. Hence, manufacturing SMEs and policy makers must note that innovation remains an essential element in small and medium sized firms. Although this paper assessed investment in various innovation activities, the paper did not assess the impact of investment on innovation activities on firms performance. Further studies should examine the impact of investment on innovation activities on firms performance. This is very important as investment in innovation activities could also boost performance of SMEs.

## References

- Ar, I. M. & Baki, B. (2011). "Antecedents and Performance Impacts of Product versus Process Innovation: Empirical Evidence from SMEs Located In Turkish Science and Technology Parks," *European Journal of Innovation Management*, 14 (2), 172-206.
- Alegre, J., Lapiedra, R. & Chiva, R. (2006). "A Measurement Scale for Product Innovation Performance," *European Journal of Innovation Management*, 9 (4), 333-346.
- Audrey P. N and Jaraji, K, (2016).The Impact of Innovation on Performance of Small and Medium Enterprises (SMEs) in Tanzania: A Review of Empirical Evidence. *Journal of Business and Management Sciences*, 4( 1) : 1-6. doi: 10.12691/jbms-4-1-1.
- Bayus, B. L., Erickson, G. & Jacobson, R.(2003). "The Financial Rewards of New Product Introductions," *Management Science*, 49 (2), 197-210.
- Bhhatia-Panthaki, P. a. (2007). Enterprise development in Zambia:Reflections on the missing middle. *Journal of International Development*, 9, 12.
- Bakar, L. J. A. & Ahmad, H. (2010). "Assessing the Relationship between Firm Resources and Product Innovation Performance,"*Business Process Management Journal*, 16(3),420-435.
- Chong, A. Y. L., Chan, F. T. S., Ooi, K. B. & Sim, J. J. (2011). "Can Malaysian Firms Improve Organizational/ Innovation Performance via SCM," *Industrial Management and Data System*, 111 (3), 410-431.
- D'Cruz, J. & Rugman, A. (1992). 'New Concepts for Canadian Competitiveness,' *Kodak Canada*, Toronto
- Espallardo, M. H. & Ballester, E. D. (2009). "Product Innovation in Small Manufacturers, Market Orientation and the Industry's Five Competitive Forces: Empirical Evidence from Spain," *European Journal of Innovation Management*, 12 (4), 470-491.
- Forker, L. B., Vickery, S. K. & Droge, C. L. M. (1996). "The Contribution of Quality to Business Performance," *International Journal of Operations and Production Management*, 16 (8), 44-62.
- Freel, M. S. (2000). Do Small innovating firms outperform non-innovators? *Small Business Economics*, 14(3), 16.
- Garcia. (2014). Small Business Revenue. *International Journal of Business and Economy*, 4(2), 987 - 994.
- Georgellis, Y., Joyce, P. & Woods, A. (2000). "Entrepreneurial Action, Innovation and Business Performance: The Small Independent Business," *Journal of Small Business and Enterprise Development*, 7 (1), 7-17.

Gu, L. Z., and Shao, Y. F. (2015). The Empirical Study of SMEs Innovation and Performance Factors in Sichuan. *Studies in Sociology of Science*, 6 (1): 40-47. Available from: URL: <http://www.cscanada.net/index.php/sss/article/view/6012> DOI: <http://dx.doi.org/10.3968/6012>

Hult, G. T. M., Hurley, R. F. & Knight, G. A. (2004). "Innovativeness: Its Antecedents and Impact on Business Performance," *Industrial Marketing Management*, 33 (5), 429-38.

Johne, A. (1999). "Successful Market Innovation," *European Journal of Innovation Management*, 2 (1), 6-11.

Kaplan, M. J. & Warren, A. C. (2007). 'Patterns of Entrepreneurship,' Second Edition, *John Wiley and Sons Inc*, USA.

Li, Q. a. (2003). Profitability of small and medium-sized enterprises in high-tech industries: The case for biotechnology industry. *Strategic Management Journal*, 24, 6.

Lin, Y. Y.- Y. & Chen, M. Y.- C. (2007). "Does Innovation Lead to Performance? An Empirical Study of SMEs in Taiwan," *Management Research News*, 30 (2), 115-132.

Medina, C. & Rufin, R. (2009). "The Mediating Effect of Innovation in the Relationship between Retailers, Strategic Orientations and Performance," *International Journal of Retail and Distribution Management*, 37 (7), 629-655.

M. Mohd Rosli and Syamsuriana S. (2013). The Impact of Innovation on the Performance of Small and Medium Manufacturing Enterprises: Evidence from Malaysia. *Journal of Innovation Management in Small & Medium Enterprise*, Vol. 2013:1-16.

Njogu, T.W (2014).The Effect of Innovation on the Financial Performance of Small and Medium Enterprises in Nairobi County, Kenya. A Research Project Submitted in Partial Fulfillment of Requirement for the Award of the Degree of Master of Business Administration, School of Business, University of Nairobi.

Norman. (2008). *Entrepreneurship policy: Public Support for technology-based ventures* Likoping University Likoping Sweden.

Obeng, R. H. a. (2009). Entrepreneurship and innovation in Ghana:enterprising Africa. *Small Business Economics*, 32(3), 20.

Olughor, R. J. (2015). Effect of Innovation on the Performance of SMEs Organizations in Nigeria. *Management* 2015, 5(3): 90-95.

Prajogo, D. I., Laosirihongthong, T., Sohal, A. & Boon-itt, S. (2007). "Manufacturing Strategies and Innovation Performance in Newly Industrialised Countries," *Industrial Management & Data Systems*, 107 (1), 52-68.

Thornhill, S. (2006). "Knowledge, Innovation and Firm Performance in High- and Low-Technology Regimes," *Journal of Business Venturing*, 21, 687-703.

Trienekens, J., Uffelen, R., Debaire, J. & Omta, O. (2008). "Assessment of Innovation and Performance in the Fruit Chain: The Innovation-Performance Matrix," *British Food Journal*, 110 (1), 98-127.

Tuan, N., Nhan, N., Giang, P., and Ngoc, N. (2016). The Effects of Innovation on Firm Performance of Supporting Industries in Hanoi – Vietnam. *Journal of Industrial Engineering and Management*, 9(2): 413-431.

Ussahawanitchakit, Phapruek (2012). Administrative innovation, technical innovation, competitive advantage, competitive environment, and firm performance of electronics businesses in Thailand, *International Academy of Business and Economic*. 12(1).

Varis, M. & Littunen, H. (2010). "Types of Innovation, Sources of Information and Performance in Entrepreneurial SMEs," *European Journal of Innovation Management*, 13 (2), 128-154.

Vivero, R.L. (2002). The impact of process innovations on firm's productivity growth: the case of Spain. *Journal of Applied Economics*, 34 (8): 1007-1016.

Verhees, F. J. H. M. a. M., M.T.G. (2004). Market orientation, innovativeness, product innovation, and performance in small firms. *Journal of Small Business Management*, 42(2), 20.

Wan, D., Ong, C. H. & Lee, F. (2005). "Determinants of Firm Innovation in Singapore," *Technovation*, 25 (3), 261-8.

Wang, C. L. & Ahmed, P. K. (2004). "The Development and Validation of the Organizational Innovativeness Construct Using Confirmatory Factor Analysis," *European Journal of Innovation Management*, 7 (4), 303-13.

Westerberg. (2008). Entrepreneur characteristics and Management control. *Journal of Business and Entrepreneurship*, 20.

Zhang, J. & Duan, Y. (2010). "The Impact of Different Types of Market Orientation on Product Innovation Performance: Evidence from Chinese Manufacturers," *Management Decision*, 48 (6), 849-867.

Oke, A., Burke, G. & Myers, A. (2007). "Innovation Types and Performance In Growing UK SMEs," *International Journal of Operations and Production Management*, 27 (7), 735-753.

Langley, D. J., Pals, N. & Ort, J. R. (2005). "Adoption of Behaviour: Predicting Success for Major Innovations," *European Journal of Innovation Management*, 8 (1), 56-78.

Gunday, G., Ulusoy, G., Kilic, K., Alpkan, L. (2011). Effects of Innovation Types on Firm Performance. *International Journal of Production Economics*, 133(2):662-676.

Kotler, P., 1991. Principles of Marketing. Prentice Hall, NJ.

Johne, A., Davies, R., (2000). Innovation in medium-sized insurance companies: how marketing adds Value. *International Journal of Bank Marketing*, 18 (1) 6-14.

Otero-Neira, C., Lindman, M. T. & Fernández, M. J. (2009). "Innovation and Performance in SME Furniture Industries: An International Comparative Case Study," *Marketing Intelligence & Planning*, 27 (2), 216-232.

Sandvik, I. L. & Sandvik, K. (2003). "The Impact of Market Orientation on Product Innovativeness and Business Performance," *International Journal of Research in Marketing*, 20 (4), 255-376.

Varis, M. and Littunen, H. (2010). "Types of Innovation, Sources of Information and Performance in Entrepreneurial SMEs," *European Journal of Innovation Management*, 13 (2), 128-154.

Mensah, F.B. and Acquah, I.S.K. (2015). The Effect of Innovation Types on the Performance of Small and Medium Sized enterprise in the Sekondi-Takoradi Metropolis. *Archives of Business Research*, 3(3):77:98.

Terziovski, M. (2010). Innovation practice and its performance implications in Small and Medium Enterprises (SMEs) in the Manufacturing Sector: A resource-based view. *Strategic Management Journal*, 31 (8), 892-902.

Van Auken, H., Madrid Guijarro, A., and Garcia Perez de Lema, D. (2008). Innovation and Performance in Spanish Manufacturing SMEs. *International Journal of Entrepreneurship and Innovation Management*, 8 (1): 36-56.

Carol, Y. and Marvis, Y. (2007). Does Innovation Lead to Performance? An empirical study of SMEs in Taiwan. *Management Research News*, 30 (2), 115-132.

Calontone, R., Cavusgil, s., and Zhao, Y. (2002). Learning Orientation, Firm Innovation Capability, and Firm Performance. *Industrial Marketing Management*, 31 (6), 515-524.

Garrido, M. J. and Camarero, C. (2010). Assessing the impact of organizational learning and innovation on performance in cultural organizations, *International Journal of Nonprofits and Voluntary Sector Marketing*, pp. 215-232.

Della, T. E. and Solari, L. (2008). Organizational Innovations and Firm Performance. Evidences From the Case of Medium-Sized Milanese Firms. Paper prepared for the XXIII National Conference of Labour Economics, Facoltà di Economia – Università degli studi di Brescia, Brescia, 11-12 September 2008.

Gerba, Y.T. and Viswanadham, P (2016). Performance measurement of small scale enterprises: Review of theoretical and empirical literature. *International Journal of Applied Research*, 2(3): 531-535.

Murphy, G.B., Trailer, J.W., & Hill, R.C. (1996). Measuring performance in entrepreneurship research. *Journal of Business Venturing*, 36(1), 15-23.

Sohn, S.Y., Joo, Y.G., & Han, H.K. (2007). Structural equation model for the evaluation of national funding on R&D project of SMEs in consideration with MBNQA criteria. *Evaluation and Program Planning*, 30(1), 10-20.

Wolff, J.A., & Pett, T.L. (2006). Small firm performance: Modeling the role of product and process improvements. *Journal of Small Business Management*, 44(2), 268-284.

Carter S, Jones-Evans D. *Enterprise and Small Business: Principles, Practice and Policy*. 1st Edn., Financial Times, Harlow, ISBN-10:0201398524, 2000, 512.

Gebreeyesus, M (2007). Growth of Micro-Enterprises: Empirical evidence from Ethiopia, Ethiopian Development Research Institute (EDRI), February, 2007.

Emma Wood H. The internal predictors of business performance in small firms, *Journal of Small Business and Enterprise Development*. 2006; 13(3):441-453.

Chittithaworn Chuthamas, Md. Aminul Islam, Thiyada Keawchana, Dayang Hasliza Muhd Yusuf. (2011). Factors Affecting Business Success of Small & Medium Enterprises (SMEs) in Thailand, *Asian Social Science*, 7(5):180-190.

Jarvis, R., Curran, J., Kitching, J., and Lightfoot, G.(2000). The use of quantitative and qualitative criteria in the measurement of performance in small firms. *Journal of Small Business and Enterprise Development*, 7(2):123-134.

Kline, p. (2000). *The handbook of psychological testing* (2nd ed.). pp.13. London:Routledge .

Tavakol M, Dennick R. (2011). Making sense of Cronbach's alpha. *Int J Med Educ.*;2:53-55.

George, D., & Mallery, P. (2003). *SPSS for Windows step by step: A simple guide and reference 11.0 update (4thed.)*. Boston: Allyn & Bacon