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PRODUCT INNOVATION AND SUSTAINABILITY OF MANUFACTURING FIRMS IN SOUTH EAST ZONE OF NIGERIA

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Abstract

The researchers have done justice by examining the relationship between product innovation and sustainability of manufacturing firms in south east zone of Nigeria. Product innovation was seen as the independent variable as sustainability is the dependent variable with its parameters as efficiency, market competitiveness and customer retention. The study adopted the use of survey research. Data for the study was collected from the primary source as the questionnaire was the major instrument used to generate the data. The study employed the use of regression analysis and the findings showed that there is significant relationship between product innovation and efficiency of manufacturing firms, there is significant relationship between product innovation and market competitiveness of manufacturing firms, also that there is a significant relationship between product innovation and customer retention of manufacturing firms. Based on the findings the study recommends among others that Firms that are endowed with resources to improve their innovative capabilities could expect a more significant improvement of their production and market performance, if they encourage and implement a high level of innovation activities.

Keywords: *Product innovation, sustainability, efficiency, market competitiveness, customer retention*

Introduction

Innovation research has advanced significantly in recent years. Demircioglu, (2016). in Schumpeter (1934) defined innovation as a new combination of existing factors in any of five ways: new products, new processes, new markets, new sources of supply, and new industry organization. Firm success is said to be dependent on innovation. According to Harper and Becker (2013), innovation resulted in considerable change, preferably an improvement in the real product, process, or service that outweighed the impact of earlier accomplishments; these writers also stated that innovation promoted sustainable corporate management.

Product innovation is the one that allows a better product to be offer than the ones currently on the market, in the sense that it offers more functions or performs better (Meeus, 2006). Through product innovation, the company can gain a competitive advantage by differentiating its production and increasing the quality and variety of goods that allow it to grow demand and open new growth opportunities (Maier, 2013). Product innovation refers to the development of goods or services with characteristics or intentions of use that differ significantly from previous products made by the enterprise (Olaru, 2016). One of the four strategic options when planning their product or market development strategies is to develop a new product (Maier, 2014).

Becker (2013) defined sustainable business management as "sustainable business management that recognizes its embededness in social, environmental, and economic systems and focuses on management and relationships to meet the environmental, social, and economic requirements of many stakeholders in its networks." Management has recently paid increased attention to innovation for sustainable business management, as innovation is increasingly recognized as an important means of contributing to sustainability.

Statement of the Problem

The process of innovation is not always smooth. It often requires a specific environment to be in place so that the people involved are encouraged, as well as enabled, to generate ideas freely, ideas that can truly propel project forward. Product Innovation is a major factor in terms of organizational growth and success. Generating a culture of product innovation in your company is a critical initiative today but despite this, many businesses combat internal challenges that slow the innovation process.

There has been significant growth with respect to investment and business development in the country, and this cuts across all areas of the Nigerian economy; E-commerce, mobile technology, fintech start-ups among others. Despite the many possibilities and potentials in the Nigerian market, not so many new businesses are able to scale through the fundamental stage, and as such are either forced to relocate or perhaps fold up, if they don’t end up being purchased by a third-party company.

Zahra (2007) and Colquitt (2010) noted that innovation may be a risky investment; developing and launching new products and/or services is necessary for firm survival and sustainability, but these are costly business processes. Delgado (2009) argued that the positive effects of innovation, particularly product innovation, may be exaggerated, whereas the potential negative effects are typically ignored or underemphasized.

Given this assertion the researcher has been able to find enough studies on this area of research especially as it applies to the geographical scope of this study. It becomes necessary that the manner in which product innovation assists sustainable business management must be investigated to gain greater and deeper insights for organizations’ managers.

Objectives of the study

The general objective of this study is to examine product innovation and organizational sustainability. The specific objectives are;

1. To examine the relationship between product innovation and the efficiency of manufacturing firms in south east zone.
2. To determine the relationship between product innovation and market competitiveness of manufacturing firms in south east zone.
3. To examine the relationship between product innovation and customer retention of manufacturing firms in south east zone.

Hypotheses

The study therefore, formulates these hypotheses in their null form;

Ho_1: There is no significant relationship between product innovation and the efficiency of manufacturing firms in south east zone.

Ho_2: There is no significant relationship between product innovation and market competitiveness of manufacturing firms in south east zone.

Ho_3: Product innovation does not significantly relate to customer retention of manufacturing firms in south east zone.

