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Innovation and sustainable development among multinational enterprises in Nigeria

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Abstract: This study explores the effect of innovation on sustainable development among multinational enterprises (MNEs) operating in Nigeria. Utilizing a cross-sectional survey design, the research investigates how innovation practices within MNEs influence the economic, environmental, and social dimensions of sustainable development in the Nigerian context. Data were collected from workers of five multinational corporations using a structured questionnaire. The study hypotheses were analysed using partial least squares structural equation modelling (PLS-SEM) via SmartPLS 3.2.9. The findings demonstrate a positive and significant effect of innovation on all three dimensions of sustainable development. This suggests that MNEs fostering innovation contribute meaningfully to achieving broader societal goals beyond economic profit. The study further recommended that MNEs should integrate sustainability metrics into their innovation performance evaluations. Track how their innovations contribute to economic growth, environmental improvements, and social well-being. This will help them identify the most impactful innovations and guide future investments towards projects that generate shared value for their business and society.

Keywords: innovation; sustainable development; multinational enterprises; Nigeria; economic sustainability; environmental sustainability; social sustainability

1. Introduction

In the ever-evolving landscape of global commerce, innovation reigns supreme as the lifeblood of success. For multinational enterprises (MNEs) operating in Nigeria, this principle holds even truer, where navigating complex economic, social, and environmental terrain demands creative solutions. Innovation not only fuels the profitability and competitiveness of MNEs but also unlocks a path towards sustainable development, contributing positively to Nigeria's future. The transformative power of innovation for MNEs is well documented. Studies reveal a clear correlation between innovation and increased firm performance, market share, and profitability [1,2]. Beyond financial gains, innovation fosters job creation, drives technological advancements, and strengthens brand reputation [3]. In the Nigerian context, these benefits are particularly crucial as the country strives towards economic diversification and job creation.

However, the impact of innovation extends far beyond the immediate concerns of MNEs. Embracing sustainable practices has become an imperative, driven by both ethical considerations and the realization that long-term success hinges on environmental and social responsibility. The United Nations Sustainable Development Goals [4] provide a comprehensive framework for achieving this balance, encompassing environmental protection, social equity, and economic prosperity. For

MNEs operating in Nigeria, innovation serves as a powerful tool to contribute to these goals, as highlighted by Okereke [5] and Oni [6]. By developing innovative solutions for resource management, community engagement, and social equity, MNEs can not only mitigate their environmental impact but also contribute positively to the communities they operate in. For instance, innovative agricultural practices can increase food production while conserving resources, while skills development programs can empower local communities and contribute to social inclusion.

As these examples illustrate, innovation holds immense potential for MNEs in Nigeria, enabling them to achieve both economic success and sustainable development. This research delves deeper into this dynamic, exploring the specific drivers and challenges of innovation for MNEs in the Nigerian context. By examining successful case studies, analyzing relevant data, and engaging with stakeholders, this research aims to provide valuable insights and recommendations that empower MNEs to harness the power of innovation for sustainable development in Nigeria.

2. Literature review

2.1. Innovation

Innovation, the lifeblood of progress, has captivated minds for centuries. Its origins trace back to the very dawn of human civilization, where tool development and adaptation marked the first sparks of ingenuity. From the wheel's invention to the printing press's revolutionary impact, innovation has continually reshaped our world. But what exactly is it, and how does it power the success of multinational enterprises (MNEs)?

While a universally accepted definition eludes us, numerous interpretations illuminate the essence of innovation. Some define it as “the successful introduction of new ideas” [7], while others emphasize its transformative nature, “the process by which ideas are translated into new or improved goods or services” [8].

