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CIRCULAR ECONOMIC BUSINESS MODEL: STRATEGIES FOR MINIMIZING ENVIRONMENTAL IMPACTS IN NIGERIA –A STUDY OF LAFARGE AFRICA PLC, SOUTH-WEST OPERATIONS, NIGERIA

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Abstract

This research was designed to evaluate circular economic business model strategies for minimizing environmental impacts in Nigeria. The objective of the study is to provide evidence on the relationship between circular economic business model and environmental impacts in Nigeria using Lafarge Africa Plc, South-West Operations, Nigeria as a case study in response to the call by previous researchers that circular economic business model are strategies for influencing environmental impacts, social well being and economic viability towards addressing the challenges of resource consumption and waste in Nigeria. The sample size of the study were 375 staff of the chosen respondents. Statistical package for social sciences and Regression analysis were run to examine the relationships and it was found that, circular economic business model showed a significant and positive relationship in minimizing environmental impacts in Nigeria, as hypothesized. The study concluded that circular economic business model has a complex and varied impact in reducing environmental impacts in Nigeria. The study recommended that, government and businesses should develop circular business economic models that minimize waste and promote sustainable consumption. Companies should design products to enable circularity and reducing environmental impacts throughout the product lifecycle, supply chain Companies should partner with closed loop systems in achieving circular economy goals; companies should regularly study the behavioiur and attitude of consumers towards circular economy products and services and the government should formulate

and implement new policy and regulatory frameworks that support the adoption of circular economic business models.

Keywords: Circular Business Economic Model, Strategies, Economic model, Environment Impacts, Lafarge Africa Plc.

Introduction

Circular economic business model is a strategy that reduces waste, minimizes resources depletion and other environmental impacts using 3R's of recycling, re-using and regenerating of products and materials (Kirechherr et al, 2017). It is as a result of several environmental problems and challenges such as climate change, flood, drought, volcanic eruption, tsunami, tornado and other environmental degradation problems that ravages the entire world, Africa and Nigeria in the entire business landscape and society that brought the concept of circular economic business model to be recognized by companies and government globally through the adoption of sustainability and circular economic business model strategies.

This shift is evident in circular economic business model dimensions in the areas of environment, social and economic. Basically, adopting innovative and emerging technologies and circular economic business model strategies for circular economic business model help business and society thrive in the long run.

Basically, to establish a nexus between circular economic business model strategies and reduction in environmental impacts has generated debate among scholars and school of thoughts, that ,circular economic business model strategies has contributed in reducing environmental impacts in Nigeria .It is of this view that, this study research question has it that ,does circular economic business model strategies led to the reduction of environmental impacts in Nigeria ?

Hypotheses

Formulated to guide the study were the following two hypotheses:

H_{o1}: Circular economic business model has no effect on reduction of environmental impacts in Nigeria.

H_{o2}: Circular economic business model does not enhance sustainability and valued resources on the economy.

Literature Review

Concept of Circular economic Business Model

According to Kirechher, et al,(2017),circular economic business model is a strategy that reduces waste ,minimize resources depletion and other environmental impacts using the 3R's of recycling, re-using and regenerating of products and materials.

The circular economic business strategy is basically influenced by environmental impact, social well-being and economic viability addressing the challenges of resource consumption and waste. In line with Baral et al (2023) circular economic business model is an effective and efficient method for business sustainability using little resources and also motivating business through green finance for business that embrace sustainable practices for achieving United

Nations sustainable development goals for meeting the needs of environmental responsibilities ,economic viability and effective resource maximization.

Dey et al (2022),opined that ,resource if efficiently used ,could reduce environmental impact and ensure viable economic as a sustainable business models and strategies .According to Awan et al (2022), evident shows that ,circular economic business model is mostly used in agricultural construction and manufacturing industry for effective and efficient sustainability (Casillo-Acobo et al (2022).

