

Green Entrepreneurship: An Empirical Investigation of Investment in Environmental Technologies and Environmental Reporting and Disclosure on Startup Business Sustainability in Nigeria

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ABSTRACT

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This study examines the role of green entrepreneurship in enhancing startup sustainability in Nigeria, with a focus on investment in environmental technologies and environmental reporting and disclosure. Using a survey research design, data was collected from 64 startups registered under the Office of Nigerian Digital Innovation (O.N.D.I) and analyzed through multiple regression techniques. The results ($\beta = .207$, $t = 5.302$, $p\text{-value} = .009$) indicate that investment in green technologies positively influences startup sustainability. Similarly, the results ($\beta = .162$, $t = 4.212$, $p\text{-value} = .028$) for the environmental reporting and disclosure indicate it positively influences startup sustainability. Consequently, the study concludes that green entrepreneurship is vital for Nigeria's sustainable development and recommends policies that promote eco-friendly investments, strengthen environmental reporting, and integrate sustainability education into entrepreneurial training programs. Therefore, it recommended that investment should be made towards ecofriendly technology with aim no to harm but to contribute to environmental safety. Also, sound understanding of environmental reporting/disclosure would help green entrepreneurs guide their activities considering the environmental effect as well as their prospective investments or even partnerships.

Keywords: Green Entrepreneurship, Investment in Environmental Technologies, Environmental Reporting and Disclosure, Startup, Business Sustainability

INTRODUCTION

Entrepreneurship plays a major role in providing a solution to the various environmental problems in Africa, where SMEs contribute 52%-58% of GDP in South Africa and 50%-60% in Nigeria. Green entrepreneurship, which is one form of entrepreneurship concentrated on friendly business practices, has gained a lot of interest and excitement, particularly in the Nigerian case, where SMEs are helping drive economic recovery; create jobs; and develop innovations (Felix, 2022). Nevertheless, many Nigerian startups still tend towards profit maximization in the trade-off against sustainability (Martins et al., 2022). In other parts of the African continent, SMEs in countries like Ghana, Rwanda, and Mozambique are also acknowledged for contributing to GDP generation and encouraging sustainable ventures; that is, SMEs in Ghana contributed 50% of GDP and provided employment at 60% (Austin, 2021) while Mozambique has made in-roads to clean energy adoption (Edward et al., 2022).

Thus, sustainable development becomes urgent in view of the ecological imbalances created by profit-oriented enterprises. The United Nations International Development Goals (SDGs) seek to balance economic advancement and ecological guarantees (Isazadeh et al., 2023). In Nigeria, conformity with sustainability standards is championed by a variety of actors, from small startups to government agencies to international organizations (Dzeble et al., 2024). Mixed with this backdrop of pressures among groupings of organizations with a major focus on optimizing profitability within the frame of workings becomes a complicated picture for sustainability issues (Kim, 2022;

Hongda & Haifeng, 2022). Green entrepreneurship thus appears to be the perfect solution, combining investments in technologies and components intended to minimize ecological harm but at the same time broadening the window for the firms to grow (Olayinka et al., 2022).

Investment in start-ups on waste reduction, energy efficiency improvement, and sustainable agriculture contributes between 60-70% of Nigeria's GDP, including about 60% of employment and economic development (Olayinka, et al., 2022; David et al., 2024). It is hoped that millions of Nigerians will be freed from poverty (Peter et al., 2023). This further adds to their number of employees and environmental reporting and disclosure guiding measurement and management of their impact while optimizing decision-making and being compliant with regulations (Khan et al., 2023; Ikpor et al., 2022).

This paper will strive to empirically validate, in the context of two specific objectives, the extent to which environmental investment and reporting affect the sustainability of startups in Nigeria: namely, determining the degree of investment in green technology as a base of assessment of the social progress index of Nigeria, and reviewing environmental reporting and disclosure as promoting sustainability. An exhaustive literature review, methodology, results, and a discussion of the findings, conclusions, and recommendations follow in the remainder of this paper.

LITERATURE REVIEW

Conceptual Review

Green Entrepreneurship

The global concept of green entrepreneurship has largely developed under the umbrella guidance of the Sustainable Development Goals by the United Nations, with Goal 9 focusing primarily on industrialization, innovation, and infrastructure (Francis et al., 2023). In contrast to the traditional profit-centered perspective, green entrepreneurship is thus defined as the process of creating business models that address environmental issues by harmonizing profit generation with environmental and social responsibility (Thomas, 2022). Industrial activities, powered by capitalism, created pollution and climate challenges that place capital and wealth above environmental sustainability (Andrea et al., 2022).

Therefore, green entrepreneurship stands as one of the best options Nigeria can adopt in dealing with the current situation of environmental degradation. The paper argues towards creating market forces leading to development on business for green products while taking maximum sustainability into account and addressing economic growth issues and sustainable development. The entrepreneurs of green growth will open up possibilities in action by following environmental duties (Sera et al., 2022).

The term green entrepreneurship is a new brand in which sustainability becomes a threshold of paramount importance to the use of eco-friendly products and services or the cleanup of the production process (Marina et al., 2021). This offers such business models a better environmental consciousness through a green entrepreneur advocating for and highlighting clean energy and pollution reduction tactics in the industry (Nikita et al., 2023). In particular, this fair observation holds relevance for the African economies, experiencing great features of many challenges with regard to their economic, environmental, and industrial development, in which practices of business could work as one of the drivers for economic development and environmental protection at the same time (Rebecca et al., 2024). Likewise, discussions in Nigeria have begun to take a radical turn on green ventures and green entrepreneurship focusing on renewable energy, waste management, and sustainable agriculture. This would greatly contribute towards solving environmental issues, job provision as well as economic development (Volodzkienė & Štreimikienė, 2023).

An environment that promotes policies and incentives is a core requirement for the development of green entrepreneurship. Hence, the regulatory frameworks that need to be established by governments and institutions must be such that they promote eco-friendly businesses for example by means of tax breaks, simplifying the registration process for green startups, investments to promote sustainable infrastructure (Matemilola & Fadeyi 2020). Organizations such as the National Power Training Institute of Nigeria (NPTIN) promote green entrepreneurship especially in Nigeria, where access to clean energy is deemed a key in aiding start-ups in the energy

sector (UN Habitat 2017). Green entrepreneurship not only promotes economic resilience but also mirrors global environmental efforts whereby Nigeria can remain competitive in the reorienting world economy (Kouam & Asongu 2022).

