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WEST AFRICA BUILT ENVIRONMENT RESEARCH CONFERENCE

Editors
Samuel Laryea
Roine Leiringer

West Africa Built Environment Research (WABER) Conference 2015

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Declaration
All papers in this publication have been through a review process involving initial screening of abstracts, review of full papers by at least two referees, reporting of comments to authors, revision of papers by authors and re-evaluation of re-submitted papers to ensure quality of content.

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NEA ONNIM NO SUA A, OHU

Symbol of knowledge, life-long education and continued quest for knowledge

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CONSTRUCTION PROFESSIONALS' PERCEPTION ON THE PROSPECT OF ADOPTING E.M.S ISO 14001 IN NIGERIAN CONSTRUCTION INDUSTRY

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The construction industry is one sector that contributes to the Development and Economic growth of any Nation, however, ii is also one that has been characterized as having a tremendous Environmental impact. ISO 14001 Environmental management system is a globally recognized Management standard and is published by ISO to serve as a framework to limit such Environmental impact and also ensure regulatory compliance. This paper asses.ses the construction professionals perception on the prospect of ISO 14001 Environmental management systems in Nigerian Construction Industry. The paper employs both primary and secondary means to source for data. The primary data was collected through a well-structured questionnaire which was distributed to construction professionals, which includes: Architects. Builders. Estate surveyors, Engineers, Land surveyors, Quantity surveyors, and Town Planners. The secondary data was collected by reviewing relevant related literatures on the subject. Findings reveal that ISO 14001 is currently not practiced by most construction companies in Nigeria, but professionals are however optimistic that there is prospect and the practice will reduce the impact construction practices have on the environment Further, implementing environmental law is the most prominent factor hindering the adoption of ISO 14001 environmental management system, followed by awareness on EMS by Construction firms, and also lack of proper motivation among practitioners in the industry, these barriers have also been directly responsible for low level of certification among construction firms. Recommendations include, stakeholders in the construction industry should work together to increase the level of awareness among practitioners and other stakeholders as well, the government should make it mandatory through the use of appropriate policies and other legislations for contractors and other practitioners in the industry to be ISO 1 1001 EMS certified.

Keywords: construction professional, environmental management system. **ISO 14001**

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- Respondents agreed with (grand mean 2.53) the reason given for adopting ISO 14001.
- Respondents believe there is prospects and agree with (grand mean 2.53) the benefits that is derived by adopting ISO 14001.
- Respondents agree that the impediments given could serve as a barrier for the adoption of ISO 14001.

CONCLUSION AND RECOMMENDATIONS

In this study an attempt was made to get the perception of construction professionals as regards their perception on the prospect of ISO 14001 in construction industry in Nigeria. First the impact of activities in the built industry on the environment was analysed, existing literatures on adoption and implementation of ISO 14001was closely examined. This was followed by preparation of a questionnaire on environmental management practices, reasons, barriers and benefit of adopting ISO 14001. Based on the respondents view on the environment management practices in the construction industry. The following conclusions were made.

ISO 14001 is not practice and implemented by companies in the construction industry, as there are no enabling legislation or policy on the standard. However professionals appreciate the benefits and prospect of ISO 14001 when adopted but the level of awareness tend to be very low among professionals. Source of information for professionals is by attending seminars, there is need to make adequate provision in school syllabus of some courses in the tertiary institutions on environment management systems. Based on the results obtained in this research, the following are recommended.

- Stakeholders in the construction industry should work together to increase the level of awareness among practitioners and other stakeholders as well.
- Government should make it mandatory through the use of appropriate policies and other legislations for contractors and other practitioners in the industry to be ISO 14001 certified.

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INTRODUCTION

As the quest to ensure environmental sustainability and compliance continues to sweep across countries in both the developed and developing countries, concerns have been expressed by organizations seeking to check the link between development and its impact to the environment. Organizations have been under increasing pressure to minimize their environmental footprint and promote sustainable development. Key among these concerns has been the generation of hazardous waste on construction sites, Air quality, Climate change gases, Drinking water pollution, Landfill waste and Ozone depletion among others

This is particular important in the case of the construction industry, which is seen as a conspicuous user of resources. Materials are derived from numerous sources and suppliers, and minimization of waste oftentimes presents particular problem. Construction also has a major impact on the environment in its consumption of energy, both directly and embodied in the materials that it uses. Ajatar (2000) outlines up to ten different adverse effects of construction activities on the environment. These include, among others, land misuse, existing site dereliction, habit destruction, misuse of natural resources, and so on. The large bulk of materials used consume a great deal of energy for transport. Taking into account both direct use and embodied energy, the construction industry consumes some significant amount of energy; Construction generates over 40 million tonnes of carbon dioxide which contributes to global warming from the greenhouse effect. Acid gases and oxides of nitrogen (NO2) are also produced, contributing to acid rain and photochemical smog production. Construction activities put a lot of pressure on the physical environment. For instance, according to Bokinni (2008), Buildings account for one fourth of the world's wood harvest, two fifth of its material and energy consumