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Environmental Audit Practices in Small and Medium Scale Enterprises in Nigeria

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Abstract

The study assessed environmental audit practice as well as the effectiveness of environmental laws in small and medium scale enterprises (SMEs) in Nigeria. It also evaluated the impact of SMEs activities on the environment and on human health. This was with a view to determining the extent of compliance of audit practice with environmental laws. Relevant data were obtained from workers using judgmental sampling technique in ten different SME categories across the country with the aid of pre-tested questionnaire, interview schedule and Focus Group Discussion. The data was analyzed using descriptive statistics and analysis of variance. The results of the analyses revealed that: (1) some of the ten different SME categories in Nigeria are significantly influenced by existing environmental laws, (2) some of the activities of the SMEs have negative effects on human health and on the environment, (3) managements of SMEs are keen on implementing environmental audits that do not attract additional production cost and that facilitate quick access to funds from financial houses, and (4) generally, the extent of compliance of SMEs to the requirements of the existing environmental laws is poor. Among many others, the study also revealed that there are significant differences among: (1) different SME categories with respect to the extent of implementation of each type of environmental audit in Nigerian SMEs, (2) different SME categories with respect to the influence of environmental laws on their audit practices, (3) different SME categories from different zones with respect to the extent of implementation of each type of environmental audit types, and (4) among zones with respect to the degree of influence of environmental laws on SME audits practices.

Keywords: *analysis of variance, compliance, hypothesis, international financial reporting standards, pollutions.*

1. Introduction

An environmental audit is generally regarded as an evaluation to identify environmental compliance and management system implementation gaps along with related corrective actions. An environmental audit may be either a compliance audit or a management systems audit. The former deals with the company's compliance status in an operational context while the latter is analogous to financial audit. A compliance audit may be multimedia (identifying and auditing all environmental media such as air, water, waste, among others) or programmatic/thematic or media specific if the audit function is limited in scope to pre-determined regulatory areas (Environmental Audit and Accounting, 2010). Nevertheless, the international standard for environmental management systems (EMS) is ISO 14001. While ISO 14001:2004 provides the requirements for an EMS, ISO 14004:2004 gives general EMS guidelines

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(Environmental Audit and Accounting, 2010). ISO 14004:2004 therefore is a management tool that enables an organization of any size to (1) identify and control the environmental impact of its activities, products or services (2) improve its environmental performance continually, and (3) implement a systematic approach to setting environmental objectives and targets, to achieve the targets and to demonstrate that they have been achieved (Environmental Audit and Accounting, 2011).

In specific terms, ISO 19011 provides guidance on the principles of auditing, which involves managing audit programmes, conducting quality management system audits and environmental management system audits. Guidance of audit functions contributed significantly to the development of established economies worldwide, especially with the coming of modern technological tools such as laptop computers. Portable printers, CD/DVDs, the internet, iPad, email and wireless internet access which have all been used to improve audits, improve/increase auditor access to regulatory information and create audit reports on site (Patrick, et al., 2010).

New international standards for environmental auditing are actively promoted by public authorities and adopted by private firms in the developed world. An emphasis on managerial systems and incentives that support a wiser use of environmental resources is being advocated. In addition to reducing risk of business failure, environmental audits promote good business practices in the economy as well as enhance better governance in smaller organizations before they become economically significant. Statutory audit is mandatory for public companies but optional for private organizations. These private organizations are mainly the small and medium scale enterprises (SMEs). Paradoxically, studies had revealed that SMEs, especially those in developing countries, are inherently bedeviled with myriads of problems such as inefficient and antediluvian production processes, red tapism and lack of critical mass of highly skilled individuals that should manage modern technological processes that are presently used in carrying out audit functions in environmental management systems. Secondly, there are issues of lack of finance and focus, inadequate market research, improper record-keeping, inexperience, cumulative negative impact of their aggregate activities on their operating environment due to their large numbers, among others (Olowu, 1993; Hallberg, 1999; Hillary, 2000; Asaolu, 2004; Khao, 2006; Newberry, 2006; Adelakun, 2007; Hillary, 1995). Yet they are generally regarded as engine of growth for most economies, but are also believed to contribute most of the environment pollution problem (Hillary, 1995). The effects or hazards constituted by these pollutions on the environment in Nigeria are either largely under reported or may not be captured in environmental auditing and reporting as highlighted in most literatures. This appears antithetical to the requirements of the newly introduced but arguably widely adopted International Financial Reporting Standard (IFRS) especially in developing nations. It is on the above premise that this study will empirically assess the role environmental audit plays in SMEs activities as well as the influence of existing environmental laws on environmental audit practice in Nigeria. Specifically, the study will investigate the following:

- The impacts of SMEs' activities on the environment and human health
- The extent of the implementation of different types of environmental audit in SMEs, and
- The degree of influence of environmental laws on audit practices in the SMEs.

Furthermore, we will formulate and test some hypotheses in order to assess and understand the differences among SME categories in Nigeria with respect to the implementations of

environmental laws and influence of these laws on their audit practices. Additionally, the hypotheses and their tests will enable us to know whether there are zone effects in the implementations of environmental laws by SMEs in Nigeria and whether there are significant differences among environmental laws with respect to their implementations and their influence on audit practices by Nigerian SMEs.

2. Literature Review

External audit reduces the risk of business failure. It assists managers of small businesses in understanding how to develop good management practices that will enhance the comprehension and recognition of emerging business opportunities while mitigating risk. In addition, Smith (2004) noted that independent auditors on environmental matters in the United States must first identify environmental risks before checking for the extent of compliance with related accounting standards.

The SMEs are non-complex organizations; however, the business environment is generally complex and highly regulated. The newly introduced and widely embraced International Financial Reporting Standard (IFRS) contains both operational and financial reporting regulations to govern both the large organizations and SMEs sectors.

All businesses are interested in further expansion, especially on an international basis. SMEs that truly desire growth must prepare a foundation for a vibrant and sound business practice which auditing of its activities can help to achieve. External audit of the organization is never expected to solve all business problems, but it may help to expose and prevent certain risks. Even though not all agencies are interested in the performance of SMEs, there are agencies such as tax authorities, banks and other financial institutions which are interested in the results emanating from SMEs activities. Audit function provides the oversight responsibility which will give interested users the confidence to rely on the financial statements presented by the SMEs' management.

SMEs constitute the majority of organizations in all countries of the world and Nigeria is no exception. SMEs often have limited access to long-term funds. Asaolu (2004) noted that neither short-term nor long-term funds of SMEs are raised from the organized financial sector. Rather, they rely heavily on their personal savings or loans obtained from friends, associates, relations or money lenders. When SMEs are able to secure loans from financial institutions, the cost is often high due to high interest rates and bank charges.

SMEs are job creators, but also exhibit high birth rates and high mortality rates and many fail to grow. The high mortality rate is often caused by lack of finance, focus, inadequate market research, improper record-keeping, mixing family, friends and business together, over-concentration on one or two markets for finished products and inexperience (Starkey, 1998; Pallen, 1998; Ekezie, 2008; Fatusin, 2008).

Olayemi (2006) noted that audited companies tend to take a more professional approach to good governance, internal controls and external advisory boards. The author further posited that through external auditing, SMEs directors' attention is further drawn to understanding their roles and responsibilities under corporate legislation.

Environmental auditing only began to appear in large US firms in the late 1970s as a result of rising environmental worries, risks and pollutions. Even then, it was not integrated with any kind of management control system. However, company environmental audits became common

in the 1990s (Willsher, 2006). Environmental audit in any SME must measure the environmental impact of the SME's activities, waste treatments and disposal methods, emissions records, wastes contractors, recycling methods, and other factors. SMEs are perceived to view any additional cost with trepidation as survival is number one in their list of priorities. Making more profit to remain a going-concern and further expansion are goals most SMEs pursue on a daily basis. An SME may see an environmental audit as extra cost which will eat into the profits of the organization. Many researchers have discovered that rather than increase organization costs, environmental management improves profit (Khao, 2006; Hillary, 1995; Willsher, 2004; Owolabi, 2007). In fact, Willsher (2004) opined that environmental negligence by an organization will have significant consequence on profit.

Just as in regular audits, environmental auditors are expected to prepare a checklist to guide their auditing activities. An organization is expected to develop its own checklist to meet compliance requirements and management systems. Air emissions and anything that discharges are some of the items to be checked for compliance during audit.

Some responsibilities facing companies, according to Smith (2004), include meeting regulatory requirements or exceeding those expectations, cleaning up pollution that already exists and properly disposing off the hazardous material, disclosing to the investors, both potential and current, the amounts and nature of the preventative measures taken by management and operating in a way that environmental damage does not occur.

The International Chamber of Commerce defines "environmental audit" as the systematic examination of the interactions between any business operation and its surroundings. This includes all emissions to air, land, and water, legal constraints, the effects on the neighboring community, landscape and ecology; and the public's perception of the operating company in the local area. An environmental audit does not stop at monitoring the level of satisfactory compliance but requires putting in place short and long term measures that would ensure waste control and avoid negative impacts on the environment and on human beings.

Smith (2004) observed that several laws governing environmental disclosures have been developed. Environmental audit functions include compliance audit, systems audit, treatment, storage and disposal facility audits, audits which focus on preventative measures that can be taken to reduce the amount of environmental risk a company has to bear, audits to determine accrual of the amount of liabilities and costs associated with environmental damages and to determine that proper disclosure of these costs have been made to the public and audits to appraise the production process to ensure that products meet specific requirements. Once the environmental risks have been identified, the auditor must check for compliance with accounting standards.

The benefits of managing the environment are many. According to Starkey (1998) these include cost savings and avoidance of negative publicity. Conflict between the need to protect the environment and desire to keep down costs and run a successful business often agitate the mind of SMEs operators. Instead of increasing costs, environmental performance improvement may actually reduce costs. This can be achieved through improvement of existing process efficiency, by proper maintenance of equipment and by introduction of modern efficient processes (Pallen, 2006). Other means are by product redesign to reduce the amount of resources used while maintaining the level of service it provides, re-using of waste by the company or passing it to the organizations that have need for it, changing the source of raw materials and making efficiency changes to infrastructure, packaging and transportation.

According to Adegoroye (1997), government enacted a number of legal instruments which spelled out in clear terms specific offenses, requirements and penalties for organizations that may contravene environmental laws. Some of the environmental legislations are:

- The Hazardous Waste Criminal Provisions Decree 42 of 1988.
- The National Guidelines and Standards for Environmental Pollution control in Nigeria.
- The National Effluents Limitations Regulations S.I.8. of 1991 which make it mandatory for industrial facilities generating wastes to retrofit or install at commencement of operations, anti-pollution equipment for detoxification of effluents and chemical discharges. The regulations also spell out by industrial categories, crucial parameters and their limits in effluents or emissions and prescribe penalties for their contravention.
- The Pollution Abatement in Industries and Facilities Generating Regulations S.I.9. of 1991 which spell out restrictions on release of toxic substances into Nigeria's ecosystem; the pollution monitoring requirement for industries, the strategies for waste reductions, requirements for environmental audits and penalties for contravention.
- The Management of Solid and Hazardous Wastes Regulations S.I.15 of 1991 which give a comprehensive list of dangerous and hazardous wastes, the contingency plans and emergency procedures. The regulations also prescribe the guidelines for ground water protection, toxic waste tracking programme, and the environmentally-sound technologies for waste disposal.
- The Environmental Impact Assessment (EIA) Decree 86 of 1992 which infuses environmental considerations into development project planning and execution. On paper, the above listed legislations on the use and abuse of the environment especially by the SMEs could hardly be faulted. However, the implementation of these legislations remains an issue that has continued to generate a lot of controversy in academic debates.

