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Green Leadership Capabilities and Environmental Innovation: A Conceptual Perspective

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ABSTRACT: The environmental issues that are mounting up and the growing international attention on sustainable development has placed the issue of good leadership in a pivotal role in leading the process of environmental innovation. The issue of green leadership as a strategy that facilitates sustainability has been recognized, but conceptual background of green leadership is limited due to its multidimensional nature and its impacts on the environmental innovation of an organization, especially in the emerging economies. In this study, there is conceptual analysis where the association between green leadership competencies and green innovation is looked at so that a composite framework can be formed to provide guidance on the theory and practice. Using conceptual research methodology, the study reviews secondary data in a systematic way, such as peer-reviewed journals, books, historical and other publications related to the topic, to synthesize knowledge on strategic green orientation, green knowledge and competence, sustainability change leadership, the digital enabled sustainability leadership and collaborative sustainability leadership. It is found that multidimensional green leadership skills have a combination of promoting eco-product and eco-process innovations, which in turn improve competitiveness and sustainability performance by the organization. On the basis of these results, this study suggests that companies should enact holistic green leadership behavior, include digital technology in sustainable programmers, and encourage knowledge-mediation and teamwork. The conceptual model empirically tested in future studies should include the investigation of the possible moderating and mediating variables. Finally, the paper makes a contribution to theory as it helps to frame an integrated green leadership-innovation model and practice by providing actionable advice to sustainably-oriented leadership.

KEYWORDS: Green Leadership, Environmental Innovation, Sustainability, Organizational Performance, Conceptual Framework.

INTRODUCTION

1.1 Background of the Study

The world is becoming more challenged by environmental degradation, the demands of climate change pressures and pressure on the stakeholders of sustainable business practices. As a reaction to this, the leadership has changed the traditional performance-oriented roles to environmentally responsible and sustainability-oriented orientations. Green leadership has become a vital organizational capability that has incorporated the environmental values in the strategic decision-making processes as well as the management of employees and the innovation processes. The original literature on the subject showed that by introducing environmental awareness into an organizational culture, leaders may be able to provoke pro-environmental behavior, encourage more green creativity, and

attain better long-term organizational success (Boiral et al., 2014; Garcasia-Morales et al., 2012). Pioneer works also highlight that environmentally strategic leadership can help firms to convert sustainability challenges into competitive advantages through value creation and innovation (Esty and Winston, 2006). On the international scale, environmental innovation which includes eco-product and eco-process innovation has turned out to be a primary mechanism by which organizations have sought sustainable development. As the research indicates, the leaders who are devoted to environmental values have a substantial impact on the growth of green innovation, environmental performance, and sustainable business performance across different sectors (Fernando et al., 2019; Elrayah and Keong, 2023).

The empirical data provided by developed and developing economies also indicate that green transformational and sustainable leadership approach has a critical influence on the development of innovation ecosystems, especially in the case of environmental uncertainty and system pressure (Cai et al., 2025; Ji et al., 2022). According to these results, leadership capabilities should be regarded as strategic resources that lead to environmental innovation as well as organizational resilience. Institutional limitation, limited resources, and industrialization frenzy towards a high rate make sustainability issues more complex in the African arena. Consequently, leadership-led environmental innovation has gained greater topicality regarding the need of the firms to find a balance between ensuring economic development and not harming the environment. The empirical study of Ghana shows that green transformational leadership does have a positive effect on the organizational performance of manufacturing SMEs, although it has a positive impact only when it is backed by green creativity (Agbenyegah et al., 2024). Likewise, studies in the developing economies have emphasized that sustainable and green leadership is associated with innovation, because of how it shapes the culture of organizations, the way it positively influences the engagement of the employees and how it directs the strategic orientations towards sustainability (Kareem and Kummitha, 2025; Ahmad et al., 2021). The studies support the belief that leadership capabilities are critical facilitators of environmental innovation under resource limited settings.

In the region of West Africa and Nigeria specifically, green leadership and environmental innovation is becoming an increasingly important concern due to the decline of the environment, government regulation, and the necessity of a sustainable economic transformation. Nigerian organizations are becoming increasingly active in volatile environments with leadership that is a determining factor of survival on a long-term basis coupled with the management of human capital and innovativeness. Research on strategic human resource management and organizational performance in Nigeria provides a focus on the relevance of leadership-based capabilities in the promotion of sustainable growth and innovation (Aliyu et al., 2024; Mohammed and Sundararajan, 2024). Also, it has been proved that entrepreneurship and innovation-based leadership are the most important directions towards sustainability in Nigeria and the contexts with the similar vision (Aliyu and Kumar, 2022). I find in this accumulating evidence a gap in the conceptual integration of the green leadership capabilities as a multidimensional construct and their overall impact on environmental innovation especially on the developing and the African economic sectors. This absence can serve as a good reason as to why the current conceptual study was conducted.

