International Journal of Scientific Research in Social Sciences & Management Studies
p-ISSN: 2579–101X | e-ISSN: 2579–1928
Volume 8, Number 2 May, 2025
IJSRSSMS

Adopting Green Finance as Strategy for Pollution Mitigation in Small and Medium Enterprises in North-Central Nigeria

[1]Isah Mohammed Ogaji, [2]Obioru Jolomi Irene & [3]Adejoh Joseph Ataja
[1,2&3]Department of Business Administration, School of Management Studies, Kogi State Polytechnic, Lokoja. P.M.B 1101

Article DOI: 10.48028/iiprds/ijsrssms.v8.i2.18

Abstract

This study examines the impact of green finance on pollution control in Small and Medium Enterprises in North-Central Nigeria, employing a descriptive research design with a cross-sectional survey approach. The method addresses quantitative data obtained from questionnaires to respond to the research questions and to evaluate the stated hypotheses. The study population consists of registered SMEs in North Central Nigeria, totalling 5,188,310, with a sample size of 400 determined using the Krejcie and Morgan (1970) sampling technique. Data were examined with linear regression analysis. The regression study indicates a robust positive correlation between green bonds and SMEs' pollution control initiatives, suggesting that heightened investment in green bonds is significantly linked to enhanced pollution control practices among SMEs. In light of these findings, the report advises that policymakers and financial institutions promote the issue and use of green bonds to enhance assistance for SMEs in their pollution mitigation endeavours. Offering incentives for SMEs to get green bonds may promote sustainable practices and diminish environmental impact.

Keywords: *Green finance, Green bonds, Pollution control, SMEs*

Corresponding Author: Isah Mohammed Ogaji

Background to the Study

Green finance refers to financial investments that promote environmentally sustainable and climate-friendly projects. This includes a wide array of financial instruments such as green bonds, green loans, and climate funds. Green bonds, in particular, have emerged as a pivotal tool in the global effort to address environmental challenges, including pollution control, by providing the necessary capital for green projects. In the context of Small and Medium Enterprises (SMEs) in North-Central Nigeria, green finance can play a crucial role in mitigating pollution. SMEs are often significant contributors to local pollution due to their reliance on outdated technologies and practices. However, these enterprises frequently lack the financial resources to invest in cleaner and more efficient technologies. Green bonds can bridge this gap by channeling funds specifically earmarked for environmentally friendly projects.

Green bonds are debt instruments issued to raise capital for projects that have positive environmental impacts. These bonds offer investors a way to support sustainable development while earning returns. The proceeds from green bonds can be used by SMEs to adopt pollution control measures such as waste management systems, renewable energy installations, and energy-efficient equipment. This not only helps in reducing the environmental footprint of these enterprises but also enhances their competitiveness and compliance with environmental regulations (Climate Bonds Initiative, 2020). The potential benefits of implementing green finance mechanisms in North-Central Nigeria are substantial. By accessing green finance, SMEs can undertake necessary environmental improvements without bearing the prohibitive costs upfront. This financial support can lead to significant reductions in pollution levels, contributing to improved public health and environmental quality in the region (UNEP, 2019). Moreover, it can stimulate economic growth by creating green jobs and promoting sustainable business practices.

Despite these advantages, the uptake of green finance in Nigeria has been slow due to several challenges, including limited awareness, regulatory hurdles, and a lack of technical expertise among SMEs. Addressing these barriers requires concerted efforts from both the public and private sectors. Policies that incentivize green investments, capacity-building initiatives, and public awareness campaigns are essential to foster a conducive environment for green finance (World Bank, 2021). The objectives of this paper is to examine the impact of green bonds on Small and Medium Enterprises pollution control in North-Central, Nigeria.

Literature Review

Green finance is a broad term encompassing financial investments flowing into sustainable development projects and initiatives, environmental products, and policies that encourage a more sustainable economy. Kumar (2019) defines green finance as financial support for sustainable development projects and initiatives, aiming to promote environmental sustainability and the reduction of carbon footprints. This includes investments in renewable energy, energy efficiency, water sanitation projects, and more. Migliorelli and Dessertine (2019) highlight that green finance refers to any financial instrument or investment that accounts for environmental sustainability. They emphasize the importance of integrating

environmental risks into financial decision-making processes to ensure the long-term viability of financial markets and investments. Taghizadeh-Hesary and Yoshino (2019) describe green finance as the allocation of financial resources to projects that promote environmental protection and energy conservation. They stress the role of green finance in mitigating climate change by supporting green technologies and renewable energy sources. Zhou and Cui (2019) focus on the policy aspect, defining green finance as a combination of financial policies, regulations, and market mechanisms that drive the flow of capital towards environmentally friendly projects. They argue that green finance is crucial for achieving sustainable development goals (SDGs). Green finance encompasses a range of financial instruments and activities that promote environmentally sustainable economic growth. One such instrument is green bonds, which are fixed-income securities that finance environmentally sustainable projects and activities (Jing & Chen, 2018).