Geissdoerfer (2017) averred that, circular economic business model lies on environment, economic and ecological aspect of the supply. Furthermore ,he reinstated that effective strategies adopted for circular economic business model include recycle, re-purpose, re-use, re-manufacturing, waste reduction, resource efficiency and the adoption of renewable energy ensures the achievement of sustainability in the society .

In line with Werning et al (2020) circular economic business model revolves around improved regulating frameworks, regulating demands and overcoming technology challenges. According to Vermunt (2019) some aspects of circular economic business model are very important that increase efficiency in resource used through a well design of durable products, re-usable and recycling of products.

To Suchek (2022) integrating innovation and revolution to circular economic business model ensures rethinking and integration of sustainable practices where companies embrace circular economic business model to remain competitive in the business and marketing environment as a result of the adoption of sustainability in their operations.

Conversely, circular economic business model faces some challenges which includes ,lack of knowledge, technical issues, customer desire for sustainable products ,financial savings measures and the issue of addressing regulatory frameworks (De Oliverra, 2023).

Opposite wise, Dey et al (2022) outlined the facts that, there are advantages of circular economic business model such as customer preferences for sustainable gods, legal constraints and financial saving.

Circular Economic Business Model Strategies

According to Pigosso, 2013; Alarcon, 2021; , Van Den,2023 and Horodyska et al (2020), the following are the circular economic business model strategies that minimizes environmental impacts and ensure sustainability:

(i)Eco-Design: This strategy aimed at developing products that reduces environmental impact and maximize resource efficiency in product lifecycle for more sustainable and circular economy.

(ii) Product as a Service: This strategy requires manufacturer to produce products based on service delivery as it discourages buying and suing product than producing products for long lasting to support circular economy of business that reduces and managed waste effectively .

(iii) Reverse Logistics: This is the management of movements of products and materials back to the stage if their originality where products are used and are collected back, processed and sale in the market to avoid and also minimize natural environment and disposal of products.
(iv) Material Substitution: This practices include substituting sustainable materials for suppliers to reduce dependence on virgin materials in a bid to reduce wastes and green house gas emissions .
(v) Biomimicry: This is the designing of new solutions to the problems facing factories during manufacturing for efficient products to avoid wastes, environmental impact for recycling ,re-use and disposal of products .
(vi) Up-cycling: This the conversion of waste materials into new, valuable and quality ones to achieve circular economy business model.

Strategies for Executing Circular Economic Business Model in Nigeria
For achieving circular economic business model requires businesses and government in Nigeria to take proactive actions .Businesses needs to increase products lifecycle and reduce waste and resource use (Sanches, et al, 2022, Unal et al, 2022, Dey et al, 2018).

On the part of government. they should offer tax reduction benefits to businesses and give technology subsidies to businesses and also creates awareness and education campaigns to the public to promote corporate sustainability and also highlights and enlightens the public and consumers about the significant of circular economic business model (Petrovie et al, 2023; Sanches et al, 2022 & Sohal,2022).

Reduce: This is a strategy of reducing waste materials, packaging and production consumption at all stages of product life cycle for minimizing carbon footprints.

Re-cycle: This strategy requires collecting and treating materials to produce new products while reducing dependence on material consumption and virgin material extraction. This strategy is adopted at design phase of manufacturing.

Re-use: This strategy involve re-using used products to ensure several times usage before the product is thrashed as a waste .Thus ,the product must be design for easy repairable for sustained life time of the products.

Re-purpose: This strategy is aimed at re-purposing products that have ended their main purpose for its easier re-used.

Innovative and Emerging Technologies for Circular Economy Business Model
These are innovative and emerging technologies for achieving circular economic business model and this involves artificial intelligence (AI), block chain, robotics and automation for promoting circular economic business model and sustainability .

(i) Automation and Robotics: This is the combination of both artificial intelligence and computer vision to sort, identify and separate waste towards reducing wastes as a revolution in waste management .Robotics enhances precision, speed and also reduce waste as a revolution in manufacturing process for promoting circularity (Noulgaridas et al, 2022).