1.2 Problem Statement

Although there has been increased understanding of green leadership as a key pillar of organizational viability, most organizations are still struggling significantly to action green leadership ideas into the actual environmental innovation results. Although the commitment of the leader towards the environmental values has been found to affect the employee pro-environmental behavior and the organizational citizenship behavior towards the environment, practice is still inconsistent and incomplete across sectors and geographical areas (Robertson and Barling, 2013; Tuan, 2019). It has been shown empirically that green transformational leadership may promote pro-environmental responses; nevertheless, those responses are typically conditional on mediating factors like green values, training systems, and organizational climate, which do not always have

a place in organizational structures (Sun et al., 2021; Liu and Yu, 2023). The main problem is the insufficient organizational ability to relate leadership practices with workforce abilities, knowledge disseminating and innovation structures that are needed to innovate the environment. Researchers assert that despite the existence of green leadership, the lack of proper integration of the human resource practices, inadequate training, and weak digital and analytical support systems inhibit the delivery of the green innovation results (Singh et al., 2020; Sundararajan et al., 2022).

In addition, new findings suggest that such initiatives of leaders may not be able to scale because of the lack of a favorable psychological green climate and systematic technology-driven innovations (Oktay soy et al., 2025). Such issues are especially acute in terms of manufacturing and SME, where the lack of resources is another restriction on the efficacy of green leadership activities (Khan et al., 2023). Besides the issue of implementation, the available literature suggests that there are huge conceptual gaps in the understanding of green leadership as a multidimensional capability. Most of the research on green transformational leadership or leadership styles investigates them independently, with behavioral outcomes mentioned that are mostly employee green behavior or organizational citizenship behavior towards environment (Wu et al., 2025). Although these studies are informative, they lack in explaining how various leadership competencies including strategic orientation, knowledge competence, digital enablement, change leadership, and collaborative sustainability are applied together in affecting environmental innovation. Most recent systematic reviews highlight the disconnectedness of sustainability leadership literature by stating that specific conceptual models are missing that can relate leadership competencies, organizational mechanisms, and innovation performance (Wijaya et al., 2025).

In the developing economies such as Nigeria, the conceptual and practical gaps are augmented by institutional weaknesses, skills, and changing organization priorities. The studies conducted in the Nigerian context emphasize the impact of decision-making, quality of leadership, and the development of the organizational capability on the firm behavior and performance, but the impact of environmental innovation is still under investigated using the frames of leadership (Sundararajan et al., 2024). Moreover, the studies of the sector recommend that workforce readiness and skills development usually lean towards operational efficiency, but not innovation aimed at long-term sustainability (Mohammed et al., 2024). It therefore follows that there is a pressing need to have a holistic conceptual framework that forms a complex construct of the green leadership capabilities and to explain their contribution towards environmental innovation especially in the emerging and developing economic environment.

1.3 Significance of the Study

The paper contributes seriously to the academic community by enhancing the academic knowledge of the relationship between the green leadership potentials and environmental innovation in a conceptual view. Even though previous literature recognizes how environmental and green transformational leadership impacts innovation and performance performance, a lot of it is generally disjointed and concentrated on a particular style of leadership or separate behaviors mechanisms (Begum et al., 2022; Ababneh, 2021). This paper builds on the existing body of literature that advances the study of green leadership by conceptualizing the phrase as a multidimensional capability, unlike most studies that focus on leadership as being a unidimensional concept. The article uses the resource-based perspective and provides a contribution to theory as it immerses the idea of green leadership capabilities as strategic organizational resources that can stimulate the creation of the environmental innovation and sustainable competitive advantage (He et al., 2023; Dhaliwal et al., 2025). Moreover, through incorporation of elements of leadership, ethics, strategy, and organizational learning kind of perspectives to a single conceptual framework, the study contributes to the current body of literature regarding environmental innovations. The previous empirical studies have established that environmental leadership and green strategic orientations improve green innovation and environmental performance, but these connexons have been studied separately (Chen and Chang,

2022; Ibarra-Cisneros et al., 2024). This gap is filled in this research as it provides a taxonomically rich conceptual connexon between leadership competencies and environmental innovation, thus meeting demands of increased integrative and theory-based sustainability studies (Zhang and Zhu, 2019). This way, the study is a basis of future empirical testing and theory expansion in the field of leadership and sustainability.