Green Bonds

Green bonds have become an increasingly important tool for funding projects that address environmental issues and promote sustainability. In North-Central Nigeria, the effect of green bonds on pollution control among Small and Medium Enterprises (SMEs) is particularly significant. One of the primary impacts of green bonds on SMEs is the improved access to capital specifically designated for environmental projects. Traditional financing mechanisms often pose significant barriers for SMEs due to high interest rates and stringent collateral requirements. Green bonds, however, are structured to attract investors who are interested in supporting sustainable development, thus offering more favorable terms and conditions for borrowers (OECD, 2017). This increased access to finance allows SMEs to invest in pollution control measures without the immediate burden of high financial costs. The availability of green bond financing enables SMEs to adopt advanced technologies that are essential for pollution control. Investments can be directed towards the acquisition of cleaner production technologies, energy-efficient equipment, and waste management systems. For instance, SMEs can implement renewable energy solutions such as solar panels or wind turbines, reducing their reliance on fossil fuels and minimizing their carbon footprint (Climate Bonds Initiative, 2020). Additionally, modern waste treatment technologies can help SMEs manage industrial waste more effectively, preventing environmental contamination.

Green bonds can also facilitate regulatory compliance among SMEs. Environmental regulations are becoming increasingly stringent worldwide, and non-compliance can result in severe penalties and reputational damage. By leveraging green bond funds, SMEs can upgrade their operations to meet or exceed regulatory standards, thereby avoiding fines and enhancing their market standing (World Bank, 2021). This proactive approach to compliance not only safeguards the environment but also promotes long-term business sustainability. The overarching goal of green bonds is to generate positive environmental impacts. For SMEs, the deployment of green bond funds towards pollution control projects can lead to significant environmental benefits. Reduced emissions of greenhouse gases, lower levels of air and water pollution, and improved waste management practices are some of the direct outcomes. These improvements contribute to better public health, preservation of natural resources, and

overall enhancement of environmental quality in the region (UNEP, 2019). Evidence from various case studies highlights the successful implementation of green bonds in supporting SME pollution control initiatives. In China, for example, green bonds have funded numerous SME projects aimed at reducing industrial emissions and improving energy efficiency (OECD, 2017). Similar success stories can be observed in Europe and North America, where SMEs have utilized green bond proceeds to implement eco-friendly technologies and practices (Climate Bonds Initiative, 2020).

Access to finance is one of the most critical barriers for SMEs aiming to implement pollution control measures. Traditional financial instruments often come with high-interest rates and stringent borrowing conditions, which can be prohibitive for smaller businesses. Green bonds, however, provide an alternative source of capital that is specifically earmarked for sustainable projects. This targeted financing helps SMEs invest in necessary pollution control technologies and practices without the immediate financial strain typically associated with large capital expenditures (OECD, 2017). Green bond financing enables SMEs to adopt and integrate modern pollution control technologies. With the funds raised through green bonds, SMEs in North-Central Nigeria can invest in equipment and systems that reduce emissions, manage waste more effectively, and improve energy efficiency. For instance, green bonds can finance the installation of renewable energy sources such as solar panels, which can significantly reduce the carbon footprint of SMEs. Additionally, these funds can support the adoption of advanced waste treatment and recycling systems, leading to better management of industrial by-products and reducing environmental contamination (Climate Bonds Initiative, 2020).

Environmental regulations are becoming increasingly stringent, and SMEs must comply to avoid penalties and enhance their market reputation. Green bonds can assist SMEs in meeting these regulatory requirements by providing the necessary funds to upgrade their operations. Compliance with environmental standards not only avoids fines but also positions SMEs as responsible and sustainable businesses, which can attract more customers and investors (World Bank, 2021). For example, the funds from green bonds can be used to install emission control systems that meet or exceed national and international standards, ensuring that SMEs remain compliant with evolving environmental laws. The primary aim of green bonds is to generate positive environmental impacts. In North-Central Nigeria, the deployment of green bond proceeds towards pollution control initiatives can lead to substantial environmental benefits. By reducing emissions, improving waste management, and enhancing energy efficiency, SMEs can significantly lower their environmental footprint. These improvements contribute to better air and water quality, reduced public health risks, and the preservation of natural resources. Furthermore, the positive environmental outcomes of these projects can enhance the overall quality of life for communities in the region (UNEP, 2019). While specific case studies from North-Central Nigeria are limited, evidence from other regions provides insights into the potential impact.

