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GLOBAL JOURNAL OF ENVIRONMENTAL SCIENCE & SUSTAINABILITY

Compliance with Environmental Regulations: Insights from Small and Medium Scale Enterprises in the Food and Beverage Sector in Southwestern Nigeria

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Article Information

https://doi.org/10.69798/60361997

ISSN (Online): 3066-3660

Published by: Koozakar LLC. Norcross GA 30071, United States.

Edited by: Oluseye Oludoye PhD

Abstract

In view of the proliferation of SMEs, their compliance with extant environmental regulations is important in reducing the environmental impact of their production activities. Literature on the level and frequency of compliance with regulations to inform enforcement policy is however scarce. In addition, information on the impact of size on compliance within the SME business category is insufficient. This study filled these gaps by the examination of level, frequency and impact of size on compliance among 256 SMEs in the food and beverage sector in Southwestern Nigeria. The study employed a structured questionnaire survey distributed to the managers of the SMEs across three states in the region. The results showed that some SMEs were not in compliance with extant regulations. About 15% of the SMEs were not in compliance with solid waste management regulations, while 15.3% have no air pollution control measures. In addition, 15.8% of the firms did not treat waste water discharge from production processes. The study also indicated that 24% of SMEs failed to conduct Environmental Impact Assessments (EIAs). Results also showed (on a 5-point Likert frequency scale from never to always) that respondents sometimes; were in compliance with continuous monitoring and reporting of environmental performance (3.39), adhered to sustainable supply chain practices (3.38) and were in compliance with stakeholder involvement in the firm's environmental initiatives (3.38). In addition, the small-sized firms were more compliant than medium-sized businesses in having a waste management plan, integrating sustainability into business operations, preparing periodic environmental audits and assessments, and responding to community complaints on wastes. The study recommended more regular and stringent enforcement policy mechanisms to curb the hazardous activities of SMEs.

Keywords: Environmental regulation; SMEs; Compliance; Food and beverages; Enforcement policy; Nigeria

INTRODUCTION

Small and Medium Scale Enterprises (SMEs) have been found to be significant drivers of innovation, which in turn is central to economic growth. This is due to the potential role and impact of the sector in the realization of many of the sustainable development goals (SDG) (Endris and Kassegn, 2022). SMEs contribute to more than 80% of SDG Targets 8 and 9 (International Trade Center - ITC, 2019) which are to "promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all" and "Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation," respectively. This is probably because the cumulative socio-economic impact of SMEs is greatly felt in all countries of the world. Although they have varying impacts in different national contexts, they contribute immensely to job creation, employment, value creation and addition, growing private businesses, and Gross Domestic Product (GDP). Globally, the SME sector represents 60% of business enterprises and employs around 50% of the workforce (Teima *et al*., 2017). In developed countries, SMEs account for at least 65% of the total business population, 70% of jobs, and over 55% of GDP (Teima *et al*., 2017).

In Africa, SMEs are the mainstream drivers of economic growth. They account for more than 80% of jobs and make up for more than 90% of private businesses in Africa, including Nigeria (Matthew *et al*., 2020; Daniel *et al*., 2021). Available data shows that SMEs in Nigeria contribute to at least 49% of Nigeria's GDP (National MSMEs Report, 2017). SMEs create job opportunities across all categories of the workforce. This sector also serves as a very important avenue for entrepreneurial development via on-the-job training and learning. Consequently, SMEs are making positive inroads in poverty alleviation, improved livelihood, income generation, and financial inclusion in Africa. The enterprises are also playing increasingly significant and more in-depth roles in socio-economic growth and development of African countries.

Despite the significant socio-economic role of SMEs across all countries, there are also growing concerns about the cumulative ecological effect of their increasing production activities. SMEs contribute 60 to 70% of total global industrial pollution (Baeshen *et al*., 2021; Han and Chen, 2021). SMEs are responsible for 40% of greenhouse gas emissions, half of global industrial pollution and commercial waste and 20 to 75% of electricity and consumption (OECD, 2023). These persistent and evolving ecological challenges arising from the sector are significant signposts to the fact that SMEs may play a critical and essential role in the promotion and realization of sustainable development targets, especially, in developing African countries. In this regard, economic policies, directed at SMEs growth, must also take into cognizance, the environmental sustainability practices of this critical economic sector.

An important responsibility imposed on enterprises, particularly in manufacturing, is to comply with applicable local, national, and international environmental legislation. Getting permits, reporting pollutants and emissions, and adhering to set standards for waste disposal, water use, and emissions are all essential components of the environmental regulations that apply to manufacturing operations in Nigeria. Otherwise, a company that disregards environmental regulations may face penalties, legal action, and damage to its brand (Morgera 2020). Nigerian environmental regulations require manufacturers to perform Environmental Impact Assessments (EIAs) before initiating certain business operations. EIAs help identify potential environmental threats and provide possible options for mitigating environmental risk (Nita *et al*., 2022). Manufacturing enterprises should not only conduct EIAs but also implement the recommended solutions, as enshrined in Nigeria's environmental regulations to reduce the ecological impact of production activities. Moreover, businesses are required by law to handle natural resources responsibly (Camilleri, 2022). This entails making ethical raw material purchases, conserving energy and water, and generating minimal waste discharges. Sustainable resource management not only enhances environmental preservation but also reduces expenses and boosts long-term profitability (Safdar *et al*., 2022; Rehman *et al*., 2021; Costa, 2021). Business compliance includes ensuring that national environmental laws are properly observed.