Scope of the Study

The content scope of this study identifies the depth of this study and the parameters within which the study operated. The study examined the relationship between product innovation and organizational sustainability. Product Innovation in this study is the independent variable and was used as a single construct and organizational sustainability is the dependent variable. The parameters of organizational sustainability that was used in this study are; efficiency, market competitiveness and customer retention. The study would determine the extent of relationship that exists between these two variables i.e (dependent and independent variables).

The geographic scope of this study is the areas which the study is about to study. In this context, the geographic scope examined the five states which the study intends to cover as well ascertain the manufacturing and production firms that would be studied. The study concentrates on selected manufacturing firms in south east zone. The manufacturing firms selected by the study are; PZ cusson in Abia state, Consolidated breweries in Imo State, Prime Ledger beer in Anambra State, Nigeria Bottling Company (NBC) in Enugu and Nigeria Breweries Plc in Ebony State.

The unit scope of this study concentrates on the management and staff of the selected firms

Review of Related Literature

Operational Conceptual Framework

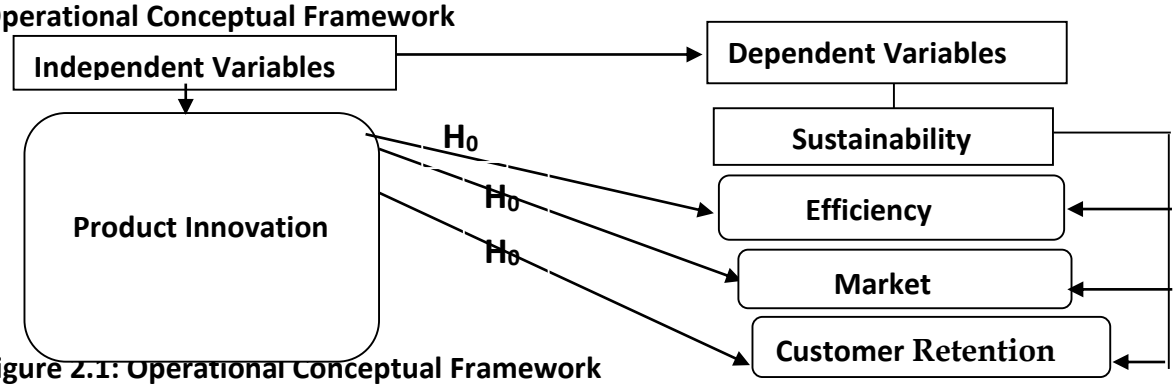

Figure 2.1: Operational Conceptual Framework
Source: From the researcher's desk, 2023

Product Innovation:

A product in the traditional sense is any tangible physical good or raw material, ranging extensively from everyday products (e.g. toothpaste) to industrial goods (e.g. steel pipes) (Gao, Yepes, Pellicer, 2017). At the early stage of the product lifecycle, there is no prevalent design in the market and products are subject to major changes. Therefore, a firm must constantly improve on an innovation to meet customer demand, expand the customer base and build up greater market advantages. There is a recent trend among service companies (e.g. insurers, financial firms, telecommunications carriers and other professional service firms) to promote their services as "products". One case in point is the successful launch of Alipay, an online financing product, by Ant Financial Company in 2004, which is trying to bring inclusive financial services to the world. As described by Fortune's Annual Change the World List 2017, Ant Financials' Ant Forest app has encouraged 450 million users in China to do just that in fulfilment of parent Alibaba Group's pledge to use financial technology to tackle climate change. Users earn points toward planting virtual trees by adopting earth-friendly habits (Demircioglu, 2016).

Organizational Sustainability

Sustainability is "an economic, social, and ecological concept (Boudreau and Ramstad 2005). It is intended to be a means of configuring civilisation and human activity so that society and its members are able to meet their needs and express their greatest potential in the present, while preserving bio-diversity and planning and acting for the ability to maintain these ideals indefinitely. Sustainability is providing for the best for people and the environment both now and in the indefinite future (Colbert and Kurucz, 2012).

The Charter of the Sustainability Committee created by the Board of Directors at Ford focuses on sustainable growth, which it defines as "the ability to meet the needs of present customers while taking into account the needs of future generations" (Ford, 2012). Sustainable growth encompasses a business model that creates value consistent with the long- term preservation and enhancement of financial, environmental and social capital. According to the Chartered Institute of Personnel and Development (CIPD, 2012), the essence of sustainability in

an organizational context is "the principle of enhancing the societal, environmental and economic systems within which a business operates".