3. Methodology

3.1. Data Collection Methods

This study is an exploratory one that was undertaken in Nigeria and it covered 10 out of the 18 categories of SMEs (Federal Ministry for Commerce, Industry and Environment, 2011) in the six geopolitical zones of the country, namely: the North-West, North-Central, North-East South-West, South-East and South-South.

Since the nature of the SMEs are inherently different in terms of their waste generation potential or capability, only the categories of SMEs that are known to have high potential for generating wastes were picked using stratified random and judgmental sampling techniques. The list of SMEs served as the sampling frame. The identified 10 SMEs categories were pure water making factories, restaurants (food and beverages), soap and detergents, wood works (sawmill), cassava processing plants, palm kernel making plants, chemical and pharmaceutical companies, waste disposal firms, fishery/cold room stores and agric-farms (poultry, piggery

among others). A sample size of 300 respondents was obtained by selecting 5 respondents from each of the 10 categories of SMEs in each of the 6 geopolitical zones through an accidental sampling technique (Soyombo, 2002). Relevant information were elicited from 300 respondents with the use of three different but complementary techniques of data collection, which were the questionnaire, Focus-Group Discussion (FGD) and interview methods. In addition to filling the questionnaire, 6 respondents from 5 to 7 randomly selected SMEs, were made to take part in the FGD and 51 respondents had a face-to-face interview with the researcher and 6 hired research assistants. The idea behind using the FGD and interview approach was to reinforce and perhaps complement the information obtained with the use of the questionnaire. Discussions centered on the influence of existing environmental laws on audit practice in the SMEs.

The questionnaire was divided into three parts. The first part contained socio-economic variables of SME staff including SME type, age, gender, marital status, experience, qualification and average monthly pay of SME staff. The second part of the questionnaire contained questions on core issues which centered mainly on the operational variables of the SMEs such as environmental-public health issues and their impact, waste management criteria, environmental practices and extent of compliance with standards prescribed by regulating agencies/ ministries/ parastatals and frequency of monitoring and reporting environmental issues by way of environmental impact assessment. Respondents in the selected SMEs were asked to rate the impact of their companies' activities on the environment and human health on a 5-point Likert Scale of 1 = very low, 2 = low, 3 = fairly high, 4 = high, and 5 = very high. In addition, they were made to answer follow up questions on the nature and extent of environmental audit undertaken by their SMEs. These include audits of compliance, systems, transaction of property transfer, production process and determination of accruals of any liability and costs associated with environmental damages and determining that proper disclosure of these costs have been made to the public. They also include audits that focus on preventive measures that can be taken to reduce the amount of risk a company has if other measures are functioning, as well as audits for treatment, storage and disposal facilities. The third part of the questionnaire contained questions that would help enhance the quality of environmental audit reports as prescribed by the international accounting standards. Generally, questionnaire were made up of open and close end questions which were hitherto pre-tested on 30 respondents in the study area. The outcome of the pretested questionnaire was used to make corrections and modifications where necessary.

Respondents were then asked to rate the influence of the existing environmental laws on audit practice on a 5-point Likert scale of 1 = no influence, 2 = very little influence, 3 = little influence, 4 = high influence, and 5 = very high influence. This may help provide an insight on the extent to which the various types of environmental audit conform to the requirements prescribed in the environmental laws.

3.2. Data Analyses

Data was analyzed using descriptive and inferential statistics. For instance descriptive statistics such as frequency, percentages, means, and standard deviations were used to evaluate the demographics. In addition, a two-way analysis of variance (ANOVA) was used to test the formulated hypotheses. This was done in order to determine whether there were significant differences with respect to the extent of implementation, influence of environmental laws and audit practice among different SME categories in different geopolitical zones of Nigeria.

Duncan's Multiple Range Test was employed to rank the mean values of responses on SMEs in order to determine which SME categories best implement the different types of environmental laws and audits across the zones. Analysis was carried out with SPSS software version 12 and MINITAB for Windows Release 11.

3.3. Data Analyses Results and Comments

The survey has a response rate of 87%. The socio-economic characteristics of the respondents show that Soap/detergents and Food and Beverages have the lowest number of respondents. In each of the other eight SME categories, the number of respondents whose opinions were obtained was between 10% and 11.54%. 58% of the respondents were in the age range of 19-36 years while respondents in the age range of 37-54 years make 28.85% of all the survey respondents. Only 12.69% of the respondents were above 55 years old. 53% of the respondents were males. Only a little above half (52.3%) of the respondents had more than 6 years experience on the job. Only 9.61% of the respondents had higher certificates and degrees. A profile of their average monthly wage showed that majority (66.92%) of the respondents in the SMEs earns an income of about $31-$42 per month.