Compliance with environmental laws is crucial for SMEs in Nigeria to ensure sustainable business practices and avoid legal penalties (Bello *et al*., 2024; Adedeji *et al*., 2020). The requirements

generally fall under several key areas. In terms of registration and permits, SMEs must register with relevant environmental authorities and obtain necessary permits including EIA for new projects. Enterprises must also adhere to proper disposal and management of hazardous waste in compliance with national regulations (Mashiringwane and Roongtawanreongsri, 2024; Rosli *et al*., 2023; Akpan and Olukanni, 2020). Consequently, businesses operating in Nigeria must adhere to regulations that restrict pollution through installation of pollution control devices. In this regard, SMEs must also comply with the use of chemicals, particularly as it concerns proper handling, storage, and disposal of chemicals and hazardous substances.

While scholarly interest in compliance of firms with environmental regulations continues to grow in Nigeria, there remain some gaps in the literature. Most studies predominantly focus on large corporations, which often have dedicated resources for compliance (Nnaji *et al*., 2024). In contrast, empirical data on SMEs' compliance behaviors remain limited, and need to be studied particularly as they lack financial capacity to comply. Research also needs to focus on sector-specific compliance studies in Nigeria, particularly in high-impact industries such as the food and beverages sector which is dominated by SMEs, which generates significant organic and inorganic waste and wastewater from the use of plastics and other forms of packaging materials and air pollution from generating heat and electricity for cooking and other food processing activities. As such, many studies do not segment findings by sector (e.g Sridhar *et al*., 2018; Amiolemen *et al*., 2024). The relationship of firm size within SMEs and environmental compliance behavior also remain underexplored. Most studies aggregate SMEs into a single category without considering how size impacts compliance (Amiolemen *et al*., 2024). The study is therefore intended to be carried out in the food and beverage sector in Nigeria, particularly in Southwestern Nigeria which is one of the largest hubs of commercial activity in the country with the aim of filling the foregoing gaps in the literature to inform enforcement policy. The aims of this study are to

i. examine the level and frequency of compliance of SMEs with extant environmental regulations; and
ii. evaluate the impact of size within the SME categories of the food and beverage industry on compliance.

The study will be based on the National Environmental-food, beverage and tobacco sector regulation (2009) which is primarily focused and directed towards the amelioration of environmental hazards in the operations and activities of firms in the food and beverage sector in Nigeria. The minimum allowable standard on emissions and discharge required of all firms in the sector is clearly stipulated in the policy document. By extension, the environmental regulatory framework is also adopted or adapted at various government levels for a more in-depth and comprehensive environmental regulation and enforcement.

LITERATURE REVIEW

Environmental Policy

Environmental policies are usually written procedures, principles and actions set out to primarily protect, conserve, and preserve the natural environment (Ogunkan, 2022). For instance, Section 20 of the Federal Republic of Nigeria's 1999 constitution (as amended) forms the foundation of Nigeria's environmental policy. However, environmental regulation is required in the actualization and operationalization of environmental policy objectives. Environmental regulation is any institutional framework and measure that focuses on mitigating, preventing, and ameliorating the detrimental ecological effects of anthropogenic activities (Wang *et al*., 2021; Jaiya and Joseph, 2014). Mcmanus (2020 p. 546) defined environmental regulation as "the imposition of obligations or restrictions on people, businesses, and other organizations to prevent environmental harm or restore degraded environments".

Therefore, environmental regulation enables the realization of environmental policy objectives.

The enactment of environmental regulations is through state legislation. In Nigeria, environmental regulations are implemented by the National Environmental Standards and Regulations Enforcement Agency (NESREA) and State environmental protection agencies such as the Lagos State Environmental Protection Agency; Oyo State Environmental Protection Agency; Osun State Environmental Protection Agency; and Ogun State Environmental Protection Agency, among others. Usually, individual states either adopt or

adapt the national environmental regulatory framework to suit the context of the respective States. The adaptation or adoption of national environmental regulations by States in Nigeria further strengthens environmental governance at all levels in the country. Essentially, the functional and statutory role of the regulatory agency is to ensure full compliance of stakeholders to extant environmental regulations.

Environmental regulatory agencies are to enforce full compliance of businesses with regulatory standards and prescriptions. More importantly, these agencies also have the legislative prerogative to sanction erring and non-compliant enterprises. For instance, the maximum allowable emissions and effluent discharges for food and beverage firms in Nigeria are clearly stated in the National Environmental Regulation (2009) of the food, beverage, and tobacco sectors.

