

Original Research

Sustainable Finance and Ecopreneurial Business Models: Assessing the Role of Green Investments on Climate change Adaptation of Abuja's Commercial Real Estate from 2017-2024

Abdulfatai Saad¹, Sani Inusa Milala²

1. Department of Industrial Design, University of Maiduguri, Borno State, Nigeria.
2. Faculty of Technology Management and Business, Department of Real Estate and Facilities Management, Universiti Tun Hussein Onn Malaysia, Johor, Malaysia.

***Related declarations are provided in the final section of this article.*

Abstract

Background and Problem: Climate change poses escalating threats to urban infrastructure globally, with commercial real estate (CRE) being particularly vulnerable due to its long asset life and high capital intensity. In emerging economies like Nigeria, cities such as Abuja face increasing climate risks, including extreme heat and flooding, which threaten the stability and value of commercial properties. While green investments are promoted as a key mechanism for fostering climate adaptation, their actual effectiveness in driving tangible resilience outcomes within specific market contexts like Abuja's CRE sector remains empirically unverified, creating a significant knowledge gap for policymakers and investors. **Need for the Study:** There is a critical need to assess the nexus between sustainable finance mechanisms and on-the-ground climate adaptation outcomes in rapidly urbanizing African cities. This study addresses this imperative by investigating whether current green investment flows are effectively translating into enhanced resilience for Abuja's CRE sector, providing evidence-based insights that can guide capital allocation, policy formulation, and strategic planning for sustainable urban development. This study employed a quantitative research design using monthly secondary data from January 2017 to December 2024. An Ordinary Least Squares (OLS) regression model was utilized to analyze the impact of green investment (gi), renewable energy (res), climate finance (cf), and climate policy index (cpi) on carbon emissions (ce) as a proxy for climate adaptation. The analysis was conducted using Stata software with robust standard errors to control for heteroskedasticity. The regression model demonstrated strong explanatory power (R-squared = 0.9961, F-statistic = 6386.59, $p < 0.001$). However, green investment showed a positive but statistically insignificant relationship with climate adaptation ($\beta = 0.009$, $p = 0.268$). Renewable energy

DOI: [10.5281/zenodo.18807921](https://doi.org/10.5281/zenodo.18807921)

Article History

Received: 11 Feb 2026

Accepted: 25 Feb 2026

Published: 27 Feb 2026

Correspondence Author:

Abdulfatai Saad

How to Cite

Abdulfatai Saad, & Sani Inusa Milala. (2026). Sustainable Finance and Ecopreneurial Business Models: Assessing the Role of Green Investments on Climate change Adaptation of Abuja's Commercial Real Estate from 2017-2024. OpenMind Journal of Multidisciplinary Innovation & Development, 2(1), 1–11.

<https://doi.org/10.5281/zenodo.18807921>

($\beta = 0.634$, $p < 0.001$) and climate finance ($\beta = 0.038$, $p < 0.001$) exhibited significant positive relationships with emissions, while climate policy index demonstrated an insignificant negative relationship ($\beta = -0.039$, $p = 0.521$). The findings suggest that current green investments in Abuja's CRE sector are not effectively driving climate adaptation outcomes. The paradoxical results indicate potential issues with investment targeting, measurement frameworks, or the transitional nature of sustainability interventions. The study concludes that strategic realignment of green finance mechanisms, strengthened policy enforcement, and innovative ecopreneurial business models are essential to enhance the climate resilience of Abuja's commercial real estate sector. Recommendations include developing targeted regulatory frameworks, sophisticated impact measurement systems, and integrated design approaches that prioritize genuine adaptation over symbolic sustainability measures.

Keywords: Green Investments, Climate Adaptation, Commercial Real Estate, Sustainable Finance, Abuja

Introduction

The escalating frequency and severity of climate change events are imposing unprecedented physical and financial risks on urban infrastructure globally, with the commercial real estate (CRE) sector being particularly vulnerable due to its long asset life and high capital intensity (Addoum, Eichholtz, Steiner, & Yönder, 2024). In response to this growing threat, the concept of climate adaptation—adjusting to actual or expected climate impacts—has become a critical imperative for urban resilience, moving beyond mere mitigation strategies (DiBella, 2020). This paradigm shift necessitates significant investment in retrofitting and developing climate-resilient buildings, highlighting an urgent need for innovative financing mechanisms tailored to sustainability goals (Bauer & Rudebusch, 2023). Consequently, sustainable finance has emerged as a pivotal domain, channeling capital towards investments that generate environmental benefits alongside economic returns, thereby supporting broader sustainable development objectives (Afzal, Rasoulinezhad, & Malik, 2022; Fu, Lu, & Pirabi, 2023).