This introduces the concept of a three-way focus for organizations striving for sustainability. This is reflected also by (Colbert and Kurucz, 2007), who state that sustainability "implies a simultaneous focus on economic, social, and environmental performance". Colbert (2012) writes that the paradigm of 'sustainable development' rests on three conceptual pillars. These pillars are 'economic sustainability', 'social sustainability', and 'environmental sustainability' Economic sustainability, by way of growth, development, and productivity, has guided conventional development science in the past. Market allocation of resources, sustained levels of growth and consumption, an assumption that natural resources are unlimited and a belief that economic growth will 'trickle down' to the poor have been its hallmarks. 'Sustainable development' expands development's concern with monetary capital to consider natural, social and human capital. Restraint upon economic growth and consumption (Colbert, 2012). Social sustainability encompasses notions of equity, empowerment, accessibility, participation, sharing, cultural identity, and institutional stability (Beadle and Moore, 2006). Economic, social, and environmental 'sustainability' form elements of a dynamic system. They cannot be pursued in isolation for 'sustainable development' to flourish.

The Indicators of Organizational Sustainability

Sustainability has different types which are social sustainability, environmental sustainability, Institutional sustainability as well as economic sustainability. However, this study concentrates on the economic aspect of organizational sustainability. The economic aspect of sustainability is made up of the following indicators which the study examines which are; Efficiency, Market Competitiveness and Customer retention.

(a) Efficiency

In order to understand the concept of organizational efficiency, it is important to comprehend the concept of efficiency in general, first. In the Australian Government Productivity Commission (2013) research report, the concept of efficiency was theorized as having three dimensions namely productive, allocative and dynamic efficiency. The Commission defines productive efficiency as one where goods and services are produced at the lowest possible cost. Productive efficiency incorporates technical efficiency conceptualised as the extent to which it is technically feasible to reduce any input without decreasing the output, and without increasing any other input. Organizational efficiency is a crucial key performance area in today's economic management systems. In the Australian Productivity Commission Report (2013), it was noted that, improving economic efficiency involves reducing costs of production per unit of output, matching the supply of goods and services to those most desired individuals.

(b) Market Competitiveness:

In the current dynamic economic environment, competitiveness is a critical factor for a firm's survival, growth and success (Oral & Kettani, 2009). Intense competition requires firms to be competitive for survival. Firms in developing countries need to enhance their competitiveness

to survive by surmounting the limitations in their local markets to thrive. A thriving organization due to their contribution will also have an impact on the competitiveness of economies (Liargovas and Skandalis, 2015). Despite the fact that there is agreement and acknowledgement on the need and importance of competitiveness for firms and economies, a concise definition of the concept still remains elusive. Competitiveness is a multifaceted and relative concept that makes it complex (Szerb, 2009). This has led to broad and varied definitions of competitiveness based on the school of thought ascribed to.

Pedraza (2014) defines competitiveness as "the ability of firms to sell products that meet market requirements while ensuring profits overtime for the firm to enable it survive and thrive in competition". The relativeness of competitiveness makes it difficult to come up with a definitive conclusive measure. However there seems to be consensus on several factors/ measures that can be used to measure competitiveness. Competitiveness is a function of several firm factors that are interrelated and include productivity, market share, efficiency, efficiency, product range, value creation and customer satisfaction. Sources of firm competitiveness include product differentiation, product/ service quality and variety, novelty, process efficiency, cost reduction, adoption of technology and export attractiveness (Pedraza, 2014).

(c) Customer Retention:

Organizations should be highly motivated to make certain its customers are satisfied. If they are not, the brand once more becomes vulnerable (Mercer, 2008). Customers are retained when they are satisfied. Customer satisfaction is the customer's overall feeling of contentment with a customer's interaction with the organization. Customer satisfaction in services has been defined as the degree to which service performance meets or exceeds the customer's expectations (Kumar, 2012; Lombard, 2009; Santouridis & Trivellas, 2010). Hui and Zheng (2010) defined satisfaction as an evaluative judgment of a specific transaction resulting from perceived quality. Danesh, Nasab and Ling (2012) defined customer retention as the future propensity of a customer to stay with the service provider. According to them, customer satisfaction is not the only variable that influences the retention of customers. Ramakrishnan, (2006) defined customer retention as the marketing goal of preventing a customer from switching to another competitor. Edward and Sahadev (2011) stated that "customer retention indicates customer's intention to repurchase a service from the service provider".

