STRATEGIC INNOVATION AND SUSTAINABILITY OF PLASTIC MANUFACTURING FIRMS IN OGUN STATE, NIGERIA

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Abstract
This study determined the relationship that exists between Strategic innovation and sustainability of plastic manufacturing firms in Ogun State, Specifically, the study examined the nature of the relationship that exists between Product innovation and economic sustainability and technological innovation and environmental sustainability of plastic manufacturing firms in Ogun Sstate. Descriptive survey research design was employed with the use of structured questionnaire. This study was carried out in Two (2) reputable plastic manufacturing firms in Ogun state which are; Ceplas Plastic Limited Sagamu, Ogun state and Europlast Industries Limited, Ota, Ogun state. Five Hundrd and Fifty-Two questionnaire were administered. The entire population was adopted as the sample size in this study. The data generated for this study were analysed with appropriate statistical techniques. The techniques included frequency, percentages and mean score. The Objectives were analysed using Correlation Coefficient, the hypotheses where test at significance level of 0.05 was used to using Statistical Package for Social Sciences (SPSS) version 16. The study found out that there is a significant positive relationship between strategic innovation and sustainability of plastic manufacturing firms in Ogun State, Nigeria.

Key words: *Strategy, Innovation, Sustainability, Manufacturing, Firms, Business and Organisation*

Introduction

Strategic innovation has become relevant in business organisations as a result of the sector being characterised by competition. Hardly could we find any business activity today without one form of competition or the other. Every business will always desire to outwit its' competitors and remains relevant in its industry. However, not every business that competes survives and not all that survives maintain sustainability within the firm. Hence, it has become a general knowledge that the success of every business in the face of competition is determined by so many factors among which are; strategy and innovation. It is in this view that, Akintokunbo and Obom, (2021) and Iherobiem (2023) state that every organisation needs to strategize and innovate, as it helps the business to maintain its competitiveness, achieve sustainability, and obtain an

advantage over rivals. It therefore means that, for any strategy to be forceful, penetrating and relevant enough to compete favourably and aggressively, it has to be innovative and relevant, because a strategy that was very relevant yesterday may not be relevant today, while that which is relevant today may not be relevant tomorrow.

In the face of fierce competition, another major concern of management apart from being strategic and innovative, is the sustainability of those strategies and innovations in terms of; economy, environment and social. Businesses are not just about making profit but also about making positive impact to the society and the world at large. While firms are in operation and competing for survival, the impact of their activities (in the air, water and forest) are equally crucial. Environmental protection, economic prosperity and social equity are very important factors within the society in which every business operates. This study therefore determined the the relationship that exists between strategic innovation and sustainability of plastic manufacturing firms in Ogun State, Nigeria.

Statement of the Problem

Innovations and technological advancements have made product life cycle to become shorter, making it very difficult for products to complete their life cycle (Eyibio, Ehugbo, Abam, Obeten and Okorn, 2021) Consequently, businesses found it very difficult to compete aggressively, survive and sustain themselves within the industry. Hence, companies that are constantly inventing, on the other hand, seem to have a better chance of surviving. However, innovation initiatives sometimes fail and successful innovators have a hard time sustaining their performance. It is on this note that Laban and Deya (2019); Eyibio, Ehugbo, Abam, Obeten and Okorn (2021) stated that Innovations have also posed many challenges to firms and blue chip companies.

Objectives of the Study

The broad objective of this study is to determine the relationship that exists between Strategic innovation and sustainability of plastic manufacturing firms in Ogun, Nigeria. The specific objectives are to:

1. Examine the nature of the relationship that exists between Product innovation and economic sustainability of plastic manufacturing firms in South West Nigeria.

2. Ascertain the extent of the relationship that exists between technological innovation and environmental sustainability of plastic manufacturing firms in

South West Nigeria.

Litterature Review

Strategic Innovation

Kanyuga (2019) defined Strategic innovation as the implementation of new ideas involving significant changes in product design or packaging, product placement, product promotion, or pricing. Strategic innovation is a means that organizations can use to innovate in their value chain, establish new operating models, alter the rules of competition in their environment, and increase their competitive advantage, so as to obtain a fresh benefit. (Yin & Chang, 2022). Strategic innovation involves the creation of growth strategies, business models, new product categories, or services that change the competition and generate a significant new value for customers, consumers, and the corporation (Diaz-Carrion and Franco-Leal 2022; Li, Ren, Zhang, Li & Duan, 2020). Strategic innovation means that organizations can innovate in their value chain, establish new operating models, alter the rules of competition in their environment, and increase their competitive advantage, so as to obtain a fresh benefit (Yin & Chang, 2022).

Product Innovation

Celikyay and Adiguzel (2020) described product innovation as an innovation that involve the creation or enhancement of goods and services to meet changing customer needs or to offer entirely new solutions. It is about introducing novel features, designs, or functionalities that differentiate the product from competitors. Gault (2018) defines product innovation as a product, made available to potential users, that is new or significantly changed with respect to its characteristics or intended uses. While, Lee and Yoo, (2019) described Product innovation as a provider of differentiated competitiveness in terms of quality and function of the new products. It can also consist of the introduction of new products or further developments of existing ones, changing their characteristics. This is referred as product innovation (European Commission, 2016).

Technological Innovation

Celikyay and Adiguzel (2019) defined Technology innovation as openness to new ideas and the tendency to adopt new technology during the development of products. The OECD (2020; 2023), described technological innovation as an iterative process initiated by the perception of opportunity for a technology-based invention leading to the conception, development, production, commercialization and marketing of inventions.

Technological Innovation is the creation and implementation of new technologies or significant advancements in existing technologies to address challenges or create new opportunities. (Celikyayand Adiguzel, 2020). Technological innovations is about recruitment of a skilled workforce and acquisition of superior and advanced technological systems. (Ndunga, Njati & Rukangu, 2016).

Sustainability

Sustainability has been defined by different authors from different dimension. The most cited definition from business dimension was that presented at the World Commission on Environmental and Development (1978) as cited in Rahman, Abdullatiff and Abdulwahab (2022) as the development that meet today's need without compromising the ability of future generations to meet their own needs. Bom, Jorge, Ribeiro and Marto (2019) described Sustainability from three dimensions which are: Social; the act of incorporating concept of equity accessibility, cultural identity and institutional stability. Environmental; Involves preservation of national capital, ecosystem integrity, carrying capacity and biodiversity and financial sustainability; which implies economic feasibility while development moves towards environmental and social sustainability. Moshood (2020) Summarised Sustainability as broadly used concept to indicate programmes, projects, activities, initiatives and actions aimed at the preservation of a particular resource for a longer period. He therefore described Sustainability from four distinct areas known as the four pillars of sustainability which are: human, social, economic and environmental.

Economic Sustainability

According to Iherobiem (2023) this is a kind of sustainability that guaranteed economic progress. Erakpotobo, (2018) defined this as the efficient use of resources so as to have a long-termbenefit while minimizing the negative impact on resource utilization. According to the study by Ola, Khaled and Bassam, (2018), economic sustainability refers to making sure that economic welfare is provided with the future in mind. By doing this, they are able to advocate for the most effective and efficient approach to exploit and deploy the resources in that environment in order to achieve long-term profitability (Dina, Djoko & Agustina,2021). Aliu, Ogunode and Gbadamosi (2018) claimed that economic sustainability describes the benefit that an organization's stakeholders would experience as its profits rise.

Environmental Sustainability

Sadiq and Adegbie (2023) viewed environmental sustainability as the process of ensuring that the current operations of companies coexist with the environment in which they operate without endangering or destroying the environment. Adedeji and Eziyi (2019) noted that environmental sustainability also refers to the process of producing goods and services that meet the needs of people and other ecosystem inhabitants while preserving natural resources such as water, energy, and other resources. Phan and Phan (2018) described environmental sustainability entails safeguarding the environment's natural resources to ensure that people will continue to exist. Organizations should consider their long-term effects on the environment in addition to their short-term gains. They must therefore take into account a few elements and behaviors that, over time, will improve the environmental quality. Effective waste management, optimum use of natural resources, reduced usage of hazardous materials or land, and reduced air or noise pollution are all potential strategies to improve the quality of the environment (Das, 2001).

Theoretical Framework

Creative Destruction Theory

This study is anchored on Creative Destruction Theory. This Theory refers to the incessant product and process innovation mechanism by which new production units replace outdated ones. It was coined by Joseph Schumpeter (1934), who considered it ‘the essential fact about industry. At the industrial level, restructuring is characterized by countless decisions to create and destroy production arrangements. This Theory is relevant to this study as it critically discussed issued related to Strategy and Innovation within industry.

Empirical Review

Adedapo and Bamiduro (2020) examined the effect of Product Innovation on Sustainable Competitive Advantage among 10 Selected Manufacturing Firms in Ibadan Metropolis, Nigeria. Primary method of data collection was used to gathered relevant information from the field, using structured questionnaire for data collection, the research design is descriptive in nature, Three Hundred and thirty (330) copies of questionnaire were distributed across the 10 selected manufacturing firms. The data was analysed using 20.0 version of SPSS. Two hypotheses were postulated and the results derived shows that there is a linear relationship between the variables. The study concluded that product innovation has a positive effect on the sustainable competitive advantage of manufacturing firms.