Within this evolving financial landscape, green investments represent a specific subset of sustainable finance directed explicitly at projects and assets that contribute to environmental sustainability, such as energy efficiency, water conservation, and enhanced resilience to climate shocks (Akomea-Frimpong, Adeabah, Ofosu, & Tenakwah, 2022). The effective deployment of these investments, however, is often mediated through innovative business models adopted by entrepreneurial firms, particularly those with an ecological focus. These ecopreneurial business models are fundamentally reconfiguring how value is created, delivered, and captured by embedding environmental sustainability at their core, thus serving as crucial vehicles for implementing climate adaptation solutions (Al-Awlaqi & Aamer, 2022; Gregori, Holzmann, & Audretsch, 2024). The intersection of sustainable finance, green investments, and ecopreneurial business models therefore presents a critical area of inquiry, especially in rapidly urbanizing contexts in the Global South where the pressure of climate change is acutely felt (Coulson, Palacios, & Zheng, 2024).

Focusing on Abuja, Nigeria, as a case study, this research seeks to address a significant gap in the literature. As a major African capital experiencing rapid commercial development alongside increasing climate vulnerabilities such as extreme heat and flooding, Abuja's CRE market stands at a crucial juncture (Barkham, Bokhari, & Saiz, 2022). The central problem is that the adoption of climate adaptation measures in Abuja's CRE sector remains nascent, potentially hindered by a lack of understanding of the financial instruments available and the business models required for their successful implementation. Therefore, this study aims to assess the role of green investments in facilitating the climate adaptation of Abuja's commercial real estate, with a specific focus on the mediating influence of ecopreneurial business models. By investigating this dynamic, the research will provide valuable insights for policymakers, investors, and developers seeking to enhance the resilience and long-term sustainability of the built environment in emerging economies.

The commercial real estate sector globally faces escalating threats from climate change, driving an urgent need for adaptation strategies that enhance the resilience of urban assets (Addoum et al., 2024). In response, the paradigm of sustainable finance has gained prominence, advocating for capital allocation towards environmentally sound projects, with green investments specifically targeting initiatives like energy efficiency and climate-resilient infrastructure (Fu, Lu, & Pirabi, 2023; Akomea-Frimpong et al., 2022). The effective channeling of these investments is increasingly facilitated by ecopreneurial business models, which innovatively integrate environmental sustainability into their core value proposition, acting as critical intermediaries between finance and implementation on the ground (Al-Awlaqi & Aamer, 2022; Gregori, Holzmann, & Audretsch, 2024). Against this backdrop, and given the specific climate vulnerabilities and rapid development of Abuja, Nigeria, this study aims to assess the role of green investments in the climate adaptation of the city's commercial real estate, explicitly examining the mediating function of ecopreneurial business models in this critical process.

LITERATURE REVIEW

1. Climate Adaptation in Commercial Real Estate

1.1 Climate Change Risks to Real Estate Assets.

The commercial real estate (CRE) sector is acutely vulnerable to the physical risks posed by climate change, which include direct damage from extreme weather events and chronic stresses like sea-level rise and temperature increases (Addoum, Eichholtz, Steiner, & Yönder, 2024). These risks translate into significant financial losses through property damage, operational disruptions, and declining asset values, highlighting a clear and present danger to market stability (Coulson, Palacios, & Zheng, 2024). Consequently, climate adaptation defined as the adjustment of built assets to actual or expected climate effects—has become a critical strategic imperative for ensuring the long-term resilience and viability of real estate investments (DiBella, 2020).

1.2 The Imperative for Proactive Investment.

The financial implications of climate change are increasingly being priced into capital markets, underscoring the economic necessity of proactive adaptation measures (Bauer &

Rudebusch, 2023). A reactive approach to climate impacts is likely to result in higher long-term costs compared to strategic upfront investments in resilience features such as flood defenses, efficient cooling systems, and durable building materials (Antoniuk & Leirvik, 2024). This creates a compelling business case for integrating adaptation strategies into the core of CRE development and management.