The Nigerian environmental policy milieu has however been considered weak in terms of lack of consistency in enforcement and sector specificity. Enforcement is a key challenge in Nigeria. Regulatory institutions, such as NESREA, are underfunded, understaffed, and face capacity constraints (Idoko *et al*., 2013; Sridhar *et al*., 2018; Nabegu, 2019). Penalties for non-compliance are often inconsistent, and inspections are sporadic, with few deterrents for violators (Sridhar *et al*., 2018). In addition, it does not adequately distinguish between compliance needs of SMEs and large industries, leading to gaps in sector-specific enforcement. Environmental regulations in Nigeria often lack sector specificity or tailored guidelines for industries such as manufacturing, agriculture, and construction. This creates gaps in applicability, particularly for SMEs (Idoko *et al*., 2013; Sridhar *et al*., 2018; Nabegu, 2019). Nigeria's compliance challenges stem from regulatory overlap, capacity deficits, and lack of awareness among stakeholders. Corruption and limited funding exacerbate non-compliance, leading to significant pollution, especially in urban industrial centers (Sridhar *et al*., 2018; Okoli and Abraham, 2024).

In comparison with other African countries, such as South Africa, Kenya and Ghana, South Africa has the most robust and encompassing environmental policy milieu. The regulations are more sector-specific and provide more detailed provisions to address different sectors and stricter penalties for non-compliance (Iredele and Ogunleye, 2017). Ghana and Kenya on the other hand suffer from enforcement challenges linked to limited resources and face similar financial and capacity issues and as such, weak surveillance persist, paralleling the Nigerian experience. In terms of specificity however, sectors such as agriculture receive more focus in Kenya, with regulations linked to water resource use, soil preservation, and pollution management (Ozigi-Bute and Gakur, 2015; Okoli and Abraham, 2024) while Ghana has invested more in community-based monitoring of environmental projects in mining regions which enhances localized enforcement.

Drivers of Compliance with Environmental Regulations among SMEs

According to the literature, the factors influencing compliance of environmental regulation among SMEs have been reported to be regulatory, economic, market and organizational factors. These factors can be internal or external to the SME. Regulatory drivers of compliance include the legal frameworks made up of environmental laws and regulations set by local, national, or international authorities. Failure to operate within these frameworks may incur penalties in form of fines and other sanctions that may affect the operations of the business. Regulatory inspections and regular monitoring by environmental agencies can also be influencing factors of compliance (Sáez-Martínez *et al*., 2016). Winter and May (2001) however reported that coercion and strict enforcement can backfire leaving compliance to other internal factors. Economic and financial factors may also be drivers of compliance. Efforts to lower operational costs by reducing waste and energy consumption may also be in line with many environmental regulations especially air pollution and waste management (Aniyikaiye *et al*., 2019). Compliance can unlock access to grants, loans, or investment opportunities. Compliance enhances reputation and may attract eco-conscious consumers and investors, thereby boosting market attractiveness of the SME. Compliance may also attract larger corporations interested in backward and forward linkages with SMEs that comply with environmental standards. Social and market forces such as consumer expectations for green products and growing preference for eco-friendly products

and services can enhance the public image and reputation of the firm and thereby encourage compliance (Ortiz-Avram *et al*., 2018). Internal organizational factors may include leadership commitment among SME owners and managers which may also prioritize compliance. For example, small and medium scale companies can significantly improve safety, hygiene, and environmental practices with management support (Meité *et al*., 2009). In addition, employee awareness and training may help to educate staff on the importance of the sustainability of production processes and help implement environmental policies much more frequently. Firms with high innovation capability may also be able to comply through the development and use of cleaner production technologies and eco-friendly processes.

Implications of Non-compliance with Environmental Regulations by Firms in the Food and Beverage Sector

Lack of compliance with environmental regulations may have implications for the environment, public health, and socio-economic development. The food and beverage sector particularly has implications for waste water, solid waste, air pollution and energy intensive processes (Woodard, 2020; Samsami *et al*., 2025). Because of the high number of SMEs, in the world today, these wastes have multiple points of discharge thereby contributing to a wider spread of environmental hazards.

Food and beverage SMEs have been found to discharge high volumes of untreated or poorly treated wastewater with high organic loads, contributing to water pollution and ecosystem damage. Wastewater from the food and beverage sector usually contains pollutants such as oils, fats, chemicals, and untreated solids, which can degrade water quality. Water pollution negatively impacts aquatic life, human health, and the availability of clean water for communities (Samsami *et al*., 2025). Most SMEs without proper waste management procedures mostly discharge into surface water.

This may lead to the contamination of groundwater and soil with toxic harmful chemicals; harming neighboring ecosystems and endangering the health of nearby communities. The poor adoption of solid waste management practices such as composting and recycling worsens environmental degradation and significantly contributing to pollution (Udugama and Jayasinghe-Mudalige, 2010). SMEs that fail to comply with air pollution regulations contribute to local air quality deterioration. Food and beverage processing activities, such as cooking, frying, and the use of heating systems, release pollutants such as particulate matter, carbon dioxide, and volatile organic compounds. These pollutants contribute to respiratory diseases and other chronic conditions. While less emphasized, energy-intensive processes and improper waste practices contribute indirectly to emissions and resource depletion. Energy saving methods of production (Amaral and da Silva, 2021) or more sustainable sources of power such as solar or wind are mostly recommended for sustainability. The consequences of SMEs in the food and beverage sector not adhering to extant regulations therefore pose specific hazards to the environment. Policies to achieve the proliferation of SMEs in any country must therefore be accompanied by appropriate environmental regulations and compliance measures.