In today's dynamic global market, innovation is not merely optional but essential for MNE survival and growth. It empowers them because, by offering unique and valuable solutions, MNEs can differentiate themselves from competitors and capture market share [9]. It also allows MNEs to adapt to changing customer preferences, technological advancements, and regulatory landscapes [10]. Likewise, innovations can generate new revenue streams, improve efficiency, and reduce costs [8]. Additionally, proactive innovation can help MNEs mitigate potential threats such as resource scarcity or technological disruption [11]. Summarily, innovation serves as the cornerstone of MNE success. By embracing its transformative power, MNEs can navigate complex markets, create value for stakeholders, and contribute to a more sustainable future. As Peter Drucker aptly stated, “Innovation is the only business that exists.” For MNEs, this rings truer than ever.

2.2. Sustainable development

The concept of sustainable development emphasizes meeting current needs without compromising the ability of future generations to meet theirs. For multinational enterprises (MNEs) venturing into the vibrant Nigerian landscape, the

pursuit of economic success becomes intricately woven with the responsibility of fostering sustainable development. This delicate balancing act demands MNEs navigate a complex terrain where profit generation intertwines with environmental stewardship and social equity.

At the heart of sustainable development lies a three-pronged approach: economic growth, environmental sustainability, and social equity [4]. While MNEs undoubtedly drive economic progress through investments, job creation, and technology transfer [12], their actions must not come at the expense of local communities or the fragile environment. This necessitates a shift from a singular focus on profit maximization to one that embraces responsible business practices, minimizes environmental impact, and fosters social well-being.

However, the path to achieving this equilibrium in Nigeria presents unique challenges. Weak governance structures, inconsistent regulations, and limited infrastructure create hurdles for responsible business practices and environmental protection efforts [13]. The stark realities of poverty and inequality further complicate the equation, where exploitation and conflict threaten social sustainability [14]. Moreover, environmental degradation looms large, with deforestation, pollution, and climate change demanding immediate attention [15].

Despite these formidable challenges, opportunities for MNEs to contribute to sustainable development in Nigeria abound. Investing in renewable energy sources like solar and wind power can not only promote clean energy access but also mitigate climate change impacts [16]. Partnering with local farmers to adopt sustainable agricultural practices can enhance food security while conserving precious resources [17]. By providing training and educational opportunities, MNEs can empower local communities and contribute to human capital development, fostering a more inclusive and equitable society [18]. Technological innovation also holds immense potential, with MNEs spearheading the development of solutions that address local challenges, such as clean water purification or waste management technologies [19].

Unlocking the true potential for sustainable development requires a collaborative approach. MNEs must forge strong partnerships with government agencies, civil society organizations, and local communities to create a shared vision and implement effective solutions. Transparency and accountability are paramount, ensuring MNEs remain accountable for their social and environmental impacts [20]. Moreover, a long-term commitment is crucial, recognizing that genuine progress necessitates sustained effort and adaptation [21].

Most importantly, the path for MNEs operating in Nigeria is not paved with easy solutions. However, by embracing a holistic approach that prioritizes not just profit but also environmental and social well-being, MNEs can become powerful catalysts for positive change. By collaborating, innovating, and committing to long-term sustainability, they can navigate the tightrope of economic success while ensuring a brighter, more equitable future for Nigeria and its people. Remember, achieving sustainable development is not a destination but a continuous journey, demanding constant evolution and a shared commitment to building a better tomorrow.

2.3. Nexus between innovation and sustainable development

Innovation and sustainable development, two seemingly disparate concepts, are intricately intertwined. While innovation holds immense potential to drive progress towards environmental, social, and economic well-being, its effects are not without their complexities and potential downsides. Numerous studies have documented the positive effects of innovation on sustainable development. For instance, Apostu et al. [22] highlight how eco-innovations, like renewable energy technologies, contribute to climate change mitigation and resource conservation. Also, Nidhi et al. [23] found that social innovations, just like mobile healthcare platforms, can improve access to essential services in developing communities. Innovation can also empower individuals and communities, as Baregheh et al. [24] demonstrate with their study on how digital platforms can facilitate citizen participation in environmental decision-making. The economic benefits of innovation for sustainable development are also undeniable. Calderone et al. [25] argue that green innovations can create new markets and jobs, while Mazzucato [26] emphasizes the role of government-led innovation in fostering sustainable economic growth. By developing cleaner technologies and more efficient processes, innovation can contribute to decoupling economic growth from environmental degradation.