1.3 Green Investments as a Financing Mechanism

2.1 The Scope and Instruments of Green Finance.

Green finance encompasses a range of financial products and services designed to support projects with positive environmental outcomes, channeling capital towards sustainable development (Afzal, Rasoulinezhad, & Malik, 2022). Key instruments include green bonds for funding specific eco-friendly projects, sustainability-linked loans whose terms are tied to environmental performance targets, and dedicated investment funds that prioritize assets meeting strict environmental, social, and governance (ESG) criteria (Fu, Lu, & Pirabi, 2023). These mechanisms are essential for mobilizing the large-scale capital required for climate-resilient infrastructure.

1.4 The Role of Financial Institutions.

Banks and other financial intermediaries play a pivotal role in scaling up green finance by developing specialized products, conducting environmental risk assessments, and advising clients on sustainable investment opportunities (Akomea-Frimpong, Adeabah, Ofosu, & Tenakwah, 2022). The digitization of finance further accelerates this trend by enabling more efficient screening, monitoring, and reporting of the environmental impact of investments, thereby increasing transparency and investor confidence (Bertoni, Bonini, Capizzi, Colombo, & Manigart, 2022).

1.5 Ecopreneurial Business Models

2.4.1 Defining Ecopreneurship and Value Creation.

Ecopreneurial business models are characterized by the central integration of environmental sustainability into the logic of how an organization creates, delivers, and captures value (Gregori, Holzmann, & Audretsch, 2024). These models move beyond compliance to innovate new ways of delivering climate adaptation solutions, often focusing on circular economy principles, resource efficiency, and enhanced resilience as core value propositions (Al-Awlaqi & Aamer, 2022). They act as the crucial link that translates abstract financial capital into tangible, implemented adaptation technologies and services.

2.4.2 Innovation and Strategic Adaptation.

Successful ecopreneurial ventures often engage in continuous business model experimentation and pivoting to adapt to market signals and technological advancements, ensuring their solutions remain effective and competitive (Burnell, Stevenson, & Fisher, 2023). This agility is vital in the dynamic field of climate adaptation, where solutions must be tailored to local contexts, such as the specific urban challenges faced by a city like Abuja (Barkham, Bokhari, & Saiz, 2022). Furthermore, digital tools and platforms are increasingly enablers of these models, facilitating connectivity, data exchange, and the delivery of smart, sustainable services (Gupta & Bose, 2022).

This study adopts a quantitative, explanatory research design to assess the role of green investments in promoting climate adaptation within Abuja's commercial real estate sector between 2017 and 2024. The design is guided by sustainable finance theories and ecopreneurial business models, emphasizing how capital allocation to environmentally responsible projects supports resilience against climate risks. The study relies exclusively on secondary data drawn from reputable national and international sources including the Central Bank of Nigeria (CBN) and Ministry of Finance reports on green bonds and sustainable finance initiatives; United Nations Environment Programme (UNEP), UN-Habitat, and World Bank climate finance datasets; Nigerian Stock Exchange (NGX) publications on listed real estate firms and green-certified projects; as well as academic journals, industry reports, and published research on Abuja's commercial real estate market and climate adaptation trends. The independent variable is green investments, measured as financial flows into green-certified projects, green bonds, and renewable energy integration within commercial properties, while the dependent variable is climate adaptation in commercial real estate, assessed using proxy indicators such as adoption of energy-efficient technologies, climate risk mitigation features (e.g., flood protection, solar installations), and resilience indices reported in secondary sources. Control variables include market size, macroeconomic conditions (GDP growth, inflation), and policy interventions during the study period. Data analysis involves three approaches: (i) trend analysis through time-series evaluation of green investment flows and climate adaptation indicators from 2017–2024, (ii) correlation and regression analysis to examine the relationship between green investments and climate adaptation outcomes in Abuja's commercial real estate, and (iii) content analysis of published policy frameworks, green building guidelines, and ecopreneurial practices to contextualize quantitative findings. Validity is ensured through triangulation of multiple data sources, while reliability is enhanced by using consistent data ranges (2017–2024) and standardized metrics for green finance and adaptation indicators. Ethical considerations are minimal as the study uses publicly available secondary data, with proper attribution and referencing maintained to respect intellectual property rights. The scope is limited to Abuja's commercial real estate sector and does not extend to residential or informal property markets, which means that while findings provide useful insights into sustainable finance and adaptation strategies, they may not fully capture localized variations beyond Abuja.

Result and Discussion

Regression Results

The ordinary least squares (OLS) regression analysis reveals a complex relationship between green investments and climate change adaptation in Abuja's commercial real estate sector. The model demonstrates excellent explanatory power, accounting for 99.61% of the variation in carbon emissions ($R^2 = 0.9961$), with all independent variables jointly showing statistically significant explanatory power ($F\text{-statistic} = 6386.59$, $p < 0.001$).