The above characteristics aptly fit the profile of typical SMEs in developing countries. As copiously discussed in various literatures, SMEs are inherently bedeviled with myriads of problems such as lack of critical mass of highly skilled individuals to manage modern technological processes, inadequate finance and inexperience (Hallberg, 1999; Hillary, 2000; Asaolu, 2004; Khao, 2006; Newberry, 2006; Adelakun, 2007).

In Table 1, all the respondents (100%) agreed that their organizations carry out environmental audit in response to the relevant question in the questionnaire. This position was reconfirmed during the interview section and in the Focal Group Discussion.

It can be seen in Table 2 that the impact of SMEs activities on the environment and on human health were generally severe because all the parameters used in measuring such activities gave mean values that were well above the theoretical mean of 2.5, which represents the mid-point on the 5-point Likert scale. However, the impact of SMEs activities on human health was more pronounced in the incident of respiratory tract infection where such effect was rated 4.48 on a 5-point Likert scale by the respondents. Skin infections ascribed to contact with organic matter such as grease on human bodies was rated 4.01 on a 5-point Likert scale while gastro-intestinal disturbances caused by waste water discharges into drinking water was rated 3.80 on a 5-point Likert scale. As regards the environment two distinct incidences were recorded, namely: air pollution arising from waste and noise from machines and environmental degradation due to indiscriminate disposal of waste - especially from cassava processing plants. These results are in consonance with previous findings which emphasized that SMEs cause environmental problems and challenges which lead to health hazards arising from inhalation of harmful smokes, emissions and noise (Hillary, 2000; Pallen, 2006; Olayemi, 2006). This could be why strict regulations in the form of environmental audits were put in place to scrutinize the activities of SMEs. Hence, environmental audit in any SME is designed to measure the environmental impact of a firm's activities, waste treatments and disposal methods, emissions records, wastes contractors, recycling methods, among others. Such environmental audit in SMEs was seen as extra cost which would eat into the profits of the organization. Many researchers have however

discovered that rather than increase organization costs, environmental management via auditing, had improved profit (Hillary, 2000; Khao, 2006; Smith, 2004).

The extent of implementation of different types of environmental audits in SMEs is presented in Table 3. In terms of audit implementation, scores obtained were 4.06 for treatment of hazardous materials, 3.92 for storage and disposal facilities and appraisal audit for production process had 3.9 on a 5-point Likert scale. During oral interview and in the focal group discussions, the reasons given by respondents for these high scores relate to the desire of the SME operations and to satisfy the requirements prescribed by lending institutions before approving mortgages (Smith, 2004).

Table 1. Socio-economic Characteristics of Respondents in the SME's (N=260)

Variables	Respondents	Percent
SME Type		
Pure water-making factories (PWMF)	27	10.39
Restaurants (Rest) - Food & Beverages	22	8.46
Soap and Detergents (SD)	18	6.92
Woodworks (WW) - Sawmills	27	10.39
Cassava processing plants (CPP)	28	10.77
Palm kernel-making plants (PKMP)	30	11.54
Chemical and pharmaceutical companies (CPC)	27	10.39
Waste disposal firms (WDF)	27	10.39
Fishery/cold room stores (FCRS)	26	10.00
Agric Farms (AF)	28	10.77
Age		
0 - 18yrs	2	0.77
19 - 36yrs	150	57.69
37 - 54yrs	75	28.85
> 55yrs	33	12.69
Gender		
Male	137	52.69
Female	123	47.31
Marital status		
Single	43	16.54
Married	173	66.54
Widow	16	6.15
Divorced	28	10.77
Experience of SME staff		
0 - 5yrs	124	47.69
6 - 11yrs	65	25.00
12 - 17yrs	61	23.46
18 - 23yrs	5	1.92
> 23yrs	5	1.92
Qualification of SME staff		
Primary school leaving certificate	51	19.62
Secondary school leaving certificate	98	37.69
OND/NCE	86	33.08
HND/BSc/BA	20	7.69
MA/MSc/M.Phil/MBA	3	1.15
Ph.D.	2	0.77
Average monthly pay of SME staff (₦)		
5,000 – 7,000	174	66.92
8,000 – 12,000	15	5.77
13,000 – 17,000	20	7.69
18,000 – 22,000	22	8.46
23,000 – 27,000	19	7.31
> 27,000	10	3.85
Do you carry out Environmental audit?		
Yes	260	100
No	000	000

Table 2. Rating of the impact of SME's activities on environment and human health

Variables	Very Low	Low	Fairly High	High	Very High	Mean	Standard Deviation
1. Air pollution arising from waste and noise from machine	30	15	20	60	135	3.98	1.80
2. Incidents of respiratory tract infection due to sawdust, inhalation of organic substances such as hydrocarbons	7	5	6	80	162	4.48	1.87
3. Environmental degradation due to indiscriminate disposal of waste especially in cassava processing plants	30	20	31	76	103	3.78	1.34
4. Incidents of gastro intestinal tract disturbances sequel to wastewater discharges that found their way to drinking water.	12	40	30	85	93	3.79	1.21
5. Incidents of skin infections arising from contact with organic matters such as grease on human bodies.	11	30	25	73	121	4.01	1.82

Table 3. Extent of implementation of different types of environmental audits in SMEs

Environmental audit types	Very Low	Low	Fairly High	High	Very High	Mean	Standard Deviation
1. Compliance audit	170	43	15	10	22	1.74	1.24
2. Systems audit	110	58	60	18	14	2.11	1.18
3. Property transfer audit	20	28	12	92	108	3.92	1.27
4. Appraisal audit for production process	10	15	58	82	95	3.91	1.08
5. Cost audit associated with environmental damage	102	98	30	21	9	1.99	1.07
6. Audit for preventive measures	68	72	59	49	12	2.03	1.86
7. Audit on treatment of hazardous materials storage and disposal facilities	7	10	50	87	106	4.06	0.99