They used customer retention as a measure of the customer's intention to stay loyal to the service provider. For them, service quality and customer satisfaction are important antecedents of customer retention. In their zeal to grow, many companies focus almost exclusively on entering new markets, introducing new products/services, and acquiring new customers. However, these companies often have a "leaky bucket" as they add new customers, old ones' defect from the firm. Some studies report the average retention rate for U.S. companies Is about 80%.21 Put differently, on average, 20% of a company's customers' defect every year (Sunil & Lehman, 2009). This means that, roughly speaking, the average company loses the equivalent of its entire customer base in about five years.

Theoretical Framework

Theory of the Innovative Firm

This theory was put forward by William Lazonick an economist to help explain superior performance in the wake of imperfect markets. According to the theory the function of a firm is

to transform productive resources into goods and services that can be commercialized. A firm can accomplishes this by engaging in in innovation. Accordingly, superior economic performance result from innovative enterprises creates products of higher quality at lower cost (Lazonick, 2013). Innovative firms have the ability to transforms productive resources into higher quality, lower cost goods and services translating to a gain for the customers and other participants in the economy (Lee, & Johnson, 2017). According to the theory, a firm is able to gain and sustain its competitiveness to compete effectively in its industry through innovation.

Such firms engage in innovation establish or sustain their competitiveness. An innovative firm may also innovate to retain its market share against an innovative competitor or to gain a strategic market position in the market (Porter 1990). Innovative firms are able to compete, through innovation as opposed to varying price and quantity.

This theory becomes relevant even as innovation economics posits that continual increase of inputs in the production process is no longer sufficient to explain the increase of output hence can be credited to a firm's innovation activities (Lee, & Johnson, 2017).

Innovative firms become competitive by investing in quality and quantity productive resources. This enable the firms to develop superior products, services and more efficient methods i.e. production, organizational and marketing methods (Lee, & Johnson, 2017). In the short- term, an innovating firm is not dictated by an increase in cost but produces high quality products leading to a decrease in the unit cost with an increase in the market share (Lee, & Johnson, 2017), Innovation enables the innovating firm to progressively penetrate various market segments based on the different economic power of the buyers. This provides a base upon which the firms can develop capabilities to access other market segments (Lazonic, 2013)

The innovative firm is also able to use innovation to achieve differentiation by offering different products and services to customers that are unique. In this way innovation strategy enables firms to compete. Continuous improvement of products, processes and methods as in innovation leads to differentiation which results in increased firm sustainability in innovative firms (Lee, & Johnson, 2017)

This theory was useful in explaining the role of innovation and how it leads to firm sustainability through the production of superior products and services in the market. Innovation also leads to differentiation an important factor in competitiveness that leads to new unique products, processes, markets and organizational methods. This helps firm's deal with competition. The theory affirms the role of innovation in firm sustainability.

Empirical Review

Ukpong, Kingsley, and Uforo. (2022) examine the relationship between business innovation on organizational sustainability in Nigeria. Survey research design was adopted for the study. Data collected were analysed using simple percentage and Pearson Product Moment Correlation. Results show that there is a significant correlation between variables of business innovation such as product innovation, process innovation and marketing innovation and organizational sustainability variables of environmental, social and economic sustainability among entrepreneurs in Akwa Ibom State.

The study by Winarti., Sarkum., & Halim, (2021), Investigates the effect of product innovation attributes (Relative advantage, Complexity, Compatibility, Trialability, and observability) on customer satisfaction and loyalty with experience as a moderator between

customer satisfaction and brand loyalty. This study uses quantitative methods, using the help of SPSS 23, and uses a path analysis approach to determine the relationship between variables. Based on a sample of 100 people living in the Labuhan Batu Regency area, it was found that Relative advantage, Complexity, Compatibility, Trialability, and Observability had a positive effect on customer satisfaction. These results also found that the product innovation attribute was a major predictor of customer satisfaction. The results of the study reveal that loyal customers use smartphone services in accordance with and consistent with the given perceptions. In addition, the research results illustrate that customer satisfaction has a significant effect on brand loyalty.