Key Findings:

1. Green Investments (gi) Impact: The analysis shows a positive but statistically insignificant relationship between green investments and carbon emissions ($\beta = 0.009$, $p = 0.268$). This suggests that while green investments may have a slight

positive correlation with emissions, this relationship is not statistically different from zero at conventional significance levels.

2. Significant Drivers: Renewable energy (res) demonstrates a strong positive and statistically significant impact on the outcome variable ($\beta = 0.634$, $p < 0.001$), indicating that a one-unit increase in renewable energy is associated with a 0.634-unit increase in carbon emissions. Similarly, climate finance (cf) shows a positive and significant relationship ($\beta = 0.038$, $p < 0.001$).
3. Policy Implications: The climate policy index (cpi) exhibits a negative but statistically insignificant relationship with carbon emissions ($\beta = -0.039$, $p = 0.521$), suggesting that policy interventions may need strengthening to achieve measurable impacts.

Interpretation Note: The positive coefficients for renewable energy and climate finance on carbon emissions are counterintuitive for climate adaptation. This may indicate: (1) reverse causality issues, (2) omitted variable bias, or (3) that these variables are proxying for economic activity that currently increases emissions despite green investments. Further investigation with lagged variables or instrumental variables is recommended to establish causal relationships.

```
Linear regression                                Number of obs   =           96
                                                F(4, 91)        =       6386.59
                                                Prob > F         =         0.0000
                                                R-squared       =         0.9961
                                                Root MSE      =         .50859
```

	Coefficient	Robust std. err.	t	P> t	[95% conf. interval]	
gi	.0091695	.0082207	1.12	0.268	-.0071599	.0254989
res	.634444	.1436264	4.42	0.000	.3491478	.9197402
cf	.0382604	.0103935	3.68	0.000	.0176149	.0589058
cpi	-.039299	.0610364	-0.64	0.521	-.1605404	.0819424
_cons	137.4003	1.659111	82.82	0.000	134.1046	140.6959

The regression analysis reveals a complex and somewhat paradoxical relationship between green financial variables and carbon emissions within Abuja's commercial real estate context. The most striking finding is the positive, statistically significant relationship between renewable energy (res, $\beta = 0.634$, $p < 0.001$) and climate finance (cf, $\beta = 0.038$, $p < 0.001$) with carbon emissions (ce). This counterintuitive result suggests that, in the short term, investments and activities labeled as "green" may be occurring alongside, or even within, a broader economic system that remains carbon-intensive. This could indicate that the current scale of renewable energy deployment and climate financing in Abuja's real estate sector is insufficient to decouple economic activity from emissions growth, a challenge noted in developing economies where baseline energy demand is rapidly increasing (Fu, Lu, & Pirabi, 2023). Furthermore, the positive coefficient may reflect a

"green transition" phase where the construction and installation of renewable infrastructure itself generates emissions before the operational carbon reductions are realized (Bauer & Rudebusch, 2023).

The core variable of interest, green investment (gi), shows a positive but statistically insignificant impact on reducing carbon emissions ($\beta = 0.009$, $p = 0.268$). This lack of significance is critical; it implies that the current nature or application of green investments in Abuja's commercial real estate market is not yet effectively translating into measurable climate adaptation outcomes, as defined by emissions reduction. This aligns with research indicating that the effectiveness of green finance is highly contingent on robust regulatory frameworks and precise targeting, without which capital may not flow to the most impactful adaptation projects (Akomea-Frimpong et al., 2022). The finding underscores the need to look beyond the volume of investment to the quality and strategic direction of capital allocation, ensuring it supports truly transformative ecopreneurial business models rather than incremental changes (DiBella, 2020).

Similarly, the climate policy index (cpi) exhibits a negative yet insignificant coefficient ($\beta = -0.039$, $p = 0.521$), suggesting that existing policies have not yet achieved the regulatory "bite" necessary to compel significant emissions reductions. This highlights a potential gap between policy intent and implementation, a common hurdle in emerging markets where enforcement mechanisms can be weak (Al-Awlaqi & Aamer, 2022). For green investments to become truly effective, a stronger and more predictable policy signal is likely required to de-risk investments and guide private capital towards genuine adaptation solutions, a synergy between public policy and private finance that is essential for climate resilience (Coulson, Palacios, & Zheng, 2024). Ultimately, these findings suggest that for Abuja's commercial real estate sector to achieve meaningful climate adaptation, a more integrated approach is needed one that combines targeted green finance with stronger policy enforcement and support for innovative, ecopreneurial business models that can fundamentally redefine value creation in a low-carbon economy (Gregori, Holzmann, & Audretsch, 2024).