The growth of green entrepreneurship is expected to trigger industrial progress and ensure sustainability in Nigeria. There lies the opportunity for Nigeria to leverage green technologies and sustainable business models towards developing economically, gaining benefits without following the wrong route of environmentally incapacitating processes as was seen with industrialization in the western world (Rohit et al. 2023). Green entrepreneurship is a key driver of sustainable development: it creates jobs, develops innovation, and mitigates risks to the environment. As Africa moves toward industrialization, incorporating sustainability in business operations will certainly start dictating the prospects of long-term prosperity, in which case green entrepreneurship constitutes a fundamental pillar into which the future of Nigeria's economy and environment will be built (Nikolaou et al. 2011).

Dimensions of Green Entrepreneurship

a- Investment in Environmental Technologies

Research has shown that green investments provide a major incentive for green entrepreneurship through support for innovations related to sustainable technologies such as renewable energy systems, energy-efficient devices, and waste management solutions (Michalis et al., 2022). These investments represent a good start towards achieving sustainable development: the shift from fossil fuels to renewable energies such as wind, solar, nuclear, and hydropower helps to reduce degradation of the environment associated with fossil fuel usages (Qinghua et al., 2022). The promotion of green investment ecosystems enables startups in Nigeria to plug the entrepreneurial and environmental sustainable solutions into new technological innovations while retaining economic viability (Dan, 2022).

According to the analysis made by Song et al. (2024), the green technology remedy fixes some disturbances in capitalism from its industrialization by coming up with clean materials, recycling wastes, and other renewable sources. A slow emergence of green startups in Nigeria indicates that broader green investment is beginning to be regarded as conducive to the resolution of pressing environmental issues aligned to the SDGs (Olujobi et al., 2023).

Green technology, which also enables startups to pursue societal purposes coupled with economic development and environmental awareness, thrives on innovation (Chanchangi et al., 2022). It removes pollution and waste while optimizing resource use in the transition toward environmentally friendly business models (Olaghere et al., 2023). Green investment is one way to replace older technologies that harm the environments of some traditional methods with emerging technologies that give benefits to the general ecology (Awewomom et al., 2024).

As technology continues to shape industries, integrating green innovations into Nigeria's industrial landscape is crucial for achieving sustainable development, particularly in line with SDG 9, which emphasizes infrastructure, industry, and innovation (Yogesh et al., 2023). By aligning investments with environmental goals, startups can drive economic transformation while safeguarding natural resources, making green technology an essential component of Nigeria's growth and sustainability agenda (Bradu et al., 2022).

b- Environmental Reporting and Disclosure

The first publication of the Environmental Protection Act really connects a company for the first time to business activity generating sustainability disclosure and reporting professions that can give up on its business impact on nature with mitigation measures to be adopted for no further degradation in that year or season. It demonstrates transparency and accountability in addressing environmental concerns Zhang et al., (2022). And since it directly affects the concern of countries, it helps in showing how green activities contribute to shifting the sustainable development of the African continent through ventures that will adopt a greener orientation in their entrepreneurial activities Quacoe et al., (2023).

Environmental reporting and disclosure can also be defined as voluntary reports disclosed by corporations, who desire to offer further information and value to their concerned stakeholders relating to how their activities and operations affect society as well as the environment Yanez and Jose (2022). These reports are disclosed in most cases

by corporations for them to be able to make public some of their agendas in relation to their activities' effect on society. This helps startups in Nigeria understand the view of the public regarding their activities and how it affects the environment taking into consideration their repercussion.

Environmental reporting is the dissemination of information, compelled either by law or voluntarily, which provides a means for outside people to know how much a stakeholder acknowledges the impacts of a company's business decisions on the environment (Pooja and Tatavarty, 2023). Usually, such reports are expected to include descriptive commentary on environmental programs or policies, compliance with local environmental laws, attainment of environmental certifications or awards, use of environmental management systems, explanation of some environmental risk assessments, quantitative figures or indicators on waste quantities and natural resource use, emissions from the company, and the capital put at stake in some intrinsic cases (Somayajula et al., 2022).

Sustainable Development

Sustainable development explains the process whereby depending on interrelated attributes, financial, social, cultural, and political are utilized to enhance the level of life of people through the sustainable use of natural resources and the preservation of the environment for both present and future generations (Zhanbayev et al., 2023). It calls for a balance between socioeconomic development on one side and environmental protection on the other so that development is speeded up but not to the extent that natural resources are depleted (Eylla, 2023). Originating from the Brundtland Report of 1987, the concept pushes for the responsible management of resources to conserve ecosystems for the future (Rueda et al., 2023).

The sustainable development draws upon the three pillars of sustainability-economy, society, and the environment-that bolster long-term responses to pollution, resource depletion, and climate change challenges (Saskia et al., 2023). Such would be a more effective catalyst to lead Nigeria, among resource-rich countries in Sub-Saharan Africa to sustainable development.

Sustainable development is a process whereby, through a paradigm shift, nations consciously move toward industrial development in line with their environmental sustainability by in effect ensuring harmony in the development and preservation of the environment (Yousef et al., 2023).

The 2015 United Nations Sustainable Development Goals campaign is aimed at eradicating poverty, protecting the environment, and promoting prosperity for everyone by 2030 (Patrick & John, 2024). The goals embody an integrated approach for addressing a spectrum of issues that a member state must simultaneously address while taking into consideration differences in the level of development, policies, and administrative systems. The key thematic areas include clean energy, climate action, water and sanitation, sustainable cities, and responsible consumption to contribute to a just and resilient global ecosystem (UNDESA, 2023). Thus, by incorporating these goals into national development strategies, countries can accelerate inclusive growth while reducing environmental damage, in a view toward long-term stability (Ahmad et al., 2024).

One of the dimensions of social development is the social progress index. The Social Progress Index (SPI) provides an assessment of how well countries meet the basic social and environmental needs of their people, independently of economic factors like GDP per capita (Kristen & Loreau, 2023). Indicated by the UN Development Program, the index measures 150 nations and more and encompasses a 1990-2020 retrospective study featuring 52 indicators across 12 components (Mercedes et al., 2023). The tool is mandated for the assessment of long-term social and environmental progress-a social measure of principal livelihood experienced in Nigeria and the social outcome of such economic changes (Manabendra & Swades, 2023; Kraus et al., 2023).

The SPI is therefore a result of several analyses of the relation of economic development and social progress; this enables the identification of highly impactful areas of investment and measurement of the effects of major events such as wars or pandemics (Stirling et al., 2022).

The SPI aspires to reinforce global well-being by assisting governments, private sectors, and nonprofits in directing their resources toward the most urgent social and environmental problems (Mohaammad et al., 2023). The SPI is different from composite indices that combine both economic and social aspects. The SPI separates these non-

economic factors so that national development can then be viewed in a much clearer light, offering a counterpoint to the Human Development Index (H. Ahmad et al., 2023; Boumahdi & Zaoujal, 2023).