Practically speaking, the results of this research may be a fruitful contribution to managers, policymakers, and organizational leaders who aim to facilitate environmental innovation by means of leadership development. The research (when emphasizing the importance of green leadership capabilities) can offer practical information on how businesses can use leadership, human resource management practices, and strategic orientation to improve the results of green innovation (Demir et al., 2025; Begum et al., 2022). The focus on the leadership skills coincides with the findings of relevant literature that reported the importance of sustainable innovation through effective talent management, engagement of employees, and organizational learning as necessary conditions in the dynamic business environments (Aliyu & Shanmugam, 2024; Muhammed and Sundararajan, 2024). Besides, the study enlightens the policymakers and institutional stakeholders as leadership is a key driver in promoting environmental innovation and sustainable development agenda. When organizations are under increasing pressure by stakeholders to act in a way that benefits the environment, green innovation, which is led by the leadership is necessary to balance the business goal and sustainability (Zhang and Zhu, 2019). The findings of this study can be used to design leadership development interventions, sustainability policies, and institutional structures to promote leadership that is environmentally responsible and innovation within the industries, especially among new and developing economies (Chen and Chang, 2022; Sundararajan and Mohammed, 2024).

1.4 Research Objectives

The central aim of the paper is to conceptually explore the associations between green leadership competencies and environmental innovation. In particular, the study aims at:

1. To conceptualize green leadership capabilities as a multidimensional construct comprising strategic green orientation, green knowledge and competence, change leadership for sustainability, digital-enabled green leadership, and collaborative sustainability leadership.
2. To examine the conceptual relationship between strategic green orientation and environmental innovation.
3. To analyze how green knowledge and competence influence environmental innovation.
4. To explore the role of change leadership for sustainability and digital-enabled green leadership in driving environmental innovation.
5. To develop an integrated conceptual framework linking green leadership capabilities to environmental innovation.

1.5 Research Questions

In line with the stated objectives, this study addresses the following research questions:

1. How can green leadership capabilities be conceptualized as a multidimensional construct within organizations?
2. What is the conceptual relationship between strategic green orientation and environmental innovation?
3. How do green knowledge and competence contribute to environmental innovation?
4. In what ways do change leadership for sustainability and digital-enabled green leadership influence environmental innovation?
5. How can an integrated conceptual framework explain the relationship between green leadership capabilities and environmental innovation?

2.0 Literature Review

2.1 Conceptual Review

2.1.1 Green Leadership Capabilities

Green leadership skills can be described as the strategic, cognitive, and behavioral skills that allow the leaders to initiate environmental values into organizational vision and decision-making and innovation. Instead of being classified into a single style of leadership, green leadership

capabilities refer to a cluster of interconnected dimensions that can help the organizations to move towards environmental goals maintaining performance and competitiveness. In earlier research, it is noted that the most effective leadership-based environmental initiatives must be backed by strategic orientation, knowledge competence, and transformational change capacity (Islam and Ahmed, 2025; Hamdun Al Marhoobi et al., 2025).

a. Strategic Green Orientation

Strategic green orientation indicates the long-term willingness of an organization to incorporate variations of the environment in the strategic vision, policies and operational decisions within operations of the organization. Strategic green leaders are attentive to ensuring that environmental goals are integrated with organizational goals in a proactive manner, and thus, sustainability is embedded in some of the core business strategies and not seen as a fringe issue. Empirical and theoretical research indicates that this orientation allows companies to predict the harm of the environment, respond to the demands of stakeholders, and invest in environmental innovative solutions (Islam and Ahmed, 2025; Hamdun Al Marhoobi et al., 2025). Strategic orientation involves proper allocation of resources, governance system and financial decision-making processes, which would enable sustainability efforts. Regarding management, it is well understood that managerial competence in dealing with complicated operational and financial systems increases long-term green strategy viability, specifically in the technology-based and regulated industries (Aliyu, 2024). Compensation of environmental priorities in the strategies will provide a ground by which leaders can be aware of the green technological advancement as well as the consistent increase in environmental performance (Hamdun Al Marhoobi et al., 2025).

b. Green Knowledge and Competence

Green knowledge and competence are the environmental awareness, technical and the capacity of leaders and employees to use environmental knowledge in organizational processes. As it is continuously noted in the literature, the process of environmental innovation heavily depends on how organizations purchase, distribute and use green knowledge (Song et al., 2020). The leaders have a key role to play in creating learning environments that encourage the provision of environmental knowledge, absorptive capacity, and skills to create green innovation. Investigations also prove that green training and competence development is the method that can greatly improve the environmental performance by improving green skills and possibilities of employees to participate in the sustainability initiatives (Yafi et al., 2021). It has been demonstrated that environmental leadership with a focus on knowledge learning and the constant maintenance of capabilities can positively influence green innovation practices and the performance of firms in general (Su et al., 2020). Along with that, leadership initiatives are also strengthened by the supportive human resource systems and green-oriented cultures, which entail the institutionalization of the environmental knowledge and competence at all organizational levels (Paillé et al., 2020; Rizvi and Garg, 2021).