Theoretical Background

Institutional theory

An argument for compliance of SMEs with regulatory frameworks is provided by institutional theory. This theory focuses on the trend in the uniformity of organizational behavior and structure, especially in conformity to norms or the perceived organization need to achieve legitimacy. Institutional theory identifies three basic mechanisms through which organization behavioral change occurs, each with its own antecedents and peculiar isomeric pressures such as coercive (regulative) pressure; normative pressure; and mimetic pressure (Scott, 1995). Scott (2008 p.51) opined that each of the institutional pressures 'offers a different rationale for legitimacy, whether by virtue of being legally sanctioned, morally authorized, or culturally supported'. Therefore, organizational response to each of the pressures differs in terms of rationale for adherence, logic of action, mechanism and indicators employed (Scott, 2008, Liao, 2018).

Coercive pressure necessitates the organization's conformity to legal and regulatory requirements. This pressure is exerted on an organization by external agents. Coercive pressure can be in different forms, notably, as a force and as

persuasion for cooperation (DiMaggio and Powell, 1983). Regulations that "stress rule-setting, monitoring, and sanctioning activities" are known as coercive pressures (Scott, 2008. P. 54). In this context, the compliance of SMEs to environmental regulations may arise as a result of reaction to government rules, regulations, incentives and sanctions for compliance failure. Consequently, coercive pressure primarily emanates from government authoritative mandates, particularly in the enforcement of government laws, policy, and regulation(s) on firms. The dire punitive consequences for non-compliance to statutory and stringent environmental regulations may push focal firms toward compliance with the regulations. Furthermore, incentive mechanisms primarily aimed at environmental sustainability also play a significant role in firm compliance. These incentives can be financial and/or non-financial. The incentive mechanism may have a compliance pull effect. A firm's propensity to comply therefore may increase with government incentive or punitive mechanisms (Galinato and Chouinard, 2018).

Normative Pressure primarily stems from professionalization and other social actors such as customers, suppliers and other stakeholders such as environmental activists (Berrone, *et al*., 2013; Scott, 2008; DiMaggio and Powell, 1983). These social actors shape organizational behavior. For instance, members of an association collectively define the *modus operandi* in order to establish some level of legitimization. Essentially, members within the same profession set out laid down rules and regulations guiding professional conduct of business activities. Also, punitive measures for non-compliance to the set rules by members of the profession are usually severe. Thus, members are compelled to strictly abide by the set standards in business routines. In addition, organizational compliance may also arise through standardized training, workshops, exhibition and trade fairs organized for or by professional and trade association for members and staff.

Mimetic pressures to comply may occur as a result of uncertainty, particularly with regard to ambiguous environmental regulations and uncertain outcomes of compliance; thus, forcing an organization to model or imitate similar organizations, perceived as being more successful by complying with environmental regulations. Usually, a problematic search for a less expensive and viable solution to compliance becomes imminent for an organization faced with enforcement penalties (Scott, 2008). Therefore, uncertainties are powerful forces that may encourage an organization to mimic or imitate organizations with higher compliance and organizational success.

In summary, institutional theory is a valuable framework for understanding SME compliance with environmental regulations as it may account for the complex interplay of external pressures and internal organizational responses, providing insights into how SMEs can effectively navigate and respond to environmental regulatory demands.

METHODOLOGY

This study was conducted in Lagos, Oyo and Osun States in the Southwestern region of Nigeria. This is because the three states comprise the highest percentage (75%) of the total SMEs in the Southwestern region (MSME, 2015). In line with the contextual classifications in MSME (2015), SMEs are defined as firms with 10-199 employees. Small SMEs have between 10 to 49 staff while medium sized SMEs have 50 to 199 employees. This was the threshold for SMEs in this study. A multi-stage sampling technique was used in the selection of the study sample. At the first stage, stratified sampling was used to disaggregate manufacturing SMEs in the selected states by industry types. At the second stage, purposive sampling was used to select enterprises in the food and beverage industry. At the third stage, stratified sampling was used to the select the firms in the SME food and beverage sector into sub-sectors using the International Standard Industrial Classification (ISIC) taxonomy. These are manufacturers of dairy products, grain mills, bakeries, confectioners, beverages, animal feed and commercial food service providers. A total population of 760 SME firms in the food and beverage sector was identified in the study area at www.infoisinfo.ng/search/manufacturers. Five hundred and ninety eight were in Lagos, 124 in Oyo and 38 in Osun State. A sample of 256 SMEs was determined for the study using the Cochran (1977) formula adjusted for the finite population correction factor from the study population. Two hundred and one, 42 and 13 firms were then

proportionally selected in Lagos, Oyo and Osun States respectively. Lastly, proportional random sampling was used in the selection of representative samples across the food and beverage sub-sectors in the three States. Only SMEs registered with at least one of the following agencies were purposively selected: National Agency for Food Drug Administration and Control (NAFDAC), National Environmental Standard Regulatory and Enforcement Agency (NESREA), Standard Organization of Nigeria (SON), Cooperate Affairs Commission (CAC), State Environmental Protection Agency, State Ministry of Commerce/Industry, and Trade and Investment.