Conceptual Framework

Figure 1: Conceptual Construct of Research Dimensions

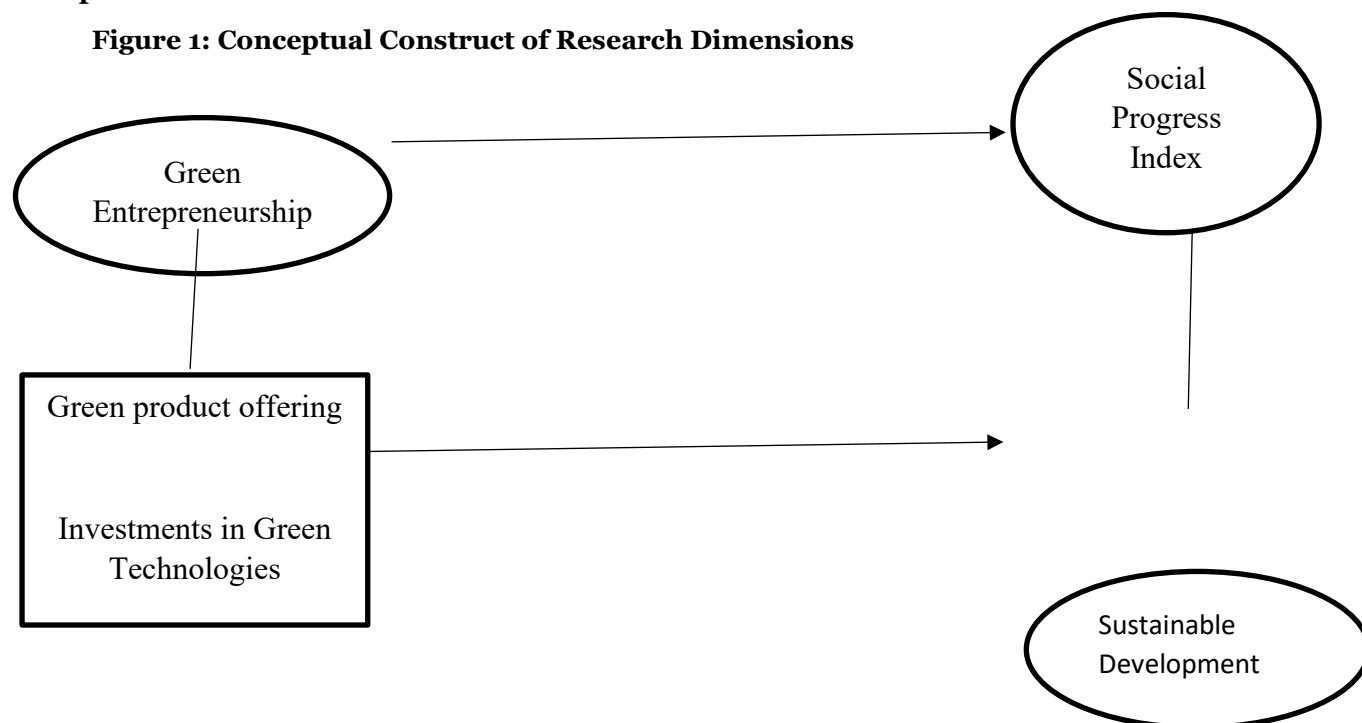


Figure 1: Study's Conceptual Framework (Researcher 2024)

Theoretical Framework

However, this study is anchored on stakeholder theory. Stakeholder theory is referred to as an efficient tool that helps an organization strategically account for various components that affect the business which are employees, customers, partners, communities, and many others Mu et al., (2023). This theory demonstrates that every business, and most especially startups in the Nigerian entrepreneurial ecosystem, are made from these components to succeed Ajah (2023). In as much as businesses are created to make profits and realize a set of vision, missions, and objectives it also takes customers to make the products to be sold, and employees to be able to carry out every single task that will ensure the best delivery of the services Gomes et al., (2023), partners and stakeholders that will uphold the business through their investment shares be it financially in most cases but also non-financial through legal advice, validated ideas that would construct a sustainable framework for the business to effectively thrive and succeed and then the communities which for most cases represents the market that would consume the products being delivered by the companies (Schaltegger et al., 2022).

Notwithstanding, the highest quality that has been invested by a startup into the making of a product, if it is not accepted and consumed by customers, all the efforts deployed by the organization would have just been invested by a startup into the making of a product if not accepted and consumed by customers all the efforts deployed by the organization would have just been at lost Funko et al., (2023), so the communities which essentially make up the customers or the target market are key part of the stakeholders that would contribute to the startup's successful goals and objectives achievement regarded their profits through products and services that have been ushered on the markets by those startups particularly, Alliou and Mourdi (2023).

Nevertheless, this theory, even though it contains necessary advantages for any organization that applies the standard prescribed, also has some defaults that may not be in all cases and all the time at the advantage of the organization, or more precisely, startups that are practitioners of green entrepreneurship and also contributors to the sustainable development of a country that is Nigeria more precisely (Kirchherr et al., 2023). This theory sometimes tries to put more emphasis on everybody within the organization, and this can constitute a distraction for the sake of goal-setting

success and may end up affecting the outcomes of business decisions. It has also been pointed out by many scholars that there is a lower level of focus on the management value Van Den Hout and Davis (2021). Even though stakeholders are an important part of the organization namely the startups, this would not signify that all focuses have to be on their interests at the detriment of the organization's own goals and objectives, which is usually the case in some organizations and it can easily be a source of distraction for the sake of goal getting Daradkeh (2023).

Applying the stakeholder theory means also attending to everybody's needs represented in the organization, and as a business established to make a profit even though it has been built with a conscious of the environment, this can be a reason for failure and not success for this particular organization (Kraus et al., 2022). Despite some short-cuts that are comprised in the design of the stakeholder theory, it appears to be the more suitable one for this study to be anchored on because even though every business (startup, small and medium enterprise or even corporation) needs to put a particular accent on its stakeholders Ozdemir et al., (2023), this will also help the organization to be able to effectively manage all of the resources whether internal and external at their disposal while not losing also focus on their main goals and objectives (De Oliveira et al., 2023).

Also, this study is anchored on the theory of social change, green entrepreneurial ventures exist on a primary mission to make profits through their ventures, but another side of their mission is also to contribute to the welfare and sustainable living of the society around, especially in Nigeria Mahajan et al., (2023). Karl Marx is the founder of this theory Krebs et al., (2022), it can be identified in sociology as an alteration of mechanisms within the social system which is characterized by changes in social symbols, rules of behavior, social organizations, or values systems La Rocca and Artieri (2023). This theory from which is derived the economic theory of social change is best suitable for the scope of this study and what this study intended to achieve. The economy theory of social change which is also known as the Marxist theory of change is based on the fundamental knowledge that a change occurred in the economic 'infra-structure' is the primary basis for its social change (Jacobs 2024).

Empirical Review

Researchers in their reviews of numerous studies, especially those conducted in the last three years, have established a consistent strong connection between green entrepreneurship and sustainable development in Africa, particularly in Nigeria, a hub for entrepreneurial activities (Walter et al., 2020). Green entrepreneurship, moreover, tends to stand as one of the key movers of economic success with a pledge towards a much softer facet of environmentally sustainable development (Antonio et al., 2022). The emerging global framework of environmentally-sustainable business operations has brought to the essence the key significance of the green-oriented entrepreneurial undertaking in shaping a more sustainable future (Lu et al., 2023).

Some scholars further believe that while green entrepreneurship regards economic and environmental sustainability, development pathways across Africa, with Nigeria as a prime example, are resource-driven (Favour & Modupe, 2024; Mohammed et al., 2022). Regardless, while Nigeria is endowed with these resources and is home to a young and vibrant workforce, green enterprises shall reflect on the development of industries as well as sociocultural change through reduced environmental exploitation (Britwum & Demont, 2022; Elsy et al., 2023).

While some researchers highlight the benefits of green entrepreneurship in driving employment and innovation, others argue that it is not the sole determinant of sustainable development in African nations (Yu et al., 2022; Gulsan et al., 2022). Proponents of green entrepreneurship emphasize its role in job creation through environmentally friendly business models, which can contribute to Nigeria's economic transformation and social well-being (Vivian et al., 2022; Richard et al., 2022). However, there is a need for stronger governmental incentives and support for green entrepreneurs, particularly for unemployed youth, to integrate into the green economy (Okechukwu et al., 2023). Industrialization remains vital for Nigeria's economic growth, but it must be pursued with environmental consciousness to avoid long-term harm to the nation's ecosystem and social fabric (Harry & Samuel, 2022; Di et al., 2023). The foremost strategies and national legislative tactics should emphasize sustainability for industries to operate within ecological limits while maximizing compensation (Wang et al., 2023; Adenike & Jim, 2023).

The government is an actor facilitating green entrepreneurship via reforms in the policies, support through funds, and research initiatives (Rebecca et al., 2020; Zenaida & Elisabete, 2023). By aligning with the United Nations' Sustainable Development Goals (SDGs), Nigeria has the potential to become a leader in green entrepreneurship,

leveraging its vast natural and human resources for sustainable growth (Mohsin et al., 2023). Researchers suggest that the adoption of a triple helix model—integrating academia, government, and the private sector—can drive innovation and investment in green initiatives (Kalaivani et al., 2023). Early-stage startups require financial backing and training in green business models to ensure long-term sustainability and competitiveness in the global market (Pravee et al., 2023; Luo et al., 2022). Also, incorporating green entrepreneurship into educational curricula can foster an environmentally conscious entrepreneurial culture among Nigeria's youth (Isaac et al., 2024; Yinglong et al., 2023).

Nigeria's manufacturing sector is a key driver of industrialization but remains one of the largest contributors to environmental degradation (Ahakwa et al., 2023; Abid et al., 2023). Scholars suggest that adopting green technology in manufacturing can reduce resource depletion and mitigate environmental harm while ensuring industrial growth (Mark et al., 2022; Edward et al., 2024). Moreover, a more inclusive and collaborative approach involving multiple stakeholders—government, private enterprises, and civil society—can help enforce sustainable business practices at all levels (Nadia et al., 2022; Zhong et al., 2023). Green entrepreneurship, when effectively implemented, has the potential to strengthen Nigeria's economy, create jobs, and improve environmental sustainability while ensuring the long-term viability of the country's development agenda (Amulya et al., 2023; Quacoe et al., 2023).

Entrepreneurship that prioritizes environmental safety contributes to resource optimization, ensuring efficient utilization, manufacturing, and value creation in the market (Lin & Xie, 2023). This approach is vital for economic development and social progress. Benjamin et al. (2021) emphasize that addressing environmental issues such as climate change, pollution, and resource depletion is crucial for Nigeria's sustainable growth. Awareness of environmental concerns requires a long-term education drive in schools, organizations, and government institutions (Adam et al., 2024; Simon et al., 2024). There is some evidence of a positive correlation between sustainable entrepreneurship and economic development that showed beyond financial incentives, environmental entrepreneurship provides a means for developing an ecological consciousness among stakeholders (Majdi et al., 2023; Wejdan et al., 2023). Participation in that awareness, coupled with creative business ventures, provides employment, production efficiencies, and/or economic transformation (Luo et al., 2022; Mehdi et al., 2023).

Green entrepreneurship, linked with social change, is therefore viewed as one of the pathways of providing tangible answers to a few socio-economic issues, including the challenges of unemployment and poverty created in Nigeria by Tota et al. (2024) and Obey (2020). Green businesses chart out pathways to fill with sustainable milestones of their operations, primarily by reducing crime, enhancing health, and ensuring economic inclusion (Augustina et al., 2023). The literature reports that environmental education initiated at a young age builds the environmental awareness of the entrepreneur in the balancing act between profit and the environment (Yunita, 2020; Yasir et al., 2023). As awareness of a sustainable product increases among consumers, developing environmental safety as the bedrock of business principles thereby becomes necessary (Yusuf & Sarah, 2024). To maximize competitive advantage by preserving resources for the long haul, entrepreneurs need to inculcate sustainability into their business strategy (João et al., 2023; Obada et al., 2024).

Due to rising awareness for environmental issues, scholars are reevaluating their definition of entrepreneurship. This includes, but is not limited to the definitions of generating wealth, which are related to the social activities of being accountable for the environment (Jiarong & Masato, 2024). The policy on sustainable entrepreneurship advocated for by the Nigerian government would include production management, skill acquisition, ecosystem regulations, and funding for SMEs (Kinuli et al., 2021; Ali et al., 2023). These initiatives are in synch with the Global Agenda 2030 on sustainable development. Nigeria is among those that profit from a systematic approach to environmental accountability, which has sped up its economic prosperity (Daniel et al., 2023). Promoting green entrepreneurship not only drives economic growth but also safeguards the environment and nurtures a healthy entrepreneurial ecosystem (Simona et al., 2024; Marc, 2024).