However, it is crucial to acknowledge that innovation is not a guaranteed path to sustainability. Some argue that technological advancements can create unintended consequences, exacerbating existing inequalities or leading to unforeseen environmental damage [27]. For instance, concerns exist that certain innovations, like automation, could lead to job displacement and exacerbate social inequalities [28]. Additionally, the resource-intensive nature of some innovations can have negative environmental impacts, highlighting the need for careful evaluation and responsible development [29].

Innovation, a powerful tool for progress, can be a double-edged sword when it comes to sustainable development. By acknowledging its complexities, fostering responsible development, and prioritizing sustainability goals, we can unlock its true potential to create a more just and equitable future for all. As Albert Einstein aptly stated, “The world needs new ways of thinking.” This study therefore proposes that:

- 1) Innovation has a positive and significant effect on economic sustainability.
- 2) Innovation has a positive and significant effect on environmental sustainability.
- 3) Innovation has a positive and significant effect on social sustainability.

3. Methodology

This study employed a cross-sectional survey design to investigate the relationship between innovation and sustainable development among multinational enterprises (MNEs) operating in Nigeria. This design allowed for the collection of data at a single point in time from a representative sample of MNEs, enabling the examination of associations between variables without the need for longitudinal tracking.

Ten multinational enterprises were approached to be part of the study; however, only five showed interest in the study. Thus, data was collected from these five multinational enterprises. The participants comprised personnel in the managerial

cadre (foremen, supervisors, factory managers, personnel managers, operations managers, general managers, and all other employees in the managerial cadre) due to their experience on the job. A total of 102 copies of the questionnaire were distributed among the five multinational corporations, out of which 67 copies were correctly filled out and returned, which represented a 65.7 percent return rate. Hence, the 67 copies of the questionnaire returned were used for the final analyses. A bootstrap method (with a bootstrap sample of 5000) was used in the final analysis [30,31]. In addition, a proportionate stratified random sampling technique was used to select representatives from each of the MNEs. Also, efforts were made to ensure the sample size was sufficient to provide statistically reliable results, considering factors such as the target population size, desired confidence level, and expected effect size.

Further, the questionnaire was pre-tested with a small sample of MNEs to ensure its clarity, validity, and reliability. Data collection was conducted through email invitations and online surveys, followed up with phone calls where necessary.

Operational measures of variables

Innovation in this study was conceptualized as a unidimensional construct, reflecting the overall level of innovative activity within the MNEs. It was measured using a five-item scale adapted from the Oslo Manual [32], with items such as “our company introduced new or significantly improved products or services in the last two years; our company invested in research and development activities in the last two years”.

Sustainable development was decomposed into economic, environmental, and social sustainability. These dimensions were adopted from Ivwurie and Akpan [33] and measured with fourteen (14) statement items. Economic sustainability focused on the MNEs’ contribution to economic development in Nigeria. It has five statement items, such as “our company contributes to economic growth and development in Nigeria; our company creates new jobs in Nigeria”. Environmental sustainability assessed the MNEs’ environmental impact and their efforts to reduce their environmental footprint. It was measured using four items, such as “our company minimizes its use of natural resources in its operations; our company reduces its greenhouse gas emissions and other pollutants”. Lastly, social sustainability focused on the MNEs’ social impact and their contributions to improving the lives of people in Nigeria. It was measured using items adapted from the UN Sustainable Development Goals [20], including “our company respects human rights and promotes fair labor practices; our company provides safe and healthy working conditions for its employees. All the items were adapted from Ivwurie and Akpan [33] and the UN Sustainable Development Goals [20] and adjusted to suit the Nigerian business environment. They were scaled on a five-point Likert scale with weights assigned as follows: 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree. The full research instrument is shown in Appendix.