Furthermore, the primary data for this study was collected using a set of questionnaire. Respondents for this study were managers or owners of SME food and beverage firms. The questionnaire elicited information on the adherence of the SME to extant environmental regulations, notably, the National Environmental (Food, Beverages and Tobacco Sector Regulations, 2009). The variables used for the study were drawn from the document. It included the compliance and internal organizational measures. The structure of the section of the questionnaire used to collect data for the study consisted of four sections; firm profile, compliance to environmental regulations, adherence to internal organizational measures and frequency of adherence. The firm profile included questions on the number of employees of the SME which was the measure of firm size. Compliance with extant regulations and internal control measures were measured on a two-item code of yes and no with yes = 2 and No = 1. Frequency of compliance was measured on a five-item scale where 1 = none and very high = 5. The level and frequency of compliance of SMEs with extant environmental regulations was determined using frequencies, percentages and means while the impact of size on compliance was achieved using a Student's t-test. Data was also collected through interviews with 10% of the respondents and observation at the premises of the SMEs. The interviews were based on the questions in the survey instrument.

RESULTS AND DISCUSSION

Results

Out of the 256 copies of questionnaire distributed, 183 were retrieved. From the copies of questionnaire retrieved, 11 respondents indicated that they had less than 10 employees while 9 had more than 199. These were not within the 10 to 199 employees used as measure for SMEs in the study. The remaining 153 were analysed for the study representing 60% of the sample. This is considered a highly acceptable response rate for surveys (Dillmann *et al.*, 2014).

The distribution of the size of the SMEs measured by number of employees showed in Table 1 reveals that 62.5% of the SMEs have between 10 to 49 employees. Furthermore, 37.5% of the SMEs indicated to have between 50-199 employees. This implies that all the firms polled were within the classification of SMEs. A study by the National Bureau of Statistics (NBS) and Small and Medium Enterprises Development Agency of Nigeria (SMEDAN) provides similar insights into the size distribution of SMEs in Nigeria (NBS and SMEDAN, 2017). The report disclosed that 55% of MSMEs in Nigeria employ between 10 to 49 workers while 30% employ 50 to 199 workers.

Table 1: Profile of the SMEs

S/N			F	%
1.	**Sector**	Dairy Products	1	0.65
		Grain Mills	1	0.65
		Bakeries	64	41.9
		Confectionery	7	4.5
		Food service providers	66	43.2
		Water and beverages	13	8.45
		Animal feeds	1	0.65
			153	100
2.	**Size (No of Employees)**			
		10-49	97	62.5
		50-199	58	37.5
			153	100

However, Akinboade and Kinfack (2012) reported covering 69 (14%) medium and 402 (86%) small sized enterprises in their study on Cameroonian SMEs. This nonetheless aligns with the findings of the study that there are a larger percentage of small-sized firms in the SME category. Another study by the International Labour Organization, ILO (2019) highlights the dominance of small-sized enterprises in developing economies. The report notes that SMEs in sub-Saharan Africa, including Nigeria, are predominantly small-sized (10 to 49 employees), with fewer medium-sized enterprises (50–199 employees).In the classification as food and beverage firms, 0.5% of the firms indicated that they were into the production and packaging of dairy products and another 0.5% operated grain mills. Approximately 42% were bakeries, 4.5% were confectioners, 8.45% produced beverages while 0.65% made animal feed. The largest share of the firms (43.2%) was commercial food service providers. FAO (2018) also reports that bakeries and food service providers dominate the SME sector due to low entry barriers, while dairy and grain processing are less common due to higher capital requirements.

The result of the SMEs adherence to the extant National Environmental (Food, Beverage and Tobacco Sector regulation, 2009) is presented Table 2. The compliance and internal organizational measures were used to assess the SME adherence to the regulation. With regards to compliance measures, 14.8% of the respondents indicated not to have complied with having a waste management plan, while 15.3% were also not in compliance with the air pollution regulations. The general environmental pollution by solid wastes in Nigeria is exacerbated by industrial activities, suggests that solid waste management is a critical area needing attention (Fayiga *et al*., 2018). The lack of stringent enforcement of air quality standards poses a challenge for SMEs in maintaining compliance. Dufatanye *et al*. (2022) reported that 33.3% of their study sample of SMEs in Rwanda failed to comply with waste water regulations.