c. Change Leadership for Sustainability

Sustainability Change leadership is concerned with the ability of leaders to spearhead change processes in the organizations to make them environmentally responsible. Green initiatives can be hard to implement, in that they can necessitate a change in the processes, technologies, and the mentality of the employees involved, and therefore the change management process should be led by the leader. It has been found out that, when aligned with environmental goals, transformational leadership enhances the culture of green and inspires employees to behave in a sustainable manner (Rizvi and Garg, 2021). Change is another aspect that requires effective change leadership, which includes overcoming socio-economic and contextual barriers and especially in the third world economies. Available evidence also indicates that leadership-based change is significant in empowering entrepreneurial operations and facilitating sustainability-focused transition in organizations and communities (Mohammed & Sundararajan, 2024). Moreover, technological change related to economical sustainability including the introduction of more advanced systems and automation will demand leaders who will be able to combine innovation strategies and environmental objectives and coordinate the organizational opposition and

capability deficits (Kumar et al., 2024). Change leadership can be used to transform green strategies and knowledge into the outcomes of environmental innovation through long term commitment to change.

d. Digital-Enabled Green Leadership

Digital enabled green leadership is the capability of leaders to use digital technologies to enable them achieve environmental goals, maximize the use of resources in a more sustainable-friendly manner, and make better sustainability-friendly decisions. With the growing integration of organizations, which are technologically active into their respective business processes, digital tools like data analytics, automation, and intelligent systems are indispensable facilitators of green initiatives. The ability of leaders to incorporate digital empowerment into sustainability plans places them in a better position to track environmental effects, enhance operations, and encourage the use of eco-innovation in business operations (Aliyu & Shanmugam, 2024). It is proposed in the literature that the technological type of leadership improves the agility and innovation ability within the organization, especially when the transformation to digital is strategically correlated with the environmental objectives. Digital leadership is the one taking care of green innovation because it enables an integration of knowledge, tracking through real-time performances, and inter-functional coordination, thus empowering the environment results (Ivanov and Keller, 2024). Besides, efficient leadership within the digital realm means governance of resources, strategic innovation, and improvement of these through appropriate governance of IT investments so that they can add value to the sustainability agenda (Mohammed, 2023). Digital-enabled leadership at the organizational level can help organizations to quickly innovate in the field of environment and remain in the rapidly changing markets.

e. Collaborative Sustainability Leadership

Collaborative sustainability leadership emphasizes the part played by leaders in supporting collaboration among internal and external stakeholders such as workers, merchants, shoppers and communities in order to deliver sustainable performance. The nature of environmental issues is such that they are multi-layered with intersections and therefore, collaboration is an important leadership skill that can further sustainability efforts. Evidence has shown that leaders that facilitate shared responsibility and participative decision-making are more likely to develop a good environmental culture and improve the performance of a given corporation in terms of its sustainability (Widjanarko et al., 2025). In addition, collaboration promotes sharing of green knowledge, innovation ideas and best practices hence environmental innovation outputs are enhanced. Teamwork based on leadership will promote employee involvement and commitment to sustainability objectives which, respectively, will promote innovation and resilience (Gunay, 2025; Du, Yan, 2024). Empirical studies also indicate that collaborative leadership strengthens sustainability initiatives implementation as it aligns the interests of stakeholders and brings together the collective resources in the innovation of the environments (Altaf et al., 2025). Collaborative sustainability leadership is therefore an important process whereby organizations convert their environmental intentions into action oriented and effective outcomes of innovation.

2.1.2 Environmental Innovation

Environmental innovation is the acquisition and establishment of new or major enhancement products, procedures, or practices, which minimize environmental degradation and optimize resources. In the paper, environmental innovation is considered as a unidimensional phenomenon that includes eco-product innovation such as product designs that are friendly to the environment and eco-process innovation, including cleaner production processes and operation processes that consume less energy (Rehman et al., 2021). Strategically, the environmental innovation is an imperative to winning competitiveness in organizations and its sustainability in the long run. The positive outcomes might also include better environmental performance, cost-efficiency, and competitive market position of the firms investing in eco-innovations (Kim and Stepchenkova, 2018). The concept of environmental innovation also leads to corporate sustainability by managing economic goals and environmental responsibility, which helps companies to effectively react to regulatory

forces and social demands (Ahsan, 2025; Ahsan and Khawaja, 2024).

In their literature, the authors have cited leadership, organizational culture, human resource practices, and technological capability as the drivers of environmental innovation. The consequences of green leadership on the innovation result are a sense of engagement within the employees and integrating environmental knowledge, as well as encouraging experimentation and learning (Ivanov & Keller, 2024; Alam and Kamal, 2025). Successful environmental innovation, in its turn, results in such positive outcomes as a better environmental performance, employee well-being, organic resiliency, and sustainable competitive advantage (Rehman et al., 2021; Shanmugam et al., 2024). In this regard therefore environmental innovation is a vital result in which the capabilities of green leadership are able to exhibit their strategic and sustainability effects.