Green entrepreneurship has demonstrated its ability to mitigate the negative effects of industrial activities while enhancing profitability for both individual ventures and national economies (Mark et al., 2022; Khalid et al., 2023). Researchers noted that resource-efficient business models significantly reduce environmental degradation and enhance competitiveness (Su et al., 2023). Efficient energy use is a key driver for sustainability, lowering costs and

promoting long-term economic growth (Carlo & Andrea, 2022). Policies that support green entrepreneurship can accelerate Nigeria's economic transition, create jobs, and cultivate skills necessary for a sustainable future (Musa et al., 2022; Minh et al., 2023). If properly implemented, green entrepreneurship will balance economic goals with environmental preservation, fostering an inclusive and sustainable economy in Nigeria (Issam et al., 2023; Oana-Daniella et al., 2023).

Green entrepreneurs play a crucial role in fostering a green economy by offering eco-friendly products and services while ensuring economic welfare (Loo & Wong, 2023). Green production systems deal with resource conservation, environmental protection, energy efficiency, and social justice, resulting in demands for the green products and, therefore, are capable of creating jobs and improving living standards (Abbate et al., 2023). Working jobs recognized by the United Nations Environment Program encompass diverse sectors, including agriculture, manufacturing, and research, as contributing to environmental sustainability (Udeagha & Muchapondwa, 2023).

Meanwhile, many studies have vindicated the relationship of green entrepreneurship to sustainable development along with scant attention on how this is adaptively implemented in Nigeria (Esther et al., 2023; Lukman & Raimi, 2023). Agencies of the governance and non-governance types should set up a mentorship program, networking spaces, and a regulatory structure for promoting startups to take on greener business models (Errico et al., 2023; Subra et al., 2023). Network building among green entrepreneurs can accelerate the achievement of sustainable development as information exchange and collaboration through knowledge sharing in a network creates an enabling environment to support green business (Ali et al., 2023; Laurence, 2022; Olu et al., 2022).

While green entrepreneurship appears like a promising economic area within Nigeria, it remains in its infancy, yet to come into its full realizable value in terms of technological advancement, financial injection, and policy support (Luo et al., 2022; Richard et al., 2022). African nations appear to recognize it increasingly now, but scholars reckon it should need plenty of research, investment, and institutional support for it to be sustained for long (Zakaria & Krzysztof, 2023; Kinuli et al., 2021). Studies from Nigeria and beyond patterning Ajah (2023), Bakry et al. (2024), and Blimova et al. (2022) observe that green entrepreneurship has taken off globally, replete with a lot of economic and social implications. Green entrepreneurship will, with nations continuing the transition to sustainable ones, keep on being most probably one of the leading academic and policy debates in the shaping of future economic and environmental strategies globally.

A recent study has pointed out glaring lacunas in the conceptual, theoretical, and empirical studies on green entrepreneurship, with Nigeria and Africa lagging on key variables, such as investments in green technologies (Wembo et al., 2022; Yussuf, 2023). However, the existing studies are dominated by Western frameworks. Hence, there is a dire need for context-specific theories beyond the widely used models of the theory of planned behavior and knowledge spillover theory by Phiphop et al. (2023) and Safiya et al. (2024). Empirical research has largely focused on Western entrepreneurial ecosystems, highlighting the necessity of expanding knowledge of Africa's green business landscape (Mir et al., 2023; Joy et al., 2023). Unlike previous studies relying on secondary data from global databases like the World Bank RISE and GEM, this research employs primary data through direct surveys with Nigerian startups, ensuring context-relevant insights (Dina et al., 2023; Thomas, 2022). Although past findings affirm the positive impact of green entrepreneurship on sustainable development, they often lack actionable recommendations suited to Nigeria's ecosystem, emphasizing the need for government support and tailored strategies for startups (Ridge & Sara, 2023; Attah et al., 2024).

METHODOLOGY

Research Design

The purpose of this research was to ascertain the cause-and-effect relationship, that is, the correlation between two variables, namely sustainable development and green entrepreneurship. For this reason, a survey research strategy was selected for this project. In using the research design chosen (survey research design), a survey was carried out in the selected startups, whereby questionnaires were administered to respondents in order to gather the data necessary for answering the questions and meeting the objectives of the study. The questionnaires were self-administered, and a detailed explanation as well as a sample of the questionnaires are given in the appendix section of this work.

Population of the Study

This study's population comprised all 176 startups that are registered with the Office of Nigerian Digital Innovation (O.N.D.I) as green entrepreneurs, or startups that practice green entrepreneurship. These startups are classified accordingly within the distinct geopolitical regions of Nigeria as following: South West, North Central, North West, South East, North East and South South. This signifies that startups under studies are scattered around the six geopolitical zones of Nigeria that which composed the population of the study.

Sample Size and Sampling Technique

Taro Yamane formula was used to calculate the sample size for this study.

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

Where; N = sample size; N = population size e = acceptable sampling error

Therefore, the sample size is calculated as follows:

$$n = \frac{176}{1 + 176 (0.1)^2}$$

$$N = 64 \text{ startups}$$

The calculation above led to the conclusion that there are 64 startups in the sample size for this study. Thus, out of the 176 startups, only 64 that are particularly under the umbrella the Office of Nigerian Digital Innovation would receive questionnaires. The green entrepreneurs found within the study's sample size will be chosen by convenience sampling. Therefore, the researcher will choose entrepreneurs or startups that are engaging in green entrepreneurship from 64 samples or companies using the convenience sampling technique.

Methods of Data Collection

In order to address the research topic, as well as the research questions and objectives, the study used both primary and secondary data. Primary data is information gathered directly from respondents using a 5-point Likert scale to ascertain their opinions. The questionnaires were tested for validity and reliability using content validity and the split-half reliability test. Also, secondary data were gathered and analyzed from prior studies, including journals, textbooks, research reports that have already been published, newspapers, and reports on these startups. The validity and reliability of the instrument to be examined have been determined and approved through pilot testing by a designated group of individuals.

Methods of Data Analysis

The regression method of hypothesis testing was used to test the two (null) hypotheses through the Statistical Package for Social Sciences (SPSS) program v.27 in order to analyze the questionnaires, or more precisely, the primary data that was previously indicated.

Model Specification

To further examine the connections between the variables under investigation, the researcher used a linear regression model that was adapted from earlier research by Ronoh et al., (2021). The interaction between the dependent variable and the two independent factors was evaluated using a multiple regression model.

$$Y = \beta_0 + \beta_1 IET + \beta_2 ERD + \varepsilon - - - - - i.$$

Where Y is the Social Progress Index, which is the component used to gauge sustainable development, Beta coefficients are denoted as β_1 , β_2 , while β_0 is the constant term. Investment in Green Technologies (IGT), Environmental Reporting and Disclosure (ERD), ε = Error term Regression coefficients. In all cases where the p-value is less than 5%, the null hypothesis $H_0: B_2 = 0$ is rejected.