(ii) Artificial Intelligence: This technology revolutionized product design by evaluating large data on materials, manufacturing processes to disassembly, repair and recycled eco-friendly products. Hence, Machine learning algorithm forecast equipment failures for timely maintenance and guiding against serious breakdown for regular flow of materials and for recovering resource (Roberts et al, 2022).

(iii) Block chain : This technology maintains lists of unchangeable data records for more transparency and open record of supply chain practices and for more ethical sustainable supply chain against frauds and fake products and effectively managed of waste and also monitor waste from generation to disposal (Raikwar et al, 2019).

(iv) Internet of Things: This technology provide real time data on use of resource ,thus ,making organizations to optimize consumption and minimize waste using smart sensors technology to track waste levels towards minimizing waste generation (Voulgaridis et al, 2022).

Theoretical Framework

The relevant theory for this study is theory of change. This theory provides a gateway for circular activities in the society. Hence, this theory is meant to achieve environmental, social and economic impacts as its defines the results, assumptions and contextual factors. This theory assists companies to develop clear understanding of how circular economic business model results to a desired changes. This made matching of the impact of circular economic business model with financial return with positive environmental outcomes (Mattos et al, 2022).

The researchers believe that, this theory of change support environmental, economic and ecological dimensions for circular economic business model. This theory backed up the designing and implementation of circular economic business model for developing more effective strategies for embracing circular economic business practices among several stakeholders like consumers, businesses, suppliers, communities and others.

Methodology

The study used the quantitative survey method to collect data from 375 staff of Lafarge Africa Plc, South –West operations, which 25 questionnaires were thrashed out because, they were properly filled. The instrument used for gathered personal data was questionnaire. The data gathering process adopted were convenience and purposive sampling techniques as they both relevant for this study because ,the staff are purposeful and readily made available to the researchers .The data were analyzed using statistical packages for the social science version 25 with the aid of regression analysis. Hence, the analysis were both descriptive and inferential statistics.

Results and Discussion

Restatement of Hypothesis One

Ho1: Circular economic business model has no effect on reduction of environmental impacts in Nigeria.

Table 1.: Summary of simple regression analysis for circular economic business model has no effect on reduction of environmental impact in Nigeria.

N	Model	*B*	Sig.	T	ANOVA (Sig.)	R^2	Adjusted R^2	F (df)
350	(Constant)	.356	0.000	5.873.	0.000[b]	0.265	0.243	19.694 (349)
	Circular economic business model	.369	0.000	.873				
	Predictors: (Constant): Circular Economic Business Model							
	Dependent Variable: Reducing Environmental Impacts							

Source: Field Survey, (2025)

Interpretation

The table shows the simple regression analysis results for the circular economic business model on environmental impacts in Nigeria The results showed that circular economic business model has a positive and significant impact on environmental impacts in Nigeria .The result indicated that, circular economic business model ($\beta = 0.369$, $t = 5.873$, $p = 0.000$, $p<0.05$), has a positive and significant effect on environmental impacts in Nigeria This implies that ,the management of Lafarge Africa Plc, and other companies should consider practicing circular economic business model improve the environmental performance of Lafarge Africa Plc and other companies in, Nigeria. The coefficient of determination, R2 value of 0.265 shows that, circular economic business model has a strong positive and significant impact on environmental performance of Lafarge African Plc, South-West operations and other companies in Nigeria. The coefficient of multiple regression determination, adjusted R2 value of 0.243 ($F (349) = 19.694$,$P= 0.000$) indicates that ,circular economic business model explained 24.3 % of the changes in environmental performance in Lafarge African Plc, South-West Operations and other companies in Nigeria. The simple regression model used to explain the variation in the environmental performance due to the impact of circular economic business model can be stated as follows:

EI = .356 +0.369 CEBM ..... … eq. i

Where:

EI = Environmental Impacts

CEBM = Circular Economic Business Model.

The results from the simple regression analysis showed that when (circular economic business model t) is improved by one unit, the environmental performance would be positively affected with an increase of 0.369. The result shows an overall statistical significance with $p < 0.05$ which implies that, circular economic business model is an important determinant of the environmental performance of Lafarge African Plc, South-West Operations and other companies in Nigeria. The results suggests that for Lafarge Africa Plc ,South-West Operations and other companies in Nigeria to improve and enhance their environmental performance, circular economic business model must be practice and implemented Therefore, the null hypothesis (Ho1) which states that , circular economic business model has no effect on reduction of environmental impacts in Nigeria was rejected.

Restatement of Hypothesis Two

Ho2. Circular economic business model does not enhanced sustainability and valued resources on the economy.

Table 2.: Summary of simple regression analysis for Circular economic business model does not enhanced sustainability and valued resources on the economy.

N	Model	*B*	Sig.	T	ANOVA (Sig.)	R^2	Adjusted R^2	F (df)
350	(Constant)	.356	0.000	2.014.	0.000[b]	0.265	0.243	19.694 (349)
	Circular Economic Business Model	.143	0.000	8.37				
	Predictors: (Constant): Circular Economic Business Model							
	Dependent Variable: sustainability and Valued resources							

Source: Field Survey, (2025)

Interpretation

The table shows simple regression analysis results for the circular economic business model on sustainability and valued resources on the economy. The results revealed that circular economic business model influence has a positive and significant effect on sustainability and valued resources in the economy of Nigeria .The results indicated that, circular economic business model influence ($\beta = 0.143$, $t = 2.014$, $p = 0.000$, $p<0.05$), has a positive and significant effect on sustainability and valued resources in the economy of Nigeria. This implies that the management of Lafarge African Plc, South-West, Nigeria operations and other companies should embrace circular economic business model to achieve sustainability and valued resources in the economy of Nigeria.

The coefficient of determination ,R2 value of 0.265 indicates that circular economic business model influence has a strong positive and significant effect on sustainability and valued resources in the economy of Nigeria .The coefficient of simple determination , adjusted R2 value of 0.243 (F=(349) = 19.694,P= 0.000) indicates that ,circular economic business model explained 24.3 % of the sustainability and valued resources in the economy of Nigeria.

The simple regression model used to explain the variation in the sustainability and valued resources in the economy of Nigeria due to the effect of circular economic business model influence can be stated as follows:

SVR = .356 +.0143 CEBM .... … eq. iii

Where:

SVR = Sustainability and Valued Resources .

CEBM = Circular Economic Business Model.

The results of the simple regression analysis show that when there is circular economic business model influence being improved by one unit, sustainability and valued resources would be positively affected with an increase of 0.143. The result shows an overall statistical significance with $p < 0.05$ which implies that, circular economic business model influence is an important determinant of sustainability and valued resources in the economy of Nigeria. The result suggests that for Lafarge African Plc, South-West operations and other companies in Nigeria to achieve sustainability and valued resources in the economy of Nigeria , circular economic business model strategies should be adopted at Lafarge operations Therefore, the null hypothesis (Ho2) which states that, Circular economic business model does not enhanced sustainability and valued resources on the economy in Nigeria was rejected.

Conclusion

The study concluded that circular economic business model has effect on reduction of environmental impacts in Nigeria. In line with Kirchherr, et al (2017), that circular economic business model as a strategy reduces waste, minimizes resources depletion and other environmental impacts using 3R's of recycling, re-using and regenerating of products and materials and also, according to Hermann (2022) circular economic business model significantly enhanced sustainability and valued resources in the economy of Nigeria.

Recommendations

(1) Government and businesses should develop circular business economic models that minimize waste and promote sustainable consumption

(2) Companies should design products to enable circularity and reducing environmental impact throughout the product lifecycle,

(3) Supply chain Companies should partner with closed loop systems in achieving circular economy goals,

(4) Companies should regularly study the behaviour and attitude of consumers towards circular economy products and services.

(5) Government should formulate and implement new policy and regulatory frameworks that support the adoption of circular economic business models.

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