Rahayu, Asim, Robert (2020) examined the effect of product quality and product innovation on consumer loyalty in Fizzul putra mandiri convection, Jombang regency. This research is a quantitative study, while the population in this study are consumers from the Fizzul Putra Mandiri Convection Jombang regency, which are included in the population of regular (customers) in which the sample to be taken is known with certainty, resulting as many as 85 regular consumers. The data was obtained using a questionnaire; the data was processed using the Structural Equation Model (SEM) or SmartPLS 3 software. The results reveal that product quality has an insignificant positive effect on consumer loyalty, which means that the higher the product quality, the higher the consumer loyalty, but the increase in consumer loyalty caused by product quality is not significant. Therefore, increasing product quality only slightly increases consumer loyalty, decreasing product quality only slightly decreases consumer loyalty. Meanwhile, product innovation has a positive and significant effect on consumer loyalty, which means the higher the product innovation, the higher the consumer loyalty and vice versa. Besides that, product quality has a positive and significant effect on product innovation, which means that the higher the product quality, the higher the product innovation, and the lower the product quality will result the lower the product innovation as well.

Roberts (2019) examined the effects of product innovativeness on the sustainable efficiency of firms with a longitudinal research in the U.S. pharmaceutical industry. Correlation coefficient was used as a statistical tool. Based on the analysis, he found support for the expected relationship between high product innovation propensity and sustained superior efficiency.

AlBatainey Mohammed,(2018) determine the influence of innovation on SMEs efficiency where 142 firms were selected as a case study in Hassan industrial city. Results confirmed that product innovation positively impacts on firm' performance.

Chukwu and Enudu (2018) investigated the impact of product packaging on consumer buying behavior. The data collected from the questionnaire instrument were analyzed using percentages and Multiple Regression. The research findings show that a significant and positive relationship lies between the independent variable, attractive packaging, value and quality of packaging, impulse purchasing and the dependent variable consumer buying behavior. A negative relationship exists between the independent variable shabby packaging and the dependent variable consumer purchasing behavior.

Maldonado (2018) undertakes a study in order to examine the consequence of technology capabilities on the quality of small businesses (SMEs) in Mexico's regional development and emerging economy. The methodology used was quantitative and hypotheses were tested by Modeling of formal equations (SEM). Data were collected and collected by surveying questionnaires answered through 308 firms situated across the Mexican State of Aguascalientes. The outcomes from the study stated that product, marketing development and

leadership innovation affect a favourable and substantial impact on Mexican SMEs ' company return.

The study by Benjamin Diaw & Gideon Asare (2018) examines the effect of innovation on customer satisfaction in the telecommunication service industry which is highly competitive in Ghana. Data were collected using questionnaire to 150 customers of MTN, Vodafone, Tigo-Airtel, Glo, and Expresso. Data analysis tools were employed to assess the relationship between variables (dependent and independent). A significant positive relationship was found between innovation and customer satisfaction and retention. The study also found that marketing innovations introduced in recent years has been a major determinant in customer satisfaction and retention.

Abdiaziz (2018) investigated the effect of process innovation on the performance of commercial banks in Kenya. Management Capacity, Systems, Product Innovation, and Capital Outlay were the variables used as strategic resources. A descriptive research design was used to gather the information needed to achieve the objectives. The target population was 261 management employees at Equity Bank Limited, Kenya in the Central, Eastern and Nairobi regions. A self-administered questionnaire was used to collect the data. The data for the study were analysed using descriptive and inferential statistics and presented in tables, charts, means and percentages. The study found out that process innovation significantly influenced the organizational performance of Equity bank. Product innovation significantly influenced the organizational performance of Equity bank. Capital outlay significantly influenced the organizational performance of Equity bank.

Agnes & Peter (2018) investigated the relationship between marketing innovation and firm performance of companies listed on the Nairobi securities exchange, Kenya. The study made use of a descriptive research design. The population comprised 62 companies listed on Nairobi Securities Exchange. The targeted respondents were managers in charge of finance and business strategy. A structured Linkert questionnaire anchored on a five-point scale was used to collect primary data. Simple linear regression analysis was used in hypothesis testing. The results revealed that marketing innovation significantly affect firm performance.

Methodology

The research method adopted in this study are under the following subheadings: research design, population of study and sample size chosen, source of data, sampling technique and research instrument, validity and reliability of research instrument and method of data analysis.

Research Design

The descriptive research design is thought to be ideal for this study since it allows the researcher to obtain the essential and relevant data for the study's success.

Population of the Study

From the Human Resource Departments of the five manufacturing firms which cover the five states of the south east zone in Nigeria; PZ Cusson Plc Abia state has ($N_1 = 45$), Consolidated breweries in Imo State has ($N_2 = 42$), Prime Ledger beer in Anambra state has ($N_3 = 38$), Nigeria bottling company in Enugu has ($N_4 = 37$), while Nigeria breweries in Ebony has ($N_5 = 38$) as the population size of the management and senior staff of the firms which has a total of 200 respondents.

Sample Size Determination

The sample of the management and staff of the firm is determined by the use of Taro Yamene formula, in Alugbuo (2005) as thus:

$$n = \frac{N}{1+N(e)^2}$$

Where: n = Sample size
N = Population size (200)
e = Allowable error (0.05)
1= Constant figure

Given that the researcher has chosen 5% or 0.05 as a level of significance the sample size can be calculated thus:

There: $n = \frac{200}{1+200(0.05)^2}$

$$n = \frac{200}{1+200(0.0025)}$$

$$n = \frac{200}{1+0.5}$$

$$n = \frac{200}{1.5} = 133$$

Hence, the total sample size to be used in this study becomes 133 respondents. Base on the calculation, the sample size is **133 respondents**

For management and staff of the selected firms, Bowley's formula was employed as follows:

$$n_h = \frac{nN_h}{N}$$

where

N_h = number allotted to each stratum
n = Sample size
n_h = population of each stratum
N = Population

PZ Cusson Abia state = $n_1 = \frac{nN_1}{N}$ $n_1 = \frac{133\times 45}{200} \approx 30$

Consolidated breweries Imo State= $n_2 = \frac{nN_2}{N}$ $n_2 = \frac{133\times 42}{200} \approx 28$

Prime Ledger beer Anambra state= $n_3 = \frac{nN_3}{N}$ $n_3 = \frac{133\times 38}{200} \approx 25$

Nigeria bottling Company Plc Enugu State = $n_3 = \frac{nN_3}{N}$ $n_3 = \frac{133\times 37}{200} \approx 25$

Nigeria Breweries Plc Ebony state = $n_3 = \frac{nN_3}{N}$ $n_3 = \frac{133 \times 38}{200} \approx 25$

S/N	Names of Selected Firms	Proportion to the total sample size
1	PZ Cusson Abia State	30
2	Consolidated Breweries Imo State	28
3	Prime Ledger beer Anambra State	25
4	Nigeria Bottling Company Plc Enugu State	25
5	Nigeria Breweries Plc Ebony State	25
	Total	**133 Respondents**

Sampling Technique

Convenience sampling method was employed to select the five organizations for the study. This method was used for reasons of accessibility and possession of the appropriate characteristics for the study. The selection of the samples was done using simple random techniques for both the staff and management. Simple random technique accords all respondents equal probability of being sampled.

Research Instrument

The research instrument used in collecting the relevant information/data for this study is a structured questionnaire. The questionnaire was divided into two parts (sections A and B). Section A contains the socio-demographic variables of the expected respondents such as gender, age, sex, educational qualifications, job status, and work experience of the respondents, among others.

The second segment of the questionnaire (Section B3 contain the necessary Product Innovation as a single variable and their contents and their likely effects on the organizational sustainability in the areas of efficiency, Market competitiveness and customer retention, and other necessary and required information.

Validity of the Instrument

Creswell (2014) states that there are three forms of validity, thus: content, concurrent and construct validity. Content validity involves the review of each questionnaire items to ensure that they measure what is ought to measure. To ensure content validity in this study, management professionals were given the questionnaires for a review so that errors, if any, were identified and corrections made/effected before the final production and distribution to the respondents.

Reliability of the Instrument

Reliability in the words of Anyanwu (2016) is the ability of the measuring instrument to yield similar results when applied to the same situation at different times. To ascertain its consistency, the instrument was subjected to a Cronbach alpha test and coefficient of reliability of above 0.5 was obtained which showed that the instrument was reliable.

Method of Data Analysis

The study employed the use of regression analysis. Basically, a **simple regression analysis** is a statistical tool that is used in the quantification of the relationship between a single independent variable and a single dependent variable based on observations that have been carried out in the past. The simple linear regression model can be expressed in the same value as the **simple regression formula**. As thus;

$$y = \beta_0 + \beta_1 X + \varepsilon.$$

In the simple linear regression model, we consider the modelling between the one independent variable and the dependent variable.

Usually, the model is typically called a simple linear regression model when there is just a single independent variable in the linear regression model. Keep in mind that it becomes a multiple linear regression model when there are more than one independent variables.