RESULTS AND DISCUSSION

a. Descriptive Statistics Tables

Table 1. Environmental Reporting and Disclosure [ERD1: My startup offers training on environmental reporting and disclosure.]

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	8	16.7	16.7	16.7
	Disagree	9	21.4	21.4	38.1
	Neutral	7	14.3	14.3	52.4
	Strongly Disagree	10	26.2	26.2	78.6
	Strongly Agree	9	21.4	21.4	100
	Total	43	100.0	100.0	

Researcher Computation (2025)

Out of 43 respondents that have attended these questionnaires, it is impressive to observe that the amount of people that both agree and disagree are as high from both sides that which reveals first of all a shared view as regarding the potency of information that green entrepreneurs acquire regarding getting trained on the essence of environmental reporting and disclosure. [Agree 8 – Strongly Agree 9] equal the number of people that make the first side of the balance while [Disagree 9 – Strongly Disagree 10] is the sum of people that aren't compatible with the idea of often getting trained on the matter of environmental reporting and disclosure. The results of this particular table are quite interesting because of the shared view point among entrepreneurs regarding training offered by startups to their staffs or even shareholders and stakeholders on how important this can be to understand the essence of environmental reporting and disclosure for a green startup business.

Table 2. Environmental Reporting and Disclosure [ERD2: My organization motivates staff to understand environmental reporting.]

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	13	31.0	31.0	31.0
	Disagree	7	16.7	16.7	47.6
	Neutral	10	26.2	26.2	73.8
	Strongly Agree	5	7.1	7.1	81.0
	Strongly Disagree	8	19.0	19.0	100.0
	Total	43	100.0	100.0	

Researcher Computation (2025)

It is as well very crucial for any startup operating in the green sector so to understand the very essence of the environmental reporting and disclosure which serves also in crucial and strategic decision making that the startup or organization is to take because it helps guide the sequence which binds factor like investments in sectors for example related to ESG (**Environmental, Social, Governance**). Therefore, there is a shared view among those that agree [Agree 13 - Strongly Agree 3] and them that don't seem to share the same view or to be on the same line [Disagree 7 – Strongly Disagree 8]. It was also noted that some people have no opinion regarding the importance of understanding the essence of environmental reporting and disclosure so to say. This table highlights the infinite

understanding that some entrepreneurs may have regarding the importance of getting to know about this tool that can be very crucial even in terms of decision making when it comes to the aspect of investment as a startup who seeks through its activities to add value to the achievement of sustainable development goals especially in Nigeria. It is also important to note that some entrepreneurs among the number of the respondents to this particular question have neither a particular view into motivating their organization or staff into understanding the essence of environmental reporting [Neutral 10]. In the course of this research, it has been understood that green entrepreneurship fields and all the measurements are yet to be totally applied into the sphere of the startup world that which justifies the neutrality of choice of some entrepreneurs.

Table 3. Environmental Reporting and Disclosure [ERD3: My business venture understands the urgent needs for environmental disclosure.]

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	12	28.6	28.6	28.6
	Disagree	9	21.4	21.4	50.0
	Neutral	12	28.6	28.6	78.6
	Strongly Agree	3	4.8	4.8	83.3
	Strongly Disagree	7	16.7	16.7	100.0
	Total	43	100.0	100.0	

Researcher Computation (2025)

A business venture especially a green business who does not have regards about the urgent needs for environmental disclosure or again publication about its activities ‘impact of the environmental might not be beneficial for such venture especially because of the area it’s dealing with which has all to do with the environmental safety based on their activities. For such the entrepreneurs surveyed have agreed [Agree 12 – Strongly Agree 3] that understanding the need for environmental reporting and disclosure is mandatory as this will highlight how effective the activities done by a startup can directly contribute to attaining the sustainable development factor in Nigeria mainly and even beyond. Meanwhile some entrepreneurs have diverse or opposite view to the first ones which their view have been surveyed [Disagree 9 – Strongly Disagree 7], thinking from their end that understanding the need and the emergency of environmental disclosure’s importance for the business is a crucial matter as it helps every green startup to understand how their activities can effectively contribute to achieving sustainable development goals. Nevertheless, the level of the neutrality [Neutral 12] regarding the urgent needs of practicing also environmental reporting and disclosure keep pointing at one important factor which is the need to encourage the promotion of the green revolution in Nigeria through the means of startups even the ones that have been surveyed in the course of this study.

Table 4. Investment in Environmental Technologies [IET1: I would like to establish an environmental oriented technology firm in the future.]

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	13	31.0	31.0	31.0
	Disagree	5	11.9	11.9	42.9
	Neutral	13	31.0	31.0	73.8
	Strongly Agree	7	14.3	14.3	88.1
	Strongly Disagree	5	11.9	11.9	100.0
	Total	43	100.0	100.0	

Researcher Computation (2025)

The green startup concept is intimately related to technology because a green business prioritizes sustainability and environmental conservation mainly through the means of tech adopted solutions, therefore the responses provided on **Table 4** gives an overview of the entrepreneurs standing as regard investing in environmental technologies, good is to observe that most entrepreneurs have the sense of investing in green technologies as mainly establishing a green firm or a tech environmental oriented firm [Agree 13 – Strongly Agree 7]. Achieving sustainable in Nigeria in the coming years will eventually depend on the investment that would be made in the green technology sector as it contributes to environmental safety. Reports from diverse international organizations advocating for a greener perspective of the world reveal how investing in green technologies would be beneficial not only to startups but to the economy as well as the environment in the coming years. Responses given by entrepreneurs on this table is a map out of the projection that will be needed in the sector of green technology as it will pertain to increase the essence of green entrepreneurship which will contribute in achieving sustainable development in Nigeria. Nevertheless, some entrepreneurs did not agree with the same view point [Disagree 5 – Strongly Disagree 5] due also to the fact that in this part of the world entrepreneurial activities are mainly yet done in the traditional way which sometimes does not need to have regards for the environment it justifies why some entrepreneurs did not necessarily opt in establishing an environmental tech oriented startup even though it would be very beneficial for the environment and the economy of Nigeria, meanwhile due to the relative newness of the concept of green entrepreneurship even in Nigeria some entrepreneurs prefer not having view or regard on whether they should or shouldn't invest in green firm as it will be of positive and significant effect on the environment in that it will contribute to achieve sustainable development in Nigeria which justify the high number of neutral responses [Neutral 13]. They prefer venture in the traditional way of doing business as it answers to entrepreneurship so they can make profit at every venture that to invest in an environmental conscious way so to make profit but also contribute to environment sustainability.