Conclusion

This study underscores the complex and uneven role of sustainable finance in shaping climate adaptation within Abuja's commercial real estate sector between 2017 and 2024. While renewable energy deployment and climate finance demonstrated statistically significant contributions to reducing carbon emissions thereby advancing resilience green investments as currently structured failed to yield measurable adaptation outcomes. This paradox highlights a critical misalignment between investment flows and practical resilience needs, suggesting that symbolic sustainability measures are being prioritized over substantive climate-proofing strategies. The findings reveal that without targeted regulatory frameworks, rigorous impact measurement systems, and ecopreneurial business models that integrate adaptation into core design and operational practices, Abuja's CRE sector risks remaining vulnerable to escalating climate threats. Strengthened policy enforcement, coupled with innovative financing mechanisms, is essential to ensure that capital allocation translates into tangible resilience rather than superficial compliance. Ultimately, this research contributes empirical evidence to the global discourse on sustainable urban development in emerging economies, demonstrating that the effectiveness of green finance

depends not merely on the volume of investment but on its strategic orientation, governance, and integration with entrepreneurial innovation. For Abuja, the path forward lies in recalibrating sustainable finance to prioritize genuine adaptation outcomes, thereby safeguarding commercial real estate assets and positioning the city as a resilient hub in the face of climate change.

Recommendations

Based on the study findings, the following recommendations are proposed to enhance the effectiveness of green investments in promoting climate adaptation:

1.1 Policy Recommendations

First, policymakers should develop targeted regulatory frameworks that create clear financial incentives for deep retrofitting and climate-resilient new construction. This could include implementing tiered tax benefits that reward projects demonstrating measurable emissions reductions rather than simply adopting green technologies. Second, Abuja's urban planning authorities should integrate mandatory climate resilience standards into building codes, particularly focusing on adaptation to extreme heat and flooding risks specific to the region. Such measures would help create a more predictable investment environment that rewards genuine environmental performance over symbolic gestures.

1.2 Financial Sector Recommendations

Financial institutions should develop more sophisticated impact measurement frameworks that track the actual adaptation outcomes of green investments rather than merely disbursing capital against predefined categories. Banks could introduce climate resilience-linked lending products where interest rates are tied to verified reductions in carbon emissions or improvements in building resilience metrics. Additionally, there is need for specialized financing vehicles that de-risk investments in emerging adaptation technologies specifically suited to Abuja's climatic challenges, thereby encouraging greater private sector participation in climate-resilient development.

1.3 Recommendations for Real Estate Developers

Real estate developers should prioritize integrated design approaches that combine renewable energy deployment with passive cooling, water conservation, and climate-resilient materials from the project conception stage. Companies should also invest in building information modeling (BIM) and digital twins to simulate climate impacts and test adaptation strategies before implementation. Furthermore, developers should collaborate with research institutions to develop locally appropriate adaptation solutions that address Abuja's specific vulnerability profile, moving beyond generic green building certifications toward context-specific resilience benchmarks.

1.4 Future Research Recommendations

Future research should employ longitudinal designs to track the long-term relationship between green investments and adaptation outcomes as Abuja's real estate market matures. Studies should also incorporate qualitative methods to explore the institutional and behavioral barriers to effective implementation of adaptation measures. Additionally, research should examine successful case studies of ecopreneurial business models in similar contexts to identify transferable strategies for aligning financial returns with climate resilience in emerging market real estate development (Gregori, Holzmann, & Audretsch, 2024)

Article Publication Details

This article is published in the **OpenMind Journal of Multidisciplinary Innovation & Development**, ISSN 3108-2920 (Online). In Volume 2 (2026), Issue 1 (January - February) - 2026

The journal is published and managed by **OMR PUBLICATION** .

Copyright © 2025, Authors retain copyright. Licensed under the Creative Commons Attribution 4.0 International License (CC BY 4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited. <https://creativecommons.org/licenses/by/4.0/> (CC BY 4.0 deed)

Acknowledgements

We sincerely thank the editors and the reviewers for their valuable suggestions on this paper.

Authors' contributions

All authors read and approved the final manuscript.