These results appear realistic in view of the fact that one of the weather–beaten or over flogged issues about the inherent challenges faced by SMEs had to do with underfunding. This underfunding is due to lack of adequate access to short or long-term finances which invariably accounted for high attrition rates of SMEs, especially in developing nations (Hallberg, 1999;

Hillary, 2005, Asaolu, 2004; Khao, 006; Newberry, 2006; Adelakun, 2007). According to respondents, below average rating obtained for compliance audit (1.74) and cost audit associated with environmental damages (1.99) were due to the unwillingness on the part of the various managements of SMEs to incur additional operating costs which they believed could erroneously eat into their profits. Ironically, instead of increasing costs, environmental performance improvement via audits, had been found to actually cause marked reduction in costs (Khoa, 2006). Respondents averred that systems audit and preventive environmental audit measures were adequate.

Table 4 reveals that the degree of influence of various environmental laws on the extent of implementation of environmental audits practices in the SMEs was little with an overall mean value of 3.40. However, specific environmental laws notably, National Effluents Limitations Regulation 5.18 of 1991 and Pollution Abatement in Industries and Facilities Generation 5.1.15 of 1991 had high influence with mean values of 4.04 and 4.07 respectively. Environmental Impact Assessment Decree 86 of 1992 had very little influence with the mean value of 1.91 on a 5-point Likert scale.

Table 4. Degree of influence of environmental laws on audit practice in the SMEs

Variables	1	2	3	4	5	Mean	Standard Deviation
1. Hazardous Waste Criminal Provision Degree 42% 1988	20	27	23	80	110	3.0	2.65
2. National Guidelines and Standards for Environmental Pollution Control	30	21	40	121	48	3.5	1.22
3. National Effluents Limitations Regulation 5.18 of 1991	12	18	27	82	121	4.04	1.27
4. Pollution Abatement in Industries and Facilities Generation 5.115 of 1991	25	10	11	90	124	4.07	1.23
5. Management of Solid Waste and Hazardous Waste Regulation 5.1.15 of 1991	15	8	50	102	85	3.90	1.13
6. Environmental Impact Assessment Decree 86 of 1992	43	149	22	40	6	1.91	1.44

Scale Interpretation: 1 = No influence, 2 = Very Little influence, 3 = Little influence, 4 = High influence, 5 = Very High influence

4. Formulation and Tests of Some Hypotheses on the Implementations of Environmental Laws by Nigerian SMEs

4.1. Formulation of Hypotheses

In order to understand the differences among SME categories in Nigeria with respect to the implementations of environmental laws and the influence of these laws on their audit practices, we formulate the following hypotheses in their null form and test them using the two-way ANOVA tests.

i. Ho_1: There are no significant differences among different SME categories with respect to the extent of implementation of each type of environmental audit in the SMEs.
ii. Ho_2: There are no significant differences among environmental audit types with respect to the extent of their implementation.
iii. Ho_3: There are no significant differences among different SME categories with respect to the influence of environmental laws on their audit practice.
iv. Ho_4: There are no significant differences among different environmental laws with respect to their influence on audit practices in the different categories of SMEs.
v. Ho_5: There are no significant differences among different SME categories from different zones with respect to the extent of implementation of each type of environmental audit in the SMEs's zones.
vi. Ho_6: There are no significant differences among different zones with respect to the extent of implementation of each type of environmental audit in the SMEs by different SME types.
vii. Ho_7: There are no significant differences among different SME categories from different zones with respect to the degree of the influence of environmental laws on their audit practices.
viii. Ho_8: There are no significant differences among zones with respect to the degree of influence of environmental laws on SME audit practices.

The hypotheses and their tests will also enable us to know whether there are zone effects in the implementations of environmental laws by Nigerian SMEs and whether there are significant differences among environmental laws with respect to their implementations and their influence on audit practices in Nigerian SMEs.

4.2. Tests of Hypotheses

4.2.1. The tests of the hypotheses in (i) and (ii) of Section 4.1 above

We tested these two hypotheses by analyzing and testing the data in Table 5a using a two-way ANOVA test. The analysis and test results are presented in Table 5b.

Table 5a. Extent of the implementation of each type of environmental audits in the SMEs by each of the SME categories

Environmental audit types	SME categories										
	PWMF	Rest	SD	WW	CPP	PKMP	CPC	WDF	F/CKS	AF	Mean
Air pollution arising from waste and noise from machine	3.79	33.31	3.65	4.34	3.61	3.91	4.68	3.81	3.72	3.94	6.876
Incidents of respiratory tract infection due to sawdust, inhalation of organic substances such as hydrocarbons	2.62	3.64	4.56	4.97	4.78	4.86	4.95	4.83	4.90	4.92	4.503
Environmental degradation due to indiscriminate disposal of waste especially in cassava processing plants	1.96	2.18	3.94	3.75	4.52	3.97	3.79	4.62	4.96	4.64	3.833
Incidents of gastro intestinal tract disturbances sequel to wastewater discharges that found their way to drinking water.	1.02	4.16	3.67	3.90	4.70	2.90	4.61	4.83	3.89	4.79	3.847
Incidents of skin infections arising from contact with organic matters such as grease on human bodies.	1.91	2.30	4.10	4.70	4.60	4.84	4.97	4.72	2.89	4.93	3.996
Mean	2.26	9.12	3.98	4.33	4.44	4.10	4.6	4.56	4.07	4.64	

Table 5b. Two-way ANOVA table for testing the hypotheses in (i) and (ii) of section 4.1.