2.2 Theoretical Framework

This research contains properly-established theories, explaining how the leadership capabilities would result in both innovation and sustainability outcomes in an organization. The present study employs a combination of resource-based View (RBV) Theory and Transformational Leadership Theory in order to suitably describe the relationship between Green Leadership Capabilities and Environmental Innovation, with the help of Dynamic Capability Theory. All these theories make an impressive contribution to the context of learning how leadership-based green capabilities act as strategic resources that promote environmental innovation.

2.2.1 The Resource-Based View (RBV) Theory

Resource-Based View (RBV) theory, which was initially postulated by Wernerfelt and subsequently enhanced by Barney, argues that those companies which have sustainable competitive advantage have valuable, rare, inimitable and non-substitutable (VRIN) resources. In the framework of this research, green leadership abilities like strategic green orientation, green knowledge and competence, and digital enabled green leadership are hypothetically depicted as intangible organizational resources that tick the VRIN standards. Green leadership skills can help companies to organize environmental expertise, and align sustainability objectives and business strategy and establish an environment that facilitates eco-innovation. The previous literature has indicated that environmental oriented leadership improves the performance of firms in green innovation by making proper use of the internal available resources in achieving sustainability goals. To this end, RBV offers an interesting description on how leadership-based green capabilities process affect environmental innovation through boosting internal resource alignment and innovation power in firms.

2.2.2 Transformational Leadership Theory

Transformational Leadership Theory focuses on the capacity of leaders to inspire, motivate, and cognitively engage followers in a manner that would make them perform beyond what is expected. Green transformational leaders, in turn, promote pro-environmental behavior, creative problem-solving, and share a vision of sustainability in the environmental context. This theory has been especially applicable in explaining the impacts of change leadership towards sustainability and collaborative sustainability leadership on environmental innovation. Leaders that develop a strong green vision and enable employees to act in a manner that is sustainable would help develop a climate that enhances experimentation, learning, and innovations. Transformational leadership thereby elucidates the behavioral and cultural dynamics in which, the green leadership capabilities are converted into the effects of environmental innovations.

2.2.3 Dynamic Capability Theory

The Dynamic Capability Theory is the extension of RBV as organizations are capable of integrating, building, and reconfiguring internal and external competences in response to the environment that is changing quickly. In environmental issues and sustainability pressures, the environment is dynamic and therefore demands constant adaptation and innovations. In this view, green leadership especially digital-enabled green leadership and strategic green orientation allows the firms to discern the environmental opportunities, capitalize on green innovation opportunities, and modify organizational processes to green sustainability. The capacity to keep obsolescing their green

innovation strategies and effectively responding to environmental opportunities, particularly under regulatory, technological, and stakeholder pressure, enables organizations to be green dynamic capabilities.

2.2.4 Rationale for Theory Selection

Combine RBV, Transformational Leadership Theory and Dynamic Capability Theory It provides a wholesome perspective of explaining the leadership environment innovation nexus. RBV identifies green leadership capabilities as strategic resources; Transformational Leadership Theory describes the motivational pathways and cultural pathways affecting innovations; Dynamic Capability Theory is the solution to adaptability and constant innovations in the context of sustainability. Collectively, the theories offer a solid theoretical rationalization to analyzing the role of multidimensional green leadership competencies in environmental innovation, hence upholding the conceptual model of this study.