In the simple linear regression model, y refers to the study or dependent variable and X is the explanatory or independent variable. The expressions β0 and β1 are the parameters of the linear regression model. The β0 parameter is regarded as an intercept term, while the β1 parameter is regarded as the slope parameter. The general term for these parameters is known as regression coefficients.

Data Presentation, Analysis and Interpretation of Result

Data presentation and analysis

Section A: Demographic data

Table 4.1: Distribution of Questionnaires

S/N	Department	Questionnaire Distributed	Questionnaire Returned	% of Questionnaire Returned
PZ Cusson Abia State	Marketing	15	15	100%
	Management	10	10	100%
	Accounting	5	5	100%
Consolidated Breweries Imo State	Marketing	14	14	100%
	Management	8	8	100%
	Accounting	6	6	100%
Prime Ledger beer Anambra State	Marketing	10	10	100%
	Management	5	5	100%
	Accounting	5	5	100%

Nigeria Bottling Company Plc Enugu State	Marketing	10	10	100%
	Management	5	5	100%
	Accounting	5	5	100%
Nigeria Breweries Plc Ebony State	Marketing	10	10	100%
	Management	5	5	100%
	Accounting	5	5	100%
Total		133	133	100%

Source: field survey 2023

The table 4.1 shows that, of the questionnaires distributed to the respondent 133 representing 100% of the questionnaires distributed were duly filled and returned by the respondents.

Age distribution of respondent

Table 4.2: Age of respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	15-25	46	34.6	34.6	79.7
	26-35	60	45.1	45.1	100
	36 above	27	20.3	20.3	
	Total	133	100.0	100.0	

Source: SPSS output

The above table shows that 46 respondents representing 34.6% of the respondent lies between the age bracket of 15-25, 60 respondents are representing 45.1% of the respondent lies between the age bracket of 26-35, 27respondents representing 20.3% of the respondent lies between the age bracket of 36 above.

Gender distribution of respondent

Table 4.3: Gender of respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	male	73	54.5	54.9	54.9
	female	60	44.8	45.1	100.0
	Total	133	100.0	100.0	
Total		133	100.0		

Source: field survey, 2023

The table above shows that the 73 representing 54.5% of the respondents are male while 60 respondents representing 44.8% were female across the region.

Diagnostic test

Test for normality of the data

Table 4.4 Normality test

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
PRODUCT_INNOVATION	.133	133	.000	.963	133	.001
INNOVATION_EFFICIENCY	.138	133	.000	.965	133	.002
INNOVATION_MARKET_COMPETITIVENESS	.120	133	.000	.959	133	.000
INNOVATION_CUSTOMER_RETENTION	.121	133	.000	.963	133	.001

a. Lilliefors Significance Correction

In testing for normality of our data set, we employ Kolmogorov-Smirnov decision rule since our sample size is greater than 100. The above result shows that our variables are statistically significant at 5% critical level showing that variables are not normally distributed. This implies that the appropriate method to analyse variables of the nature is ordinal regression analysis since the variable are not normally distributed.

Test of goodness of fit

Table 4.5 Goodness of Fit

Variable	Chi-Square	Df	Sig.
Model 1	39093.489	790	.054
Model 2	12254.387	729	.450
Model 3	6075.063	729	.034

Source: SPSS result output 2023

The test for goodness of fit as revealed in the table above shows that the model is well fitted, since the probability value is greater than 5% level of significance. This implies that the model has a good fit and the result of the parameter estimate is reliable for decision making.

Pseudo R-square test

Table 4.6 Pseudo R-square

		Pseudo R-Square	**Pseudo R-Square**	**Pseudo R-Square**

Model 1	Cox and Snell	.643	.798	.917
Model 2	Nagelkerke	.648	.805	.925
Model 3	McFadden	.217	.343	.533

Source: SPSS result output 2023

Pseudo R^2 test also known as coefficient of determination is obtained as 65%, 81% and 92% which is greater 50%. This implies that the variables explain 65, 81, and 92 percent of the model while the difference is taken care of by stochastic variable.