Source	Sum of squares	Degree of freedom	Mean square	Variance ratio	P-value
Environmental laws/regulations (row)	3.19094	4	0.797735	1.9827959751	.1180ns
SME categories (columns)	26.07569	9	2.8972988889	7.20132994835	.0000***
Residual	14.48382	36	0.4023283333		
Total	43.75045	49			

The results of the ANOVA in Table 5b shows that there are highly significant differences among different SME categories with respect to the extent of implementation of each type of environmental audit in the SMEs. The calculated p-value for the test is 0.000 which is less than 0.01.

The Duncan's multiple range test for the means of 10 SME categories is presented below in Table 5c.

Table 5c. Duncan's multiple range test of the means for 10 SME categories

	Treatment (SME Categories)	Mean	n
1	Restaurants (Rest) Food & Beverages	9.12a	10
2	Agric Farms (AF)	4.64ab	10
3	Chemical and Pharmaceutical Companies(CPC)	4.60ab	10
4	Waste Disposal Firms (WDF)	4.56ab	10
5	Cassava processing plants (CPP)	4.44bc	10
6	Woodworks (WW) – Sawmills	4.33bc	10
7	Palm kernel-making plants(PKMP)	4.10c	10
8	Fishery/cold room stores (F/CRS)	4.09c	10
9	Soap and Detergent (SD)	3.98c	10
10	Pure water making factories (PWMF)	2.26e	10

Table 5c, shows that mean value for Restaurants (Food and Beverages) was significantly different from other means. Agric Farms (AF), Chemical and Pharmaceutical Companies (CPC) and Waste Disposal Firms (WDF) are in the same category but their mean values are significantly different from those of other SMEs. The mean values for Cassava processing plants (CPP) and Woodworks (WW) are same but significantly different from other SME categories.

Also the mean values for Palm kernel-making plants (PKMP), Fishery/cold room store (F/CRS) and Soap and Detergent (SD) are the same but significantly different from the rest SME categories. The SME category that has the lowest but significant mean value which was different from other SMEs, was pure water making factory (PWMF).

The results also show that the differences among environmental audit types with respect to the extent of their implementations are not significant. The p-value for the test is 0.1180, which is greater than 0.05. Therefore, the null hypothesis H_{01} in section 4.1 is rejected while the null hypothesis H02 is accepted.

4.2.2. The Tests of the Hypothesis in (iii) and (iv) of Section 4.1

Like in the previous tests, we used two-way ANOVA to test the hypothesis in (iii) and (iv) above. The data presented in Table 6a below was used for the test. The results of the analyses and test are as given in Table 6b.

Table 6a. The degrees of influence of environmental laws on audit practice in different categories of SMEs.

Environmental laws/regulations	SME categories										
	PWMF	Rest	SD	WW	CPP	PKMP	CPC	WDF	F/CKS	AF	Mean
Hazardous Waste Criminal Provision Decree 42 of 1988	2.80	3.50	3.75	3.61	2.05	2.81	3.90	3.51	2.67	2.60	3.12
National Guidelines and Standards for Environmental Pollution Control	3.92	2.93	4.01	3.26	3.61	3.35	2.92	2.96	3.71	4.10	3.477
National Effluents Limitations Regulation 5.18 of 1991	2.10	3.67	4.20	3.98	4.91	3.96	4.96	4.80	3.91	3.87	4.036
Pollution Abatement in Industries and Facilities Generation 5.115 of 1991	2.15	3.80	4.41	4.20	4.86	3.89	4.83	4.71	4.10	3.81	4.076
Management of Solid Waste and hazardous Waste Regulation 5.1.15 of 1991	2.10	2.03	3.90	4.50	4.40	4.07	4.12	4.60	4.67	4.25	3.864
Environmental Impact Assessment Decree 86 of 1992	1.01	1.21	2.30	1.84	1.98	1.78	3.25	1.45	2.51	1.81	1.914
Mean	2.35	2.86	3.76	3.57	3.64	3.31	4.00	3.67	3.60	3.41	

The results of the ANOVA in Table 6b show that there are significant differences among different SME categories with respect to the influence of environmental laws on their audit practices. The p-value for the test is 0.0015, which is less than 0.00.

The Duncan's multiple range test for the means of 10 SME categories is presented in Table 6c.

Table 6b. Two-way ANOVA table for testing the hypotheses in (iii) and (iv) of section 4.1.

Source	Sum of squares	Degree of freedom	Mean square	Variance ratio	P-value
Environmental laws/regulations (row)	33.680315	5	6.736063	17.908461923	.0000***
SME categories (columns)	12.551135	9	1.3945705556	3.707597998	.0015***
Residual	16.926235	45	0.3761385556		
Total	63.157685	59			

Table 6c. Duncan's multiple range test of the means for the 10 SME categories.

	Treatment (SME Categories)	Mean	n
1	Chemical and Pharmaceutical Companies(CPC)	4.0a	10
2	Soap and Detergent (SD)	3.76a	10
3	Waste Disposal Firms (WDF)	3.67ab	10
4	Cassava processing plants (CPP)	3.64ab	10
5	Fishery/cold room stores (F/CRS)	3.60b	10
6	Woodworks (WW) – Sawmills	3.57b	10
7	Agric Farms (AF)	3.41bc	10
8	Palm kernel-making plants(PKMP)	3.31c	10
9	Restaurants (Rest) Food & Beverages	2.86d	10
10	Pure water making factories (PWMF)	2.35d	10

Table 6c, shows that mean value for Soap and Detergent (SD) and Chemical and Pharmaceutical Companies (CPC) are significantly different from other means. Waste Disposal Firms (WDF) and Cassava processing plants (CPP) are in the same category but their mean values are significantly different from those of other SMEs. The mean values for Fishery/cold room store (F/CRS) and Woodworks (WW) are same but significantly different from other SME categories. Also the mean values for Palm kernel-making plants (PKMP) and Agric Farms Fishery/cold room store (F/CRS) are the same but significantly different from the mean values for the rest of the SME categories. The SME categories that have the lowest but significant mean values which was different from the mean values for other SMEs, are Restaurants (Rest) Food & Beverages and pure water making factory (PWMF).