2.2.4 Integrated Theoretical Model

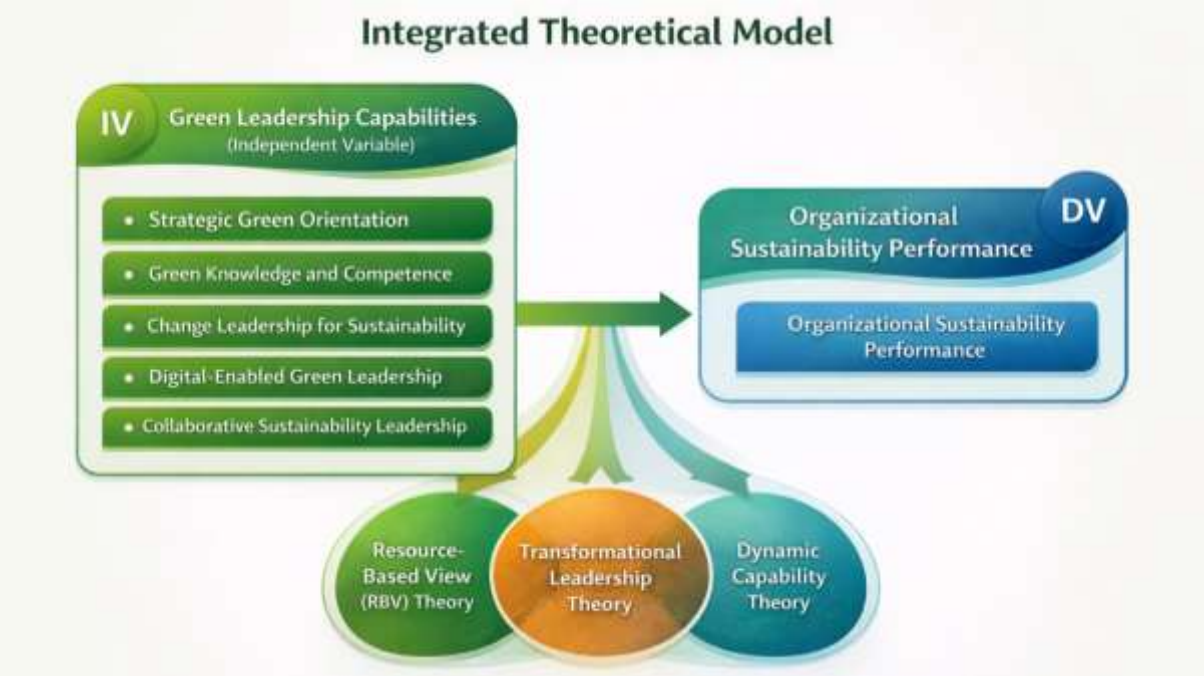

Figure 1: Integrated Theoretical Model of Green Leadership Capabilities and Organizational Sustainability Performance

Source: Developed by the researcher (2026)

The theoretical model is integrated in the conceptual diagram between the multidimensional capabilities of green leadership and performance organizational sustainability. The independent variable, Green Leadership Capabilities, is organized based on the five dimensions, Strategic Green Orientation, the Green Knowledge and Competence, Change Leadership towards Sustainability, the Digital-Enabled Green Leadership, and Collaborative Sustainability Leadership. The latter dimensions are displayed to affect the dependent variable, Organizational Sustainability Performance, focusing on the effect of a successful green leadership in achieving sustainable results. It is a theoretically grounded model based on three complementary theories, namely, the Resource-Based View (RBV), which in its turn focuses on the strategic importance of leadership capabilities as highly specific organizational resources; the Transformational Leadership Theory, which lends significance to the importance of leaders to motivate and inspire sustainable behaviors; and finally, Dynamic Capability Theory, which lends importance to the capacity of organizations to evolve and innovate in accordance with the environmental challenges. The arrows visually reflect the directional impact of the leadership capabilities on the sustainability performance that synthesizes the theoretical bases in one unifying framework to lead the empirical research and practical application.

2.3 Linkages Between Theories, Independent Variable, and Dependent Variable

The section combines the theoretical based discussions in Section 2.2 with the independent and dependent variables of the study and how the green leadership capabilities have an impact on the

environmental innovation using established theoretical lenses.

2.3.1 Strategic Green Orientation and Green Knowledge Capabilities through the RBV Lens

By relying on the Resource-Based View (RBV), strategic green orientation and green knowledge and competence are framed as the useful intangible resources which can help organizations to attain an outcome of sustainability based on innovation. Strategic green orientation indicates a long-term commitment by the leadership to involve environment concerns in the strategy of organizations, distribution of resources and decision making. Such orientation incorporated at the leadership level allows establishing a systematic channel of investing in the ecological-friendly technologies, restructuring of products, and enhancement of green processes. On the same note, environmental expertise, skills, and experiential learning as the green knowledge and competence improve the absorptive capacity of firms in adapting to eco-innovation. Under the RBV, the organization accumulating and deploying environmental knowledge in an effective manner is in a better place to come up with eco-product and eco-process innovations that may not be easy to replicate by their competitors. In this way, the strategic green orientation and green knowledge capabilities play the role of strategic resources that directly lead to the development of environmental innovation.

2.3.2 Role of Change Leadership and Digital-Enabled Practices in Supporting Environmental Innovation

The change leadership theory of sustainability presents the transformational Leadership Theory as an influencing factor to motivate the employees to pursue environmental objectives and get involved in the innovation activities. Sustenance-based change agents foster an organizational environment that fosters experimental, risk-seeking, and continuous improvement environments vital to environmental innovation. By inspirational and intellectual stimulation, green leaders who are change-oriented provoke employees to come up with innovative ways of dealing with the environmental problems. In line with this view, the digital-enabled green leadership that is based on the Dynamic Capability Theory accentuates the use of technology that enhances green innovation results. Data analytics, automation, and smart systems are digital tools that help organizations track environmental performance, minimize resource consumption, as well as propel eco-innovation. Digital technologies contribute to the potential of leaders to make firms more sensitive to detecting opportunities in the environment, exploiting an innovation opportunity, and re-working processes in regard to sustainability needs. As a result, digital enabled practices are also pivotal facilitators of the environmental innovation.

2.4 Empirical Review

In the recent empirical research, green leadership has been a crucial focus to environmental innovation in multiple industries and economies. It is established worldwide that leaders who embrace environmentally based strategies have a positive impact on the outcomes of the organization due to their boost of eco-innovation and sustainable organizational behavior (El-Kassar and Singh, 2019; Farrukh, 2025). As an example, the service and manufacturing industries show that green transformational and servant leadership directly relate to the sustainability performance of organizations by facilitating pro-environmental behavior and promoting innovation efforts (Althnayan et al., 2022; Arici and Uysal, 2022). Green leadership has been associated with improved organizational performance and social contribution in the emerging economies especially in the African region. Nigeria-based studies point out that an eco-friendly leadership style motivates innovation and contributes to the economic empowerment of women and the sustainable development agenda (Aliyu & Shanmugam, 2023; Aliyu, Shanmugam, and Lawal, 2022). Likewise, conceptual data of Ghana and other West African countries proposes that with organizational support green leadership, green creativity and sustainability performance among SMEs are improved (Alzghoui and Aboalganam, 2025; Ariosa and Nawangsari, 2025).

The available body of empirical literature also highlights the need to integrate digital and technological strategies on green innovation support. It has been observed that digital platforms and digital enabled leadership practices makes acquisition of green knowledge, performance of innovation and decision making with eco

consciousness, which shows the increased significance of technology in sustainable organizational practices (Aliyu and Shanmugam, 2024; Asbeetah et al., 2025). This tendency can be observed in a variety of settings which means that green leadership, along with digital and strategic potential, is an important source of both environmental innovativeness and sustainable competitiveness in the long term. Overall, existing empirical evidence shows that there are stable positive correlations between the concepts of green leadership and environmental innovation and that the mediating variables of such relationships are organizational culture, digital capabilities, and employee engagement. The major tendencies imply that companies implementing multidimensional green leadership strategies are in a better position to attain sustainable performance and competitiveness especially in the developing markets where the economic and environmental issues are also interconnected (Aliyu and Shanmugam, 2024; Arici and Uysal, 2022).

2.5 Research Gap

Although there is an increasing popularity of green leadership and environmental innovation, there are still a few gaps in the literature. Theoretically, most of the previous literature has addressed a single aspect of green leadership, including transformational or ethical leadership, and relatively little has been done regarding the questions of multidimensional aspects strategic green orientation, green knowledge and competence, change leadership, digital-enabled leadership, and collaborative sustainability leadership (Robertson and Barling, 2013; Singh et al., 2020; Ivanov and Keller, 2024). This theoretical weakness limits our comprehension as to how holistic leadership capacity leads to environmental innovation in concert. Empirical researchers tend to focus studies in developed economies or small industries, including manufacturing, and insufficient studies in emerging markets, in services, or in technology-led industries where environmental factors are critical (Ji, Xue, and Zhong, 2022; Boiral, Baron, and Gunnlaugson, 2014; Aliyu and Sundararajan, 2025). Therefore, a lack of evidence exists regarding the way in which green leadership practices can be implemented in different cultural, regulatory, and economic settings, especially in less developed countries such as the ones located in Africa.

Ideally, the majority of the research uses a single theory (resource-based perspective or green transformational leadership models) and does not incorporate different theoretical perspectives in elucidating the intricate relationship between the dimension of leadership and the outcome of environmental innovation (Chen and Chang, 2022; Demir et al., 2025; Kareem and Kummitha, 2025). This form of gap inhibits the formulation of holistic frameworks that would consume the dynamic procedures in which green leadership would generate sustainable competitive advantage. To conclude, the existing gaps will be incorporated through a multidimensional, situational, and theoretically integrated solution including the integration of all major dimensions of green leadership and exploring how these come together and influence environmental innovation, especially in emerging and technologically developing contexts (Aliyu & Shanmugam, 2023; Boiral, Baron, and Gunnlaugson, 2014).

2.6 Conceptual Framework of the Study

This paper suggests a theoretical framework that can be used to describe how environmental innovation and green leadership capabilities relate to each other. Basing the framework on the developed theories of leadership and innovation, the theory understands green leadership as multidimensional independent variable and includes strategic green orientation, green knowledge and green competence, sustainability change leadership, digital-enabled sustainability leadership, and sustainability leadership (collaboratively). It is believed that these leadership competencies positively affect the environmental innovation which is considered as a one-dimensional construct integrating innovations of a eco-product and eco-process. The framework offers a guided prism of how leadership-based resources, behaviors, and capabilities contribute to innovation of the environment of the organization.