Table 5. Investment in Environmental Technologies [IET2: I would like to recommend investing in environmental technology to friends and others.]

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	14	33.3	33.3	33.3
	Disagree	4	9.5	9.5	42.9
	Neutral	12	28.6	28.6	71.4
	Strongly Agree	9	19.0	19.0	90.5
	Strongly Disagree	4	9.5	9.5	100.0
	Total	43	100.0	100.0	

Researcher Computation (2025)

The building of a society goes sometimes through others getting engaged in whatsoever might be useful for the society, the same applies to getting many other entrepreneurs or even non-entrepreneurs into investing in environmental tech related solutions and startups, during the survey done for this study a good number of green entrepreneurs agreed to recommend to friends and others investing into environmental tech or simply a green business venture [Agree 14 - Strongly Agree 9] it shows the possible emancipation at which green entrepreneurial activities are likely to grow in Nigeria even over the coming years which would help in order to achieve sustainable development in Nigeria, comparably the number of people not in line to that statement is relatively low [Disagree 4 – Strongly Disagree 4]. It shows the significant effect that green entrepreneurship through investment made in green ventures might have on sustainable development on the environmental and economic factors in Nigeria. This also reveal the future of green entrepreneurship through tech investment solutions how this future could actually be of great effect for the economy of the country but also its environmental and social sustainability. Meanwhile still some possible agents of change through their neutrality [Neutral 12] reveals that green entrepreneurial ventures would

likely grow stronger if more of the youth entrepreneurs especially taking into consideration the age gap (Table.5) that adopted the idea of green entrepreneurship the most get to invest in green technologies ventures as well.

Table 6. Investment in Environmental Technologies [IET3: I say positive things about investing in environmental technologies to others.]

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	12	28.6	28.6	28.6
	Disagree	6	14.3	14.3	42.9
	Neutral	11	26.2	26.2	69.0
	Strongly Agree	9	21.4	21.4	90.5
	Strongly Disagree	4	9.5	9.5	100.0
	Total	42	100.0	100.0	

Researcher Computation (2025)

Investment in green or environmental technologies has become an important matter as this proxy is one of the most important measurements of green entrepreneurship and its effects on sustainable development. As we observe in this table the number of people agreeing to represent the emancipation of the investment concept in green technologies is on high followed by those that not only agree but strongly believe in a good ROI when it comes to investing in green technologies [Agree 12 – Strongly Agree 10], while others do not really believe into the same ideology which means the concept of green technology in the course of building a green entrepreneurial venture is still yet to be accepted or again adopted by many that is what justify the following result [Disagree 6 – Strongly Disagree 4] and this boils down to people that are yet to develop an interest in the line of investing in green technologies as regarding building green entrepreneurial ventures in order to achieve sustainable development in Nigeria [Neutral 11], due to the high level of neutrality task is calling to encourage more the essence and plain understanding of encouraging why it is essential for startups to invest in green technology to help Nigeria achieving sustainable development.

Table 7. Sustainable Development [SD1: The basic human needs indicate a good level of the national progress index]

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	15	35.7	35.7	35.7
	Disagree	4	9.5	9.5	45.2
	Neutral	16	38.1	38.1	83.3
	Strongly Agree	6	11.9	11.9	95.2
	Strongly Disagree	2	4.8	4.8	100.0
	Total	43	100.0	100.0	

Researcher Computation (2025)

Sustainable development to be achieved in Nigeria depends on the implication of many factors and most essentially the national progress index, this survey can be underlined as a feedback startups get from individuals directly or indirectly affected by them which represent a good indication of the national progress index as tool to measure sustainable development in Nigeria, in that regards 15 of the respondents agreed that they contribute in achieving sustainable development by providing the basic human need as part of the national progress index followed by 6 that also strongly agreed to this survey which means that their startups are oriented in contributing to sustainable

development by providing basic human needs in Nigeria, while other startups have not the same regards [Disagree – 4, Strongly Disagree 2] it simply means these startups don't necessarily view providing basic human needs as the ultimate factor to achieve sustainable development in Nigeria but they tend to consider as environmental safety as the real measurement through which sustainable development can be achieved in Nigeria that which will guide them in whatsoever operations their startups will put in places also to make profit for them.

Table 8. Sustainable Development [SD2: Fundamental well-being is sign of a significant regional progress]

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	14	33.3	33.3	33.3
	Disagree	5	11.9	11.9	45.2
	Neutral	15	35.7	35.7	81.0
	Strongly Agree	7	14.3	14.3	95.2
	Strongly Disagree	2	4.8	4.8	100.0
	Total	43	100.0	100.0	

Researcher Computation (2025)

Progress index within a country is often measured through the level of well-being observed on the population and in the case of this study which seeks to understand how sustainable development is fostered in Nigeria by the means of green entrepreneurship, fundamental well-being is a very crucial aspect to measure up the level of the social progress index. In that regards entrepreneurs mostly agreed at 33.3% and 14.3% respectively based on the orientation of their startups which tend to affect the society at large as a leverage for sustainable development that fundamental well-being is significant for the regional progress index as it contribute to achieve social progress index, while others effectively disagreed to this fact at 11.9% and 4.8% respectively relating the aspect that fundamental well-being might not necessarily translate in a significant regional progress, meaning that for these entrepreneurs sustainable development can be achieve in Nigeria by factors other than social progress index in the example of gross domestic product with a focus that is not so anchored on the environmental sustainability as this work seeks to demonstrate. This explains the neutrality aspect that most respondents having attended the distributed questionnaires have shown by not giving explicit responses on the matter at hand which is if or not social progress index can effectively be translated through the fundamental well-being aspect within a society.

Table 9. Sustainable Development [SD3: Opportunities represent a positive factor of the organizational progress index]

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	16	38.1	38.1	38.1
	Disagree	5	11.9	11.9	50.0
	Neutral	14	33.3	33.3	83.3
	Strongly Agree	6	11.9	11.9	95.2
	Strongly Disagree	2	4.8	4.8	100.0
	Total	43	100.0	100.0	

Researcher Computation (2025)

The final survey simply highlights how startups can achieve social progress index through business opportunities that might be on their stakes which will enable them to make significant profit while effectively contributing towards achieving sustainable development goals in Nigeria. For this final survey the positive feedback has been more than the negative representing 38.1% of respondents agreeing 16 in numbers; followed by 11.9% of them that strongly

agreed representing 6 in numbers. Knowing fully well that not all the entrepreneurs have the same view on the topic matter of achieving sustainable development in Nigeria through green ventures it explains why relatively a low number responded negatively [Disagree 5 – Strongly Disagree 2], which means most entrepreneurs agreed that opportunities in securing funds, investments, partnerships or even innovations for their startups represents a positive factor for their organization progress index which will now affect significantly the social progress index in response of helping positively achieve sustainable development in Nigeria in respect to the Sustainable Development Goals Agenda 2030 initiated by the United Nations in the year 2015 and precisely the Goal 9 which represents: **Industry – Innovation – Infrastructure**.