For instance, in China, green bonds have successfully funded SME projects aimed at reducing industrial emissions and increasing energy efficiency, resulting in measurable environmental

improvements (OECD, 2017). Similar initiatives could be implemented in North-Central Nigeria, leveraging green bonds to support local SMEs in their pollution control efforts. The research was fundamentally based on pecking order theory. The Pecking Order Theory of financing posits that organisations and individuals prioritise the utilisation of personal funds prior to seeking external debt and equity. It is a framework for analysing corporate financing that posits organisations endeavour to mitigate information asymmetries and preserve ownership by initially utilising internal financing, succeeded by external debt and equity. Myers (1984); Berger and Udell (2003).

Empirical Review

Bu, et al, (2020). Environmental Orientation, Green Supply Chain Management, and Firm Performance: Empirical Evidence from Chinese Small and Medium-Sized Enterprises using Survey questionnaire data from 247 CEOs of Chinese SMEs; analyzed using Structural Equation Modeling. The study found that Internal and external environmental orientations positively affect green supply chain management (GSCM) practices like environmental selection, monitoring, and collaboration with suppliers, which in turn improve firm performance. The study recommended that emphasize should be giving to the importance of environmental orientation and GSCM in business strategies to enhance firm performance. The study is limited to Chinese SMEs, so findings may not be generalizable to SMEs in other regions.

Khurram, et al, (2023). Green bonds issuance, innovation performance, and corporate value: empirical evidence from China using analysis of data from Chinese-listed companies using statistical techniques. The study revealed that Issuance of green bonds is positively correlated with innovation performance and corporate value. Green bonds provide financial resources necessary for investing in pollution control technologies and sustainable practices and recommendations that policymakers should encourage green bond issuance as a means to finance environmentally sustainable projects and innovations. The study focuses on listed companies, and results might differ for smaller unlisted SMEs.

Lan, et al, (2023). The effect of green finance on industrial pollution emissions: Evidence from China using data envelopment analysis (DEA) to measure green financial development and its impact on industrial pollution. Findings show that green finance, including green bonds, significantly reduces industrial pollution emissions by encouraging investment in cleaner technologies and practices. The study further development of green finance mechanisms is recommended to enhance pollution control efforts. The study's reliance on DEA might oversimplify the complex relationships between green finance and pollution control.

Methodology

The survey design was chosen due to the descriptive nature of the study. Out of the 400 questionnaires distributed to SMEs in North Central Nigeria, 379 were accurately completed and returned, while 21 copies deemed invalid. The conclusions were drawn based on the 379 returned questionnaires. A five-point Likert scale, ranging from Strongly Agree to Strongly

Disagree, were employed. Statistical Package for Social Sciences (SPSS) version 20.0 software was utilized for data analysis while linear regression were employed to test the formulated hypotheses. Model Specification SMEPC = α + β1GB1 + e ------1 Where α = Vertical Intercept SMEPC= Dependent variable i.e. *Small and Medium Enterprises pollution control*.GB- Green bonds (GB) e =Error terms or residual. β1 = Slope of the coefficients.

Result and Discussion of Findings

Results of Regression

Table 1: Regression model summary for the impact of green bonds on SMEs pollution control.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.591[a]	.349	.347	3.10046

a. Predictors: (Constant), GB

The Adjusted R Square, slightly lower at 0.349, accounts for the number of predictors and confirms the model's robustness in explaining SMEPC variance.

Table 2: ANOVA summary for the impact of green bonds on SMEs pollution control

ANOVA [a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	1940.870	1	1940.870	201.904	.000[b]
	Residual	3624.042	377	9.613		
	Total	5564.913	378			

a. Dependent Variable: SPC

b. Predictors: (Constant), GB

The table shows that the regression model is statistically significant, with an F-value of 201.904 and a p-value (Sig.) of .000, indicating that the probability of the observed results occurring by chance is virtually zero. This confirms that the model reliably predicts SMEPC based on the independent variables.