Table 2: SMEs Adherence to Extant National Environmental (Food, Beverages and Tobacco Sector) Regulations (2009)

S/N	Variables	Yes F (%)	No F (%)
A	**Compliance Measures**		
i	Do you have an environmental policy in place?	100 (65.6)	53 (34.4)
ii	Have you conducted an environmental impact assessment?	116 (76.0)	37 (24.0)
iii	Are you in compliance with wastewater discharge regulations?	129 (84.2)	24 (15.8)
iv	Do you have a waste management plan?	130 (85.2)	23 (14.8)
v	Are you in compliance with air pollution regulations?	130 (84.7)	23 (15.3)
B	**Internal Organizational Measures**		
i	Do you have a designated environmental manager or team?	115 (74.9)	38 (25.1)
ii	Are environmental regulations integrated into your business operations and decision-making processes?	123 (80.3)	30 (19.7)
iii	Do you conduct regular environmental audits and assessments?	91 (59.6)	62 (40.4)
iv	Are your employees trained on environmental best practices?	127 (83.1)	26 (16.9)
v	Do you have a system in place for reporting environmental incidents and non-compliance?	99 (64.5)	54 (35.5)
vi	Does your enterprise test wastewater regularly or periodically?	99 (64.5)	54 (35.5)
vii	Have your neighbors ever complained of your Enterprises' wastewater or other discharges before?	45 (29.5)	108(70.5)

In addition, 15.8% and 24% of the respondents indicated not to be in compliance with the stipulated wastewater discharge regulations, and have not conducted an environmental impact assessment, respectively. About 34% of the respondents indicated not to have an environmental policy in place.

In terms of internal organizational measures, 16.9% of the respondents indicated that they had not

trained their employees in environmental best practices while 19.7% indicated not to have integrated environmental regulations into their business operations and decision-making processes. In addition, 25.1% of the respondents indicated that they did not have a designated environmental manager or team, while 35.5% of the respondents stated not to have a system in place for reporting environmental incidents nor conducting periodic tests of wastewater. Mabadahanye *et al*. (2024) in a study in the Vhembe District also revealed inconsistencies in monitoring water quality and a significant educational gap among workers, suggesting that enhanced training and standardized procedures are necessary for better compliance. The authors also reported inconsistencies and a lack of transparency in monitoring water quality to enhance water management efficiency and compliance. The study recommended more training, standardized procedures, proactive maintenance, and stakeholder involvement. Some (29.5%) indicated that there are reports from host communities of waste discharge from the firm.

The frequency of compliance to the extant environmental regulation is measured on a 5-point Likert scale of always (5) to never (1) is as presented in Table 3. The mean rating showed that respondents are often (3.84) in compliance with the regulation that stipulates employee training and awareness programs on environmental regulations.

Table 3: SME Frequency of Compliance to the Extant Regulations

		Extent of Compliance Freq. (%)						
S/N		**Always (5)**	**Often (4)**	**Sometimes (3)**	**Rarely (2)**	**Never (1)**	**Mean**	**Std. Deviation**
i	Employee training and awareness programs on environmental regulations	46(30.1)	55(36.1)	34 (22.4)	17(10.9)	1 (0.5)	3.84	0.996
ii	The Implementation of environmentally friendly technologies and practices as stipulated in the National Environmental (Food and Beverage Sector) 2009 Regulation	47 (30.6)	49(32.2)	36(23.5)	18(11.5)	3 (2.2)	3.78	1.074
iii	Supply chain management and procurement practices that consider environmental impact	30 (19.7)	32(20.8)	65(42.6)	18(11.5)	8 (5.5)	3.38	1.092
iv	Stakeholder engagement and community involvement in environmental initiatives	25 (16.4)	26(16.9)	72(47.0)	23(15.3)	7 (4.4)	3.26	1.045
v	Continuous monitoring and reporting of environmental performance	29 (19.1)	28(18.6)	70(45.9)	23(14.8)	3 (1.6)	3.39	1.009

In the same vein, respondents are often (3.78) in compliance with the implementation of environmentally friendly technologies and practices as stipulated in the National Environmental (Food, Beverage and Tobacco Sector Regulation, 2009), while they were sometimes (3.39) in compliance with continuous monitoring and reporting of environmental performance. In developing countries, poor administration of environmental compliance is a significant barrier, with many SMEs struggling to maintain necessary documentation and reports, which affect their compliance status (Maphumulo *et al*., 2023). Furthermore, the firms indicated that they sometimes (3.38) adhered to the stipulated supply chain management and procurement practices that consider environmental impact. Similarly, respondents indicated that they sometimes (3.26) were in compliance with stakeholder engagement and community

involvement in the firm's environmental initiatives. Although civil regulatory pressures can also play a role in specific contexts Lynch-Wood and Williamson (2014) report that these pressures often lead to compliance-reinforcing measures. The frequency of compliance has been attributed to two major factors. Firstly, a lack of understanding of the regulations and the implications on the environment may be a reason for SMEs not to comply frequently. Wilson *et al*. (2011) reported in a study of SMEs in the United Kingdom that SMEs' knowledge and understanding of environmental legislation was poor and no single SME, regulator or support organisation appreciated 'environmental compliance' as a whole concept. Secondly, consistency of enforcement has also been linked to perception of regulations by the firm. Some firms perceive that compliance implies only paying attention to what is identified as infringements by inspectors during inspection (Wilson *et al*., 2015).

Table 4 shows the impact of SME size on compliance of regulatory measures. Size was measured in terms of number of employees. Most of the means of compliance in the results of this study shows that small-sized SMEs are more compliant with environmental regulations than medium-scale firms in all of the regulations except for employees training regulations (M = 1.16; SD = 0.37 and M = 1.19; SD = 0.40) and the extent of compliance with supply chain management and procurement practices (M = 3.30; SD = 1.14 and M = 3.36; SD = 0.99) where medium-scale firms were more compliant.

Table 4: Impact of SME Size on Compliance

S/N	SMEs Environmental Regulatory Measures	SME Size				t(153)	*p*-value
		Small Size (10-49 employees)		Medium Size (50-199 employees)			
		Mean	SD	Mean	SD		
1	Having an environmental policy in place	1.39	.49	1.31	.47	1.03	.30
2	Periodic environmental impact assessment	1.26	.44	1.22	.42	.47	.64
3	Compliance with wastewater discharge regulations	1.21	.41	1.12	.33	1.43	.15
4	Waste management plan	1.20	.40	1.07	.26	2.41	.02
5	Compliance with air pollution regulations	1.19	.39	1.12	.33	1.11	.27
6	Designated environmental manager or team	1.25	.43	1.19	.40	.83	.41
7	Integration of environmental concern into business operations and decision-making processes	1.25	.43	1.09	.28	2.80	.01
8	Periodic environmental audits and assessments	1.48	.50	1.33	.47	1.95	.05
9	Employees training on environmental best practices	1.16	.37	1.19	.40	-.39	.70
10	An in-house systemic framework for reporting environmental incidents	1.39	.49	1.28	.45	1.50	.14
11	Periodic test on liquid/wastewater discharge	1.41	.49	1.28	.45	1.76	.08
12	Responsive to neighborhood complaints on wastewater or other discharges	1.84	.37	1.52	.50	4.17	.00
13	The extent of SME compliance with employee training and awareness programs on environmental regulations	3.85	1.00	3.71	1.08	.81	.42
14	The extent of SME compliance with the implementation of environmentally friendly technologies and practices as stipulated in the National Environmental (Food and Beverage Sector) 2009 Regulation	3.86	1.12	3.59	1.01	1.50	.13
15	The extent of SME compliance with supply chain management and procurement practices that consider the environmental impact	3.30	1.14	3.36	.99	-.35	.73
16	The extent of SME compliance with stakeholder engagement and community involvement in environmental initiatives	3.26	1.09	3.26	.97	-.01	1.00
17	The extent of SME compliance with continuous monitoring and reporting of environmental performance	3.44	1.03	3.26	.93	1.12	.26

Level of significance $p \leq 0.05$

This may be due to the availability of resources to train staff. In addition, larger firms because of larger volume of processing activities may need an elaborate supply chain system requiring environmental regulatory strategies. These results were however not statistically significant ([t (153) = -0.39; p > .05]; [t (153) = -0.35; p >.05])
Typically, studies found in the literature report higher compliance rates among large companies. For example, Díaz-García *et al*. (2016) report that large firms typically exceed SMEs in complying with regulatory requirements, with only about one-fifth of SMEs demonstrating a proactive environmental stance. However, not many studies report compliance within the SME size category.

Small-sized SMEs however surpass medium-scale firms in all other measures of environmental compliance in this study. The mean rating of the small firms that indicated that they had a waste management plan was significantly higher by 0.13 [t (153) = 2.41; p < .05] than the medium sized firms. This result is not in line with other studies where it is generally reported that small firms often encounter challenges in complying with waste management measures compared to their larger counterparts as they lack the resources to implement comprehensive environmental management systems (Vickers *et al*. 2009; Hidayah *et al.*, 2022)

There was also a significant difference [t (153) = 2.80; p < .05] in the mean rating of level of compliance between small- and medium-scale firms in integrating environmental concerns into business operations and decision-making processes by the firms. The average ratings of the small-scale firms were higher than those of the medium-scale SMEs. Vickers *et al*. (2009) reported that small-sized firms find it challenging to integrate sustainable practices into business operations. The authors however contend that the adoption of frameworks such as ISO 14001 by small firms may provide a structured approach that can significantly enhance their environmental management systems better than those of larger firms. There was also a significant difference [t (153) = 4.17; p < .005] in the positive ratings of responsiveness to neighborhood complaints on wastewater or other discharges with the small firms having higher mean ratings by 0.15 indicating that they were generally more responsive. Latip *et al* (2022) reported that smaller firms in the food sector in India are more responsive to customer, regulatory and community pressures to adopt environmental management practices. Abdou *et al*. (2023) found similar results among small-scale firms in the Saudi Arabian restaurants. This has been attributed to the fact that customers and other stakeholders are closer observers of the environmental practices of small-scale firms as compliance is also an indication of a healthy and clean environment.