Presentation of ordinal regression estimate

Table 4.7 Ordinal regression estimate

	Variables (efficiency of manufacturing firm)	estimate	Std. Error	Wald	df	Sig.	95% Confidence Interval	
Model 1	PRODUCT_INNOVATION	3.837	1.105	12.056	1	.001	1.671	6.004

Source: SPSS result output 2023

Table 4.7.1 Ordinal regression estimate

	Variables (market competitiveness of manufacturing firms)	Estimate	Std. Error	Wald	df	Sig.	95% Confidence Interval	
Model 2	PRODUCT_INNOVATION	8.897	1.307	46.359	1	.000	6.336	11.458

Source: SPSS result output 2023

Table 4.7.2 Ordinal regression estimate

	Variables (customer retention of manufacturing firms**)**	estimate	Std. Error	Wald	df	Sig.	95% Confidence Interval	
Model 3	PRODUCT_INNOVATION	7.477	1.354	30.514	1	.000	4.824	10.130

Source: SPSS result output 2023

Test of hypotheses

The hypotheses of the study were tested using the result presented in table 4.7, 4.7.1 and 4.7.2 for the three hypotheses respective.

Hypothesis One

Ho_1: There is no significant relationship between product innovation and the efficiency of manufacturing firms in south east zone.

Interpretation

From table 4.7 the Prob-value of product innovation is obtained as 0.01 which are less than 0.05 critical value. We therefore reject the null hypothesis that there is no significant relationship between product innovation and efficiency of manufacturing firms and accept the alternative hypothesis that a relationship exists.

Hypothesis two

Ho_2: There is no significant relationship between product innovation and market competitiveness of manufacturing firms in south east zone.

Interpretation

From table 4.7.1 the Prob-value of product innovation is obtained as 0.000 which are less than 0.05 critical values. We therefore reject the null hypothesis that there is no significant relationship between product innovation and market competitiveness of manufacturing firms and accept the alternative hypothesis that a significant relationship exists

Hypothesis three

Ho_3: Product innovation does not significantly relate to customer retention of manufacturing firms in south east zone.

Interpretation

From table 4.7.2 the Prob-value of product innovation is obtained as 0.000 which are less than 0.05 critical values. We therefore reject the null hypothesis that there is no significant relationship between product innovation and customer retention of manufacturing firms and accept the alternative hypothesis that a significant relationship exists.

Discussion of Findings

The study on product innovation and sustainability of manufacturing firms in south east region of Nigeria has been extensively analyzed. The study discussed the following findings.
Hypotheses one, two and three were tested to determine the degree of relationship product innovation has on efficiency, market competitiveness and customer retention. The analysis of the first hypothesis showed that significant relationship exist between innovation and the efficiency of manufacturing firms in south east zone. From the Prob-value of product innovation is obtained as 0.01 which is less than 0.05 critical values which automatically rejects the null hypothesis and the alternative hypothesis accepted. The findings as was obtained from the second hypothesis showed that there is a significant relationship between product innovation and market competitiveness of manufacturing firms. The Prob-value of product innovation is obtained as 0.000 which is less than 0.05 critical values. The analysis obtained from testing the third hypothesis showed that there is a significant relationship between product innovation and customer retention of manufacturing firms. These responses are in agreement with the studies

by (Ukpong, Kingsley, and Uforo 2022) examined the relationship between business innovation on organizational sustainability in Nigeria. Results show that there is a significant correlation between variables of business innovation such as product innovation, process innovation and marketing innovation and organizational sustainability variables of environmental, social and economic sustainability among entrepreneurs in Akwa Ibom State. In a similar manner (Winarti., Sarkum., & Halim, 2021) Investigated the effect of product innovation attributes (Relative advantage, Complexity, Compatibility, Trialability, and observability) on customer satisfaction and loyalty with experience as a moderator between customer satisfaction and brand loyalty. The results found that product innovation attribute was a major predictor of customer satisfaction.

Summary of Findings, Conclusion and Recommendations

Summary of Findings

The study summarized the findings based on the analyses from the hypotheses as follows;

(i) There is significant relationship between product innovation and efficiency of manufacturing firms.

(ii) There is significant relationship between product innovation and market competitiveness of manufacturing firms.

(iii) There is a significant relationship between product innovation and customer retention of manufacturing firms.

Conclusion

The study concludes that a significant relationship exit between product innovation and efficiency, market competitiveness and customer retention

Recommendations

Based on the findings and conclusion, the study recommends as follows;

(i) First, managers of firms should put additional emphasis on innovations as they are important instruments for achieving sustainable competitive power. Improved innovative performance is contingent upon the degree of implementation of innovations.

(ii) Firms that are endowed with resources to improve their innovative capabilities could expect a more significant improvement of their production and market performance, if they encourage and implement a high level of innovation activities.

(iii) It is also observed that product innovation enhances customers retention as such managers of organizations should ensure that they improve on the innovation of their product as it retains their customers.

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