Celikyay and Adiguzel (2019) assessed Product Innovation Performances in Terms of Competitive Strategies of Companies in Production Sector Under the Influence of Technology Orientation. In this study, 383 white collar (engineer) employees were surveyed. The factor analysis (explanatory and confirmatory) and reliability analysis of the scales was conducted using SPSS 25 and AMOS Program. The correlation and regression analysis, and sobel and Hayes process tests were performed to examine the effect of mediator variable. The results showed that there is a statistically positive and meaningful relationship between technology orientation and product innovation.

Agbo (2019) appraised customers' and employees' responses to technology innovation, and their effects on the performance of the Nigerian banks. Fifteen (15) major banks were selected for the research. Two null hypotheses were formulated. One Thousand, Nine Hundred and Twelve (1912) copies of questionnaire (for customers) were distributed to customers to test the first hypothesis out of which One Thousand, Six Hundred and Thirt-Four (1634) copies were collected (85%) of the distributed copies questionnaire, One Thousand, Four Hundred and Fifty-Eight (1458) copies of questionnaire were distributed to selected banks employees to test the second hypothesis, One Thousand, Two Hundred and Twenty- Three (1223) copies questionnaire were collected making 84% response rate. Pearson correlation co-efficient was used to analyse the hypotheses. Findings revealed that technological innovation influenced banks employee's performance, customer's satisfaction and improvement in banks profitability.

Leban and Deya (2019) ascertained the effect of strategic innovations on organisational performance of information communication technology firms in Nairobi in terms of product innovation, market innovation, process innovation, and organisational innovation. Descriptive research survey was employed through the use of questionnaire and the data was analysed using descriptive statistics with statistical package of social sciences (SPSS) Version 21 and Microsoft excel. Multiple regression analysis was used to ascertain the relationship between the dependent and independent variable. The findings revealed that Market innovation was the most common and highest predictor of organisational performance followed by product innovation, then process innovation while organisational innovation had the lowest effect.

Methodology

The study adopted descriptive survey research design. This design is considered appropriate for this study since the study explored the opinions of the respondents on the strategic innovation and sustainability of plastic manufacturing firms in Ogun State, Nigeria. The study was conducted in Ogun state. This study was carried out in Two (2)

reputable plastic manufacturing firms in Ogun state which are; Ceplas Plastic Limited Sagamu, Ogun state; Europlast Industries Limited, Ota, Ogun state;

The population of this study consists of various stakeholders of those plastic firms within the study area, which involved 502 staff of Two (2) reputable plastic manufacturing firms in Ogun State Nigeria owned by private individuals in the study area. This includes management, managers, supervisors and some experienced and senior staff directly responsible for the policy development, forecast and implementation within plastic manufacturing firms in Ogun of Nigeria. The entire population was adopted as the sample size for this study. This approach ensures comprehensive coverage and allows for a more accurate analysis of the strategic innovation practices and sustainability outcomes across all relevant firms. By using the entire population, the study minimizes sampling error and provides a more robust foundation for generalizing the findings to the entire population of interest.

The method of data collection for this study was both primary and secondary. The primary data were collected with the use of structured questionnaire. The questionnaire was distributed to plastic manufacturing firms via google doc in their respective communication platforms, where management, managers and supervisors and some experienced staffs can access it. However, the secondary data were from comprehensive literature review of existing studies on strategic innovation and sustainability of manufacturing firms. The objectives were analysed using Correlation Coefficient, while the hypotheses were tested with Pearson Product Moment Correlation Coefficient at 1% significance level. All these tests were carried out through Statistical Package for Social Sciences (SPSS) version 16.

Data Analysis

Table 1: Correlations

		EconomicSustainability	Production Innovation
Economic Sustainability	Pearson Correlation	1	1.000
	Sig. (2-tailed)		.000
	Sum of Squares and Cross-products	6639.450	6639.450
	Covariance	13.252	13.252
	N	502	502
Production Innovation	Pearson Correlation	1.000	1
	Sig. (2-tailed)	.000	
	Sum of Squares and Cross-products	6639.450	6639.450
	Covariance	13.252	13.252
	N	502	502

. Correlation is significant at the 0.01 level (2-tailed).

Table 1 presents the correlation between Economic Sustainability and Production Innovation. The Pearson correlation coefficient is 1.000, indicating a perfect positive correlation between the two variables. This means that as Economic Sustainability increases, Production Innovation also increases in perfect proportion, and vice versa. The statistical significance (Sig. 2-tailed) is 0.000, which is lower than the significance level of 1%. This indicates that the relationship between the two variables is statistically

significant, meaning it is highly unlikely to have occurred by chance.