There was also a significant difference [t (153) = 1.95, p = 0.05] in the average number of firms that indicated that they do periodic environmental audits and assessments with small-sized firms indicating higher means. This suggests that small-sized enterprises adhere more to this regulation than medium-scale firms. These audits not only ensure compliance with environmental policies but also foster a sense of accountability towards local communities. Studies that suggest that small firms show more accountability towards local communities may align with the findings of this study.

DISCUSSION

Majority of the respondents indicated that they have complied with most of the regulations. Having an environmental policy in place and conducting environmental impact assessments (EIA) are however significant issues among SMEs in Nigeria. Interviews among the respondents that indicated that they did not have any policy in place acknowledged that they did not know how to go about having an environmental policy. Others that attempted to conduct EIA complained about the high costs of getting one done. Some also reported that EIAs are often disregarded due to costs constraints, lack of awareness, or weak regulatory enforcement. Harelimana *et al*. (2020) reported on the need to establish environmental units, hire environmental officers, and improve institutional coordination and resource allocation to effectively implement environmental impact assessments in a study of some SMEs in industrial sectors in Rwanda.

In addition, about 20% of the respondents claimed that they are not in compliance with wastewater discharge regulation, did not have a waste management plan and are not in compliance with air pollution regulations. Non-compliance with

wastewater discharge regulations is a major environmental challenge in Nigeria. Observations showed that many SMEs in the food and beverage sector discharge untreated or poorly treated wastewater into water bodies, leading to water pollution and health hazards for surrounding communities (Aniyikaiye *et al*., 2019). The lack of waste management plans exacerbates this problem, as solid and liquid wastes are often disposed of indiscriminately. This contributes to clogged drainage systems, flooding, and the spread of waterborne diseases. It was also observed that air pollution from SMEs in the food and beverage sector is linked to the use of energy sources such as diesel and petrol powered generators for production. Non-compliance with air pollution regulations results in the emission of harmful gases, including carbon monoxide and particulate matter, which negatively impact air quality and public health. The frequent use of open fires among food vendors in South Africa negatively impact health and wellbeing with increasing risks of respiratory diseases among the populace (Sepadi and Nkosi, 2022).

As far as internal organizational measures are concerned, having designated environmental managers or teams seem to be common among SMEs. However without such roles, environmental compliance is often deprioritized, and there is no systematic approach to addressing environmental risks. This lack of structure hinders the integration of environmental considerations into business operations and decision-making processes. Debra *et al*. (2021) advocate for the inclusion of environmental sustainability institutions in Africa to bridge the gap in waste management and promote sustainable development and cleaner production.

The respondents also claimed that they sometimes conducted environmental audits and often train their employees on waste disposal and environmentally sustainable production practices. Regular environmental audits and employee training on environmental best practices are critical for ensuring compliance with the extant regulations. However, many SMEs in Nigeria do not conduct audits or provide training due to financial constraints or a lack of awareness. This results in poor environmental performance and increased incidents of non-compliance (Harelimana *et al*., 2020). However, frequent training of staff to imbibe environmentally friendly work processes may enhance the sustainability of the impact of the firm's activities on the environment.

The respondents also indicated that they sometimes involved their immediate community in their environmental initiatives and monitor their environmental performance. The absence of systems for reporting environmental incidents and non-compliance further exacerbates the problem. Many SMEs do not have mechanisms in place to monitor or address environmental issues, leading to repeated violations. Community complaints about wastewater discharge and other pollutants are common, highlighting the disconnect between SMEs and their host communities. Periathamby (2011) reports that waste management requires cooperation and collaboration among stakeholders in the SMEs host communities for efficient waste collection, recycling, treatment and disposal

In the analysis of the impact of size on compliance, it is evident that the small-sized firms polled are significantly better than medium-sized firms in terms of adherence to environmental regulations on waste pollution management, sustainability integration in business processes, environmental audits, and community inclusion. Though small-sized firms encounter unique challenges due to limited resources and expertise, which can hinder their compliance with environmental standards, they may be driven by community pressures towards good environmental stewardship. They also have less complex business operations, are more community embedded and with fewer employees which make monitoring by regulators easier and adherence to regulations more necessary

CONCLUSION

The study concludes that though most of the firms indicated that they complied with the regulations and had internal processes to support adhering to the regulations, the firms only sometimes complied with small firms sometimes showing more proactive behavior than medium-sized ones. However, according to the population of firms used in this study, as many as fifty firms (or about 20%) do not comply with stipulated environmental regulations. This may have far-reaching implications on enforcement and compliance measures in the sector. More frequent visits by

enforcement agents may increase frequency of compliance. In addition, community-based monitoring may be enhanced by policy measures. Future research may focus on the size of operational activities of the SMEs in relation to noncompliance to determine the actual environmental costs. One area of study which may emanate from this research is the lack of concentration on informal SMEs which are less likely to comply with extant environmental regulations due to different influencing factors. This study was focused on SMEs that were registered because of the purposive sampling technique which enabled the identification of SMEs from certain databases. Future studies may utilize other sampling procedures such as snowball sampling technique to identify informal sector SMEs

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