Additionally, the results also show that there are significant differences among different environmental laws with respect to their influence on audit practices in the different categories of SMEs. The p-value for the test is 0.0000 and this is less than 0.05. Hence, we reject both the null hypotheses H_{03} and H_{04} as stated in section 4.1.

Duncan multiple range test below shows that some of the means for environmental laws/regulations are statistically different from each other.

Table 6d. Duncan multiple range test of the means for environmental laws/regulations

Rank	Treatment (Environmental laws/regulation)	Mean	n
1	Pollution Abatement in Industries and Facilities Generation 5.115 of 1991	4.076a	10
2	National Effluents Limitations Regulation 5.18 of 1991	4.036ab	10
3	National Effluents Limitations Regulation 5.18 of 1991	3.864ab	10
4	National Guidelines and Standards for Environmental Pollution Control	3.477bc	10
5	Hazardous Waste Criminal Provision Decree 42 of 1988	3.12c	10
6	Environmental Impact Assessment Decree 86 of 1992	1.914d	10

The Duncan's multiple range test above shows that the means for three environmental regulations, namely: Pollution Abatement in Industries and Facilities Generation 5.115of 1991, National Effluents Limitation Regulation 5.18 of 1991, and National Effluents Limitation Regulations 5.18 of 1991 are not significantly different from each other but they are each significantly different from the means for Hazardous Waste Criminal Provision Decree 42 of 1998 and Environmental Impact Assessment Decree 86 of 1992. These differences contribute very significantly to the rejection of hypothesis H_{03}. There are also significant differences among the means for Hazardous Waste Criminal Provision Decree 42 of 1998 and Environmental Impact Assessment Decree 86 of 1992. The test also shows that the influences of the Pollution Abatement in Industries and Facilities Generation 5.115 of 1991 and National Effluents Limitation Regulation 5.18 of 1991 on audit practices in the different categories of SMEs are much greater than the influence of each of the remaining four environmental laws.

4.2.3. Test of the Hypotheses in (v) and (vi) of section 4.1

These two hypotheses in (v) and (vi) of section 4.1 were also tested by applying two-way ANOVA tests to the data in Table 7a below. The results of the analyses and tests are also given in Table 7b.

The ANOVA tests in Table 7b show no significant differences among different SME categories. The test has a p-value of 0.361 and this is much greater than 0.05.

In contrast, the tests show that there are significant differences among different geographical zones with respect to the extent of implementation of each type of environmental audit in the SMEs by different SME types. The p-value for this is 0.0002, which is less than 0.01. Therefore, the null hypothesis H_{05}, as stated in section 4.1, is accepted while the null hypothesis H_{07} is rejected.

Table7a. The extents of the implementation of different types of Environmental Audits in the SMEs in different zones of Nigeria

Geographical zones of Nigeria	SME categories										
	PWMF	Rest	SD	WW	CPP	PKMP	CPC	WDF	F/CKS	AF	Mean
Northwest	2.31	1.69	1.10	1.01	1.02	1.01	1.03	1.05	2.81	1.43	1.446
North-Central	3.10	1.04	3.10	2.71	1.10	1.20	1.65	2.16	3.61	1.61	2.128
Northeast	3.97	2.01	1.01	1.10	1.11	1.10	1.70	1.75	4.69	2.70	2.114
Southwest	2.89	3.25	1.47	2.85	3.10	3.91	4.91	4.60	1.46	4.10	3.254
Southeast	2.47	3.11	2.10	3.41	4.75	4.81	3.60	3.41	3.91	3.61	3.518
South-South	1.95	1.73	2.13	3.56	4.01	2.90	1.25	2.83	4.25	3.14	2.775
Mean	2.782	2.138	2.818	2.400	2.515	2.488	2.357	2.633	3.455	2.765	

Table7b. Two-way ANOVA table for testing the hypotheses in (v) and (vi) of section 4.1

Source	Sum of squares	Degree of freedom	Mean square	Variance ratio	P-value
Geographical zones of Nigeria (row)	30.695568333	5	6.13911367	6.18326469	.0002***
SME categories (columns)	10.104008333	9	1.122667593	1.13074155	.3617ns
Residual	44.678681667	45	0.992859593		
Total	85.478258333	59			

Table7c. Duncan's multiple range test of the means for geographical zones.

Rank	Treatment (Geographical zones of Nigeria)	Mean	n
1	Southeast	3.518a	10
2	Southwest	3.254a	10
3	South-South	2.775ab	10
4	North-Central	2.128bc	10
5	Northeast	2.114c	10
6	Northwest	1.446	10

As can be seen in Table 7c, the Duncan's multiple range test shows that the means for the Southeast and Southwest zones are the largest and the two means are not significantly different from each other. However, the two means are significantly difference from the means for the North-Central, Southeast, and Northwest zones. There is little or no significant different between the means for the South-South zone and the means for Southeast and Southwest zones. What these results indicate is that all the different types of environmental audits are implemented much

more in the Southeast, Southwest, and South-South zones than in the North-Central, Northeast, and Northwest zones.