4. Results and discussions

This study examined the effect of innovation on sustainable development among Nigerian multinational enterprises (MNEs) using partial least squares structural

equation modelling (PLS-SEM). Several key aspects of the research and its data made PLS-SEM the ideal tool for the job. Firstly, the study aimed to explore and validate a relatively new theoretical model in a context that has not been extensively researched: sustainable development within Nigerian MNEs. PLS-SEM handles exploratory models, where understanding relationships between constructs is more crucial than confirmatory hypothesis testing [34]. Secondly, the sample size was relatively small. Compared to covariance-based structural equation modelling (CB-SEM), PLS-SEM is more robust with smaller samples because it relies on ordinary least squares regression [35]. Thirdly, the study included variables that did not follow a normal distribution, which can be problematic for CB-SEM. PLS-SEM is less sensitive to violations of normality assumptions, making it a suitable choice for this data [36]. Fourthly, PLS-SEM is adept at handling complexities and accommodating formative constructs, where the indicator variables causally influence the latent variable [37]. Fifthly, predicting the impact of innovation on various aspects of sustainable development was the key focus of the study. PLS-SEM is particularly well-suited for prediction-oriented research, aiming to explain the variance in the dependent variables [34].

The following hypotheses were formulated in chapter one of this study:

- i. Innovation has a positive and significant effect on economic sustainability.
- ii. Innovation has a positive and significant effect on environmental sustainability.
- iii. Innovation has a positive and significant effect on social sustainability.

Table 1 revealed significant paths between innovation and economic sustainability ($r = 0.813$; $r^2 = 0.661$, $t = 9.943$; $p < 0.05$), innovation and environmental sustainability ($r = 0.870$; $r^2 = 0.757$, $t = 9.049$; $p < 0.05$), technology usability and contextual performance ($r = 0.790$; $r^2 = 0.624$; $t = 10.143$; $p < 0.05$), and innovation and social sustainability ($r = 0.728$; $r^2 = 0.530$; $t = 15.214$; $p < 0.05$). Therefore, the formulated hypotheses were supported. These results imply that higher levels of innovation within MNEs are associated with better performance in achieving sustainable development goals.

Table 1. Predictive accuracy, predictive relevance and effect sizes (f^2).

Hypotheses	Correlation coefficient (r)	Predictive accuracy (r^2)	Adjusted (r^2)	P -values	T -values	Effect size (f^2)	Predictive relevance (Q^2)
IN -> S	0.813	0.661	0.659	0.001	9.943	0.35	0.215
IN -> EnS	0.790	0.624	0.620	0.000	10.143	0.28	0.183
IN -> SS	0.728	0.530	0.528	0.000	15.214	0.36	0.262

Where: IN = Innovation, ES = Economic Sustainability, EnS = Environmental Sustainability, SS = Social Sustainability. $r^2 = 0.19$ = weak, r^2 , 0.33 = moderate, r^2 , 0.67 = substantial [38]. Effect size (f^2), 0.02 = small, 0.15 = moderate, while 0.35 = large. Predictive Relevance (Q^2), > 0 = satisfactory [37].

Source: SmartPLS 3.2.9 output on research data, 2024.

Discussions

The positive effects of innovation on various dimensions of sustainable development show the strategic role of innovation in the achievement of sustainable development by multinational corporations in Nigeria. Specifically, the finding that innovation positively influences economic sustainability resonates with previous studies across diverse contexts [37]. Innovation acts as the conductor, leading to new

products, services, and efficiency, ultimately boosting economic growth and job creation [38]. Also, the finding of a positive and significant effect of innovation on environmental sustainability echoes earlier works [39,40]. Innovation enables cleaner technologies, resource efficiency, and minimized environmental impact, aligning with the growing emphasis on sustainability within Nigerian businesses. Lastly, the positive and significant effects of innovation on social sustainability align with studies like Yazdani et al. [41] and Murillo-Luna et al. [42], which highlight how innovation can improve working conditions, community development, and social inclusion. This offers a promising score for Nigerian MNEs to address social challenges and contribute positively to society.

While the findings align with several existing studies, some studies have reported limited or even negative impacts of innovation on certain sustainability dimensions [42,43]. These might be due to factors like the specific type of innovation, inadequate implementation, or unintended consequences, indicating that the innovation-sustainability relationship is not always positive.

5. Conclusion and recommendations

In conclusion, this study has shed light on the effect of innovation on sustainable development within Nigerian MNEs. The significant and positive effects of innovation on economic, environmental, and social dimensions highlight the potential of innovation to drive positive change and contribute to a more sustainable future. These findings resonate with existing research, but also encourage further exploration of the unique context of Nigerian MNEs and the specific types of innovation that drive progress.

While limitations like the sample size and measurement choices should be acknowledged, this study serves as a valuable stepping stone. Future research can build upon these findings by investigating specific types of innovation, exploring mediating mechanisms, conducting longitudinal studies, and examining the nuances of the Nigerian context. Ultimately, understanding and harnessing the power of innovation will be crucial for Nigerian MNEs to achieve sustainable development and contribute positively to their communities and the global landscape.

The following recommendations are made for the MNEs:

- i. The MNEs should shift their innovation focus towards developing products, processes, and services that directly address environmental and social challenges in Nigeria. Think beyond incremental improvements and aim for disruptive solutions that tackle issues like water scarcity, waste management, or energy efficiency. Partner with local communities and research institutions to ensure your innovations respond to specific needs and contexts.
- ii. They should also integrate sustainability metrics into their innovation performance evaluation. Track how their innovations contribute to economic growth, environmental improvements, and social well-being. This will help them identify the most impactful innovations and guide future investments towards projects that generate shared value for their business and society.
- iii. Lastly, the MNEs should collaborate with other MNEs, local startups, and NGOs to create an ecosystem of innovation for sustainable development. Share

knowledge, resources, and best practices to accelerate the adoption of sustainable solutions across different industries. By fostering a collaborative approach, they can amplify their impact and contribute to a systemic shift towards a more sustainable future for Nigeria.

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Appendix: Questionnaire

Section A: Innovation

Indicate your level of agreement with the following sentences from 1 = Strongly Disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Strongly Agree.

S/N	Innovation	1	2	3	4	5
1	Our company introduced new or significantly improved products or services in the last two years.					
2	Our company invested in research and development activities in the last two years.					
3	Our company has a dedicated team or department responsible for innovation activities.					
4	Our company encourages employees to suggest and implement new ideas.					
5	Our company collaborates with external partners (universities, research institutions, etc.) on innovation projects.					

Section B: Sustainable development

Indicate your level of agreement with the following sentences from 1 = Strongly Agree; 2 = Agree; 3 = Neutral; 4 = Disagree; 5 = Strongly Disagree.

S/N	Sustainable development	1	2	3	4	5
Economic Sustainability						
1	Our company contributes to economic growth and development in Nigeria.					
2	Our company creates new jobs in Nigeria.					
3	Our company invests in local communities and suppliers in Nigeria.					
4	Our company pays fair wages and benefits to its employees in Nigeria.					
5	Our company contributes to government tax revenues in Nigeria.					
Environmental Sustainability						
1	Our company minimizes its use of natural resources in its operations.					
2	Our company reduces its greenhouse gas emissions and other pollutants.					
3	Our company promotes sustainable waste management practices.					
4	Our company invests in renewable energy sources.					
Social Sustainability						
1	Our company respects human rights and promotes fair labor practices.					
2	Our company provides safe and healthy working conditions for its employees.					
3	Our company invests in education and training for its employees and communities.					
4	Our company promotes diversity and inclusion in its workforce.					
5	Our company contributes to community development projects in Nigeria.					