Figure 2: Conceptual Framework of Green Leadership Capabilities and Environmental Innovation

Source: Author's conceptualization (2026)

The conceptual framework shows a direct and positive relationship between the green leadership capabilities with environmental innovation. It infers that with strategic green orientations, good environmental knowledge, sustainability-oriented change leadership, the implementation of digital technologies, and a partnership with stakeholder's organizational executives are more apt to foster the creation of eco-products and processes innovations. The framework helps to emphasize the role of leadership as a key motivator of environmental innovation and offers a systematic framework of the study of the outcomes of sustainability-oriented innovation in organizations, specifically on the context of emerging and developing economies.

3.0 Research Methodology

The proposed research follows a conceptual research design since research on a developing topic like that of green leadership capabilities and environmental innovation can have few or insufficient empirical data in some or all areas. Conceptual research provides the possibility to both develop theoretical frameworks, determine relationships between variables and synthesise the existing knowledge to come up with new information. The literature choice method has included systematic review of previous literature in the global, African, and Nigerian environment. The databases including Scopus, Web of Science, ScienceDirect and Google Scholar were referred to to find out all the peer-reviewed journal articles, books, and conference proceedings related to the topic of green leadership, sustainability, and environmental innovation, and so on. The selection of studies was done according to relevance, rigour, recency and contribution to theory and practice to have comprehensive understanding on the subject matter. To conduct conceptual analysis and synthesis, the research systematically analyses, compares and synthesises results of the evaluated literature in a coherent framework that can create a linkage between multidimensional green leadership capabilities (independent variable) and environmental innovation (dependent variable). Patterns and gaps and theoretical viewpoints are evaluated to develop interrelations and present a composite conceptual model. This approach will be used to ensure that the study makes a contribution both in academics and practice, through offering an evidence-based, well-structured framework on which to understand the way in which green leadership facilitates environmental innovation.

4.0 Findings of the Study

1. **Conceptualization of Green Leadership Capabilities:** The article defines green leadership capabilities as a multidimensional construct that includes strategic green orientation, green knowledge, and competence, change leadership on sustainability, digital-enabled green leadership, and collaborative sustainability leadership that offers a practical conceptual insight to the research community and practitioners (Aliyu et al., 2024; Yafi et al., 2021).

2. **Strategic Green Orientation and Environmental Innovation:** Strategic green orientation is identified to be conceptually creating environmental innovations through the alignment of organizational vision and long-term strategic goals with the objective of sustainable development, which facilitates firms in engaging in eco-product and eco-process innovations (He et al., 2023; Widjanarko et al., 2025).
3. **Green Knowledge and Competence Contribution:** Green knowledge and competence play vital roles in environmental innovation, with organizational learning, environmental expertise, and skills development making the employees and leaders to adopt innovative green practices (Song et al., 2020; Su et al., 2020).
4. **Change Leadership and Digital-Enabled Practices:** Change leadership to sustainability, in conjunction with digital-enabled green leadership, in theory improves environmental innovation by facilitating transformative practice and using technology to realize and monitor green initiatives efficiently (Hamdun Al Marhaba et al., 2025; Aliyu and Shanmugam, 2024).
5. **Integrated Conceptual Framework:** The research constructs an integrated framework that connects all the dimensions of green leadership capabilities to environmental innovation based on RBV, Transformational Leadership, and Dynamic Capability theories, which provide an overall model of being able to guide the future research and practise (Islam and Ahmed, 2025; Ibarra-Cisneros et al., 2024).

5.0 Recommendations of the Study

1. **Adopt Multidimensional Green Leadership Capabilities:** To ensure a successful outsourcing of environmental innovation, organizations ought to establish and institutionalize all five dimensions of the green leadership strategic orientation, knowledge and competence, change leadership, digital-enabled leadership, and collaborative leadership (Aliyu et al., 2024; Hamdun Al Marhoobi et al., 2025).
2. **Integrate Strategic Green Orientation in Planning:** Managers ought to consider long-term sustainability goals in the organization strategy to support the introduction of innovative ideas in products and processes that support environmental friendliness to their competitive advantage and sustainability performance (He et al., 2023; Widjanarko et al., 2025).
3. **Enhance Green Knowledge and Competence:** Organizations ought to introduce training, sharing of knowledge and capacity building movements in efforts to enhance environmental expertise of both leaders and employees as a way of creating effective adoption of green innovations (Song et al., 2020; Su et al., 2020).
4. **Leverage Change Leadership and Digital Tools:** The companies are advised to enable leaders to lead changes in sustainability and use digital tools to monitor the environment, report on it, and manage innovations (Hamdun Al Marhoobi et al., 2025; Aliyu and Shanmugam, 2024).
5. **Empirical Testing and Policy Alignment:** Future studies are advised to empirically confirm the conceptual model, possible mediators or moderators, whereas policymakers are advised to support frameworks that could prompt organizations to pursue green leadership practices and environmental innovation (Islam and Ahmed, 2025; Ibarra-Cisneros et al., 2024).

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