Table 10: Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.4687	.463		10.129	.000
Investment in Green Technologies	.027	.068	.030	5.017	.009
Environmental Reporting and Disclosure	.162	.074	0.70	0.076	.028

a. Dependent Variable: Sustainable Development

Researcher Computation (2025)

Startups tend to have an important regard in the order of investing in green technologies in regards of their business objectives by a significance level of .009 which signify that technology being the backbone of green entrepreneurial ventures would be an important aspect in helping them achieving social progress index in Nigeria. Meanwhile, environmental reporting and disclosure is on the low regarding the significance level on social progress index in Nigeria by reason of the result of .028 which is a very low significance level and it means that the environmental reporting and disclosure aspect of green entrepreneurship has not been adopted fully by startups even in Nigeria.

Table 11: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.132 ^a	.021	.003	1.12040

Researcher Computation (2025)

The Model Summary table revealed that the R Square is at 0.21 which revealed at which level the effect of green entrepreneurship which is considerably affecting sustainable development through social progress index in Nigeria.

Empirical evidence from analyses showed that investment in green technologies is also a major component when it

TABLE 12: ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
001 Score	Between Groups	22.407	43	.546	.	.001
	Within Groups	.000	0	.		
	Total	22.407	43			

a. Dependent Variable: Organizational Performance

comes to push forward the green entrepreneurship agenda in Nigeria. Knowing fully well that the concept of a startup

is mainly technology based, green tech investment has therefore a major role to play in the entrepreneurial ecosystem in Nigeria since it is related to sustainable development achievement as it will affect the social progress index, based on the respondents' feedback we can highlight the following conclusion by saying (Olaghere et al., 2023). There is a continuous growing when it comes to the vision of establishing a green startup in Nigeria and this is favorable as it will help solve all the problem related to the society and environment as it contributes directly to better the social progress index in Nigeria Chen et al., (2023), it will be also of good advantage to encourage the establishment of such ventures which will then power up distribution of jobs as it would reduce even considerably unemployment in Nigeria, also very importantly it will be good to advocate the venture aspect in green technologies even to the younger ones in schools and universities as they will follow the full concept gradually as they can grow (Badru et al., 2023).

Also, the study found out that environmental reporting and disclosure, another non-negligible factor that composed green entrepreneurship as it affects the achievement of sustainable development in Nigeria through social progress index, through survey shared for this chapter it was observed that there is a shared view on the important role that this variable can play as far as green entrepreneurship is concerned and its effect on the sustainable development in Nigeria and here are some highlights given through respondents' view (Yasir et al., (2023); It will be beneficial for a green startup precisely but any other startup also possibly to be trained appropriately on the subject of environment reporting and disclosure so to understand what is the real scope that matters in this concept, staffs working in a green startup are encouraged on their own devotion to understand this concept so that they will have a guided productivity in order to help this startup achieves its goals and contribute to sustainable development, startups also need to know that the well-understanding of this concept is for the emergency at hand which is the environmental safety as it totally depends on green entrepreneurship but is also directly related to social progress index factor (Arejiobe et al., 2023).

CONCLUSION AND RECOMMENDATION

This research has established that: there is no significant effect of green entrepreneurship on the sustainable development of startups in Nigeria and there are no barriers hindering the contribution of green entrepreneurship to the startups' sustainable development in Nigeria. Therefore, in order to achieve sustainable development in Nigeria green entrepreneurship has a crucial role to play and this can majorly be done through startups that are advocates of green business ventures and innovation in respect with the environmental safety in Nigeria that which is directly contributing to sustainable development. It is therefore essential to encourage the emancipation of this entrepreneurship style which is relatively new in Nigeria for it to grow to full potential in the startups horizon as this is going to be beneficial at the micro level to the startups themselves but at the macro level to Nigeria, its institutions but also to the environment and the society.

Based on the results obtained from the previous chapter, suggestions/recommendations would be made for this study as following:

1. Investment should be made towards ecofriendly technology with aim not to harm but to contribute to environmental safety. Since the startup concept is directly attached to technology and innovation it should be done using technological know-how that would be beneficial even to the environment as well as the society for the benefit of the country as a whole not only startups.
2. A sound understanding of environmental reporting/disclosure would help green entrepreneurs guide their activities considering the environmental effect as well as their prospective investments or even partnerships.

Contribution to Knowledge/Policy Implication and Suggestion for Future study

Contribution to Knowledge

This research discussed the effect of green entrepreneurship on the sustainable development of startups in Nigeria. As to contribute in knowledge it reveals how green entrepreneurship if approached through the right concepts as discussed through the dissertation work would add considerable value to sustainable development not only in Nigeria but mainly for any nation seeking to address its challenges in a more sustainable way. This also means that sustainable development can count on the insights developed regarding green entrepreneurship to be certainly achieved in any

place within the planet. Therefore, as a matter of contributing to knowledge green entrepreneurship can be very efficient for the sustainable development of Nigeria.

Policy Implication

The results of this study call for action more targeted toward policies that support green entrepreneurship as a driver of sustainable development in Nigeria. Government agencies should work to provide a regulatory framework that will provide a catalyst for startups that use environmentally friendly business models through tax breaks, grants, and access to green finance. Policies should also encourage public-private partnerships to share knowledge and promote innovation in green technology. Strengthening the environmental laws will also be important for business compliance with environmental laws. Finally, introducing green entrepreneurship education into the national curricula will prepare future entrepreneurs with the relevant knowledge needed to sensitize them to sustainable native economies.

Suggested Area for Further Studies

The topic of green entrepreneurship is a very wide subject matter that is still evolving in Nigeria as this has been said in previous chapter. After having gone through many literatures in regards of this thesis, it would be advisable that many more studies need to be done as regard the real essence of green entrepreneurship for Nigeria, how can Nigeria with all its resources and natural endowments benefit achieve green economy, how can Nigeria and Africa at large champion sustainable development just on focusing on their natural resources and also ensure the safety of future generations to come. These studies are the type of research that can derived from this research as to address further studies on this topic matter.

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