Table 3: Regression Analysis of Green Bonds on SMEs Performance Coefficients

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	9.672	.516		18.749	.000
	Green Bonds	.419	.030	.591	14.209	.000

a. Dependent Variable: SMEs PC

The regression analysis presented in the table examines the relationship between green bonds and SMEs' pollution control (PC). The unstandardized coefficient (B) for green bonds is 0.419, which indicates that for every unit increase in green bonds, there is an expected increase of 0.419 units in SMEs' pollution control, assuming all other factors are held constant. The standardized coefficient (Beta) is 0.591, suggesting a strong positive relationship between green bonds and SMEs' pollution control efforts. This is reinforced by the t-value of 14.209 and a significance level (Sig.) of 0.000, which indicate that the relationship is statistically significant at the 0.05 level. The constant (intercept) value of 9.672 suggests that when the green bonds variable is zero, the baseline level of pollution control is 9.672 units. Overall, the results imply that increased investment in green bonds is significantly associated with improved pollution control practices among SMEs

Key Findings

The regression analysis reveals a significant positive relationship between the issuance of green bonds and improvements in pollution control among small and medium-sized enterprises (SMEs). Specifically, the unstandardized coefficient indicates that an increase in green bonds is associated with a corresponding increase in pollution control measures by SMEs. The standardized coefficient further underscores the strength of this relationship, while the high t-value and statistical significance demonstrate the reliability of these findings. This suggests that green bonds serve as an effective financial instrument to enhance environmental performance within the SME sector.

Conclusion

This study set out to examine the impact of green finance, specifically green bonds, on pollution control initiatives within Small and Medium Enterprises (SMEs) in North-Central Nigeria. The findings provide compelling empirical evidence that green bonds serve as a significant and effective financial strategy for enhancing environmental performance in this critical sector. The regression analysis confirms a robust, positive relationship between green bond issuance and improved pollution control practices among SMEs. The statistically significant model demonstrates that increased access to this targeted financing directly enables SMEs to invest in essential pollution mitigation technologies, such as waste management systems, renewable energy adoption, and energy-efficient equipment. This aligns with the core premise of the study: that a primary barrier for SMEs limited capital can be overcome by green financial instruments specifically designed to fund sustainable transitions.

Therefore, the study concludes that green bonds are not merely a theoretical financial concept but a practical and potent tool for driving ecological modernization in Nigeria's industrial landscape. By channeling capital towards environmentally sound projects, green finance directly addresses the nexus of economic activity and environmental degradation. For SMEs in North-Central Nigeria, adopting green finance represents a viable pathway to achieve regulatory compliance, reduce operational risks associated with pollution, and build long-term sustainability and competitiveness. However, the study's focus on North-Central Nigeria and the financial mechanism of green bonds also highlights contextual limitations. The full

potential of green finance can only be realized alongside complementary measures, including strengthened environmental regulations, technical capacity building for SMEs, and broader awareness campaigns to stimulate demand for green investments. Ultimately, the successful integration of green finance into the SME sector is imperative for achieving dual objectives: fostering inclusive economic growth from the backbone of the Nigerian economy and ensuring the environmental health of the region for future generations.

Recommendations

Based on these finding, it is recommended that policymakers and financial institutions should encourage the issuance and utilization of green bonds to further support SMEs in their pollution control efforts. Additionally, raising awareness about the benefits of green bonds and integrating them into corporate environmental strategies could enhance their adoption and effectiveness.

References

Bu, X., Dang, W.V.T., Wang, J., & Liu, Q. (2020). Environmental orientation, green supply chain management, and firm performance: Empirical evidence from Chinese small and medium-sized enterprises, *International Journal of Environmental Research and Public Health, 17*(4), 1199. https://doi.org/10.3390/ijerph17041199

Climate Bonds Initiative. (2020*). Green Bonds: Mobilizing the Debt Capital Markets for a Low-Carbon Transition.*

Khurram, M.U., Xie, W.W., Mirza, S.S., & Tong, H. (2023). Green bonds issuance, innovation performance, and corporate value: Empirical evidence from China. *Heliyon, 9*(4), e14895.

Kumar, P. (2019). *Green Finance: Innovations in Sustainable Development*.

Lan, J., Wei, Y., Guo, J., & Li, Q. (2023). The effect of green finance on industrial pollution emissions: Evidence from China. *Environmental Science and Pollution Research, 30*(5), 6789-6801.

Migliorelli, M., & Dessertine, P. (2019). *The rise of green finance in Europe*. Palgrave Macmillan.

OECD (2017). Mobilizing Bond Markets for a Low-Carbon Transition.

Taghizadeh-Hesary, F., & Yoshino, N. (2019). *The Way to Green Finance: From Concept to Implementation*. Springer.

UNEP. (2019). *Green finance for sustainable development: A Compilation of Insights from Financial Institutions.*

World Bank. (2021). Financing Climate Action: The Role of Green Bonds and Other Instruments.

Zhou, X., & Cui, Y. (2019). *Policy, Regulation and Innovation in Green Finance*, Routledge.