Test of Hypotheses

Hypothesis 1

H_0: There is no significant correlation between Economic Sustainability and Production Innovation (i.e., the correlation coefficient is zero).

H_1: There is a significant positive correlation between Economic Sustainability and Production Innovation (i.e., the correlation coefficient is not zero).

Decision Rule

The decision rule is based on the significance level (α). Typically, α is set at 0.5 (1%). Since the p-value (0.000) is less than α (0.05), we reject the null hypothesis (H_0) and accept the alternative hypothesis (H_1). This means that there is a statistically significant, perfect positive correlation between Economic Sustainability and Production Innovation.

Table 2: Correlations

		HumanResources Sustainability	ServiceInnovation
EnvironmentalSustainability	Pearson Correlation	1	.995
	Sig. (2-tailed)		.000
	Sum of Squares and Cross-products	16046.679	15649.301
	Covariance	32.029	31.236
	N	502	502
TechnologicalInnovation	Pearson Correlation	.995	1
	Sig. (2-tailed)	.000	
	Sum of Squares and Cross-products	15649.301	15417.277
	Covariance	31.236	30.773
	N	502	502

. Correlation is significant at the 0.01 level (2-tailed).

The table 2 presents the correlation between Human Resources Sustainability and Service Innovation. The Pearson correlation coefficient is 0.995, indicating an exceptionally strong positive relationship between the two variables. This suggests that as human resources sustainability improves, service innovation tends to increase correspondingly. The significance value (Sig. 2-tailed) is 0.000, which is well below the conventional threshold of 0.01. This means the correlation is statistically significant, implying that the observed relationship is unlikely to have occurred by random chance.

Hypothesis 2

H_0: There is no significant correlation between Human Resources Sustainability and Service Innovation (i.e., the correlation coefficient is zero).

H_1: There is a significant positive correlation between Human Resources Sustainability and Service Innovation (i.e., the correlation coefficient is not zero).

Decision Rule

To determine whether to reject or accept the hypotheses, we set a significance level (α) of 0.01. Given that the p-value (Sig. 2-tailed) is 0.000, which is less than α, we reject the null hypothesis (H_0). This outcome indicates that there is a statistically significant and very strong positive correlation between Human Resources Sustainability and Service Innovation, suggesting that enhancements in human resources sustainability are likely to lead to improvements in service innovation.

Discussion of the Results

The results of objective 1 in this study show a significant positive relationship between product innovation and economic sustainability in plastic manufacturing firms in South West Nigeria, with a Pearson correlation coefficient of 1.000 ($p = 0.000$). This perfect correlation suggests that as product innovation increases, so does economic sustainability, highlighting the importance of innovative products in driving financial success. These findings align with those of recent studies, such as those by Demirgüc-Kunt et al. (2022), who also observed a strong link between innovation and economic outcomes in the manufacturing sector, emphasizing the role of product diversification in sustaining market relevance.

The results of objective 2 indicated an exceptionally strong positive correlation (Pearson correlation coefficient of 0.995) between Environmental Sustainability and Technological Innovation, suggesting that improvements in Environmental sustainability are closely linked to advancements in Technological innovation. The statistical significance of this correlation (p-value of 0.000) reinforces the notion that the relationship is unlikely to be due to random chance, indicating a robust connection. The considerable variability in both variables, as evidenced by their respective sums of squares and covariance, suggests that fluctuations in Environmental sustainability are likely to influence Technology innovation significantly. These findings are consistent with research by Birchall (2023), who noted that while technological advancements can greatly contribute to sustainability, the rate of adoption is often slowed by financial constraints and the need for supportive infrastructure to implement green technologies effectively.

Findings

From various analysis carried out in the course of this study, the following findings was discovered:

1. There is a significant positive relationship between product innovation and economic sustainability, with a perfect Pearson correlation coefficient (r=1.000, p=0.000), demonstrating that increased product innovation drives economic prosperity in plastic manufacturing firms.

2. There is a strong positive correlation between service innovation and human resources sustainability, with a pearson correlation of (r=0.995, p=0.000) stating the importance of innovative services in maintaining a sustainable workforce

Conclusion

Based on the results obtained from the test of the hypotheses, the researcher concludes that strategic innovation in terms of: product and technological innovation is significantly positively related to economic and environmental sustainability of Plastic manufacturing firms in Ogun State Nigeria.

Recommendations

Plastic manufacturing firms in Ogun should continue to invest in product innovation to drive economic sustainability. Also, Companies are expected to invest more in energy-efficient technologies to support environmental sustainability.

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