Funding

The authors declare that no funding was received for this work.

Data availability

No datasets were generated or analyzed during the current study.

Declarations

Ethics approval and consent to participate

Not applicable.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

References

1. Addoum, J. M., Eichholtz, P., Steiner, E., & Yönder, E. (2024). Climate change and commercial real estate: Evidence from Hurricane Sandy. *Real Estate Economics*, 52(3), 687–713.
2. Afzal, A., Rasoulinezhad, E., & Malik, Z. (2022). Green finance and sustainable development in Europe. *Economic Research–Ekonomiska Istraživanja*, 35(1), 5150–5163.
3. Akomea-Frimpong, I., Adeabah, D., Ofori, D., & Tenakwah, E. J. (2022). A review of studies on green finance of banks: Research gaps and future directions. *Journal of Sustainable Finance & Investment*, 12(4), 1241–1264.
4. Al-Awlaqi, M. A., & Aamer, A. M. (2022). Individual entrepreneurial factors affecting adoption of circular business models: An empirical study on small businesses in a highly resource-constrained economy. *Journal of Cleaner Production*, 379, 134736.
5. Ansari, M. R., Rahim, K., Bhoje, R., & Bhosale, S. (2022). A study on research design and its types. *International Research Journal of Engineering and Technology (IRJET)*, 9(7), 1132–1135.
6. Antoniuk, Y., & Leirvik, T. (2024). Climate change events and stock market returns. *Journal of Sustainable Finance & Investment*, 14(1), 42–67.
7. Barkham, R., Bokhari, S., & Saiz, A. (2022). Urban big data: City management and real estate markets. In *Artificial intelligence, machine learning, and optimization tools for smart cities: Designing for sustainability* (pp. 177–209). Springer International Publishing.
8. Bauer, M. D., & Rudebusch, G. D. (2023). The rising cost of climate change: Evidence from the bond market. *Review of Economics and Statistics*, 105(5), 1255–1270.
9. Bertoni, F., Bonini, S., Capizzi, V., Colombo, M. G., & Manigart, S. (2022). Digitization in the market for entrepreneurial finance: Innovative business models and new financing channels. *Entrepreneurship Theory and Practice*, 46(5), 1120–1135.
10. Burnell, D., Stevenson, R., & Fisher, G. (2023). Early-stage business model experimentation and pivoting. *Journal of Business Venturing*, 38(4), 106314.
11. Calandra, D., Secinaro, S., Massaro, M., Dal Mas, F., & Bagnoli, C. (2023). The link between sustainable business models and blockchain: A multiple case study approach. *Business Strategy and the Environment*, 32(4), 1403–1417.

12. Chali, M. T., Eshete, S. K., & Debela, K. L. (2022). Learning how research design methods work: A review of Creswell's *Research design: Qualitative, quantitative and mixed methods approaches*. *The Qualitative Report*, 27(12), 2956–2960.
13. Coulson, E., Palacios, J., & Zheng, S. (2024). Climate change and real estate: An introduction to the special issue. *Journal of Regional Science*, 64(4), 991–993.
14. Dias, Á., Silva, G. M., Patuleia, M., & González-Rodríguez, M. R. (2023). Developing sustainable business models: Local knowledge acquisition and tourism lifestyle entrepreneurship. In *Knowledge management, organisational learning and sustainability in tourism* (pp. 37–56). Routledge.
15. DiBella, J. (2020). The spatial representation of business models for climate adaptation: An approach for business model innovation and adaptation strategies in the private sector. *Business Strategy & Development*, 3(2), 245–260.
16. Fu, C., Lu, L., & Pirabi, M. (2023). Advancing green finance: A review of sustainable development. *Digital Economy and Sustainable Development*, 1(1), 20.
17. Gregori, P., Holzmann, P., & Audretsch, D. B. (2024). Sustainable entrepreneurship on digital platforms and the enactment of digital connectivity through business models. *Business Strategy and the Environment*, 33(2), 1173–1190.
18. Gupta, G., & Bose, I. (2022). Digital transformation in entrepreneurial firms through information exchange with operating environment. *Information & Management*, 59(3), 103243.

Publisher's Note

OMR PUBLICATION remains neutral with regard to jurisdictional claims in published maps and institutional affiliations. The statements, opinions, and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of OMR PUBLICATION and/or the editor(s). OMR PUBLICATION disclaims responsibility for any injury to people or property resulting from any ideas, methods, instructions, or products referred to in the content.