4.2.4. Test of the Hypotheses (vii) and (viii) of section 4.1

Finally, in this subsection, we tested the two hypotheses in (vii) and (viii) of section 4.1 by applying the two-way ANOVA test to the data in Table 8a below. The results of the ANOVA tests can be seen in Table 8b.

Table 8a. The degrees of the influence of environmental laws on audit practice in different categories of SMEs in different zones of Nigeria

Geographical zones of Nigeria	SME categories										
	PWMF	Rest	SD	WW	CPP	PKMP	CPC	WDF	F/CKS	AF	Mean
Northwest	1.61	1.34	1.70	1.01	1.01	1.30	1.02	1.15	1.97	1.50	1.361
North-Central	2.90	1.06	2.95	2.40	1.09	1.10	1.45	1.98	2.95	1.40	1.928
Northeast	2.94	1.92	1.25	1.10	1.11	1.47	1.60	1.35	4.03	2.50	1.927
Southwest	2.34	3.16	1.93	2.89	3.12	3.79	4.14	4.02	1.31	4.01	3.071
Southeast	2.29	3.01	2.30	3.20	3.57	4.66	3.40	3.30	3.76	3.40	3.289
South-South	1.05	1.10	2.01	3.41	3.98	2.50	1.10	2.15	4.11	3.10	2.451
Mean	2.188	1.932	2.023	2.335	2.313	2.470	2.118	2.325	3.022	2.652	

Table 8b. Two-way ANOVA for testing the hypotheses in (vii) and (viii) of section 4.1.

Source	Sum of squares	Degree of freedom	Mean square	Variance ratio	P-value
Geographical zones of Nigeria (row)	27.460088	5	5.492017667	7.13650772	.0001***
SME categories (columns)	5.512635	9	0.612515	0.79922062	.6217ns
Residual	34.630495	45	0.769566556		
Total	67.603218333	59			

The ANOVA tests in Table 8b above show that there are no significant differences among different SME categories from different zones with respect to the degree of the influence of environmental laws on their audit practices. The p-value for the test is 0.6127, which is greater than 0.05. In sharp contrast to this, the ANOVA tests show that there are highly significant differences among zones with respect to the degree of influence of environmental laws on SME audits practices. For this, the p-value is 0.0001, which is much less than 0.01. Based on these results, we accept the null hypothesis H_{07}, as stated in section 4.1, while we reject the null hypothesis H_{08}.

Table 8c. Duncan's multiple range test of the means for geographical zones

Rank	Treatment (Geographical zones of Nigeria)	Mean	n
1	Southeast	3.289a	10
2	Southwest	3.071ab	10
3	South-South	2.451bc	10
4	North-Central	1.928cd	10
5	Northeast	2.927cd	10
6	Northwest	1.361d	10

The Duncan's multiple range test in Table 8c above shows that there is little or no difference between the means for the Southeast and Southwest zones. It also shows little or very slight difference between the means for Southwest and South-South zones. However, the test shows significant differences among the means for Southeast and Southwest zones on one hand and the means of North-Central, Northeast, and Northwest zones on the other hand. The obvious conclusion from this is that environmental laws in Nigeria have much greater influence on audit practices in the Southeast, Southwest, and South-South zones than in the North-Central, Northeast, and Northwest Zones. These are the major differences that contribute to the rejection of the null hypothesis H_{08}.

5. Limitations, Summaries and Conclusions

5.1. Limitations

This study is limited to environmental laws and audit practices in SMEs in Nigeria. It did not examine similar accounting practices in micro and large firms in the country. The examination of similar accounting practices in micro and large firms in the country is another very big study that should be done separately.

5.2. Summaries and Conclusions

This study empirically assessed the roles that environmental audits play in SMEs' activities in Nigeria. It also assessed the influence of existing environmental laws on environmental audit practice in the country. It provides an insight into the extent of compliance of SMEs to environmental audit. This could have a number of potential implications on policy formulation.

The study revealed that:

- Some of the ten different SME categories in Nigeria are significantly influenced by existing environmental laws.
- Some of the activities of the SMEs in Nigeria have negative effects on human health and on the environment
- Managements of SMEs in Nigeria are keen on implementing environmental audits that do not attract additional production cost and that facilitate quick access to funds from financial houses.

- Generally, the extent of compliance of SMEs to the requirements of the existing environmental laws in Nigeria is poor.

The study also showed that there are significant differences among:

- Different SME categories with respect to the extent of the implementation of each type of environmental audit in Nigerian SMEs.
- Different SME categories with respect to the influence of environmental laws on their audit practices
- Different SME categories from different zones with respect to the extent of implementation of each type of environmental audit types, and
- The geographical zones in Nigeria with respect to the degree of influence of environmental laws on SME audits practices.

Additionally, the study showed that there are no significant differences among:

- Environmental audit types with respect to the extent of their implementations.
- SME categories from different zones with respect to the extent of implementation of each type of environmental audit types.
- Different SME categories from different zones with respect to the degree of the influence of environmental laws on their audit practices.

The study revealed that most SMEs in Nigeria undertake environmental audits and that the practice is moderately influenced by the existing environmental laws. However, the study also showed that managements of SMEs are keen in implementing environmental audits that would not attract additional production cost. This is at variance with the widely held view that costs incurred from environmental audits could, on the long run, impact positively on profit made by SMEs. Consequently, it is strongly recommended that SME managements should give full attention to environmental audit practice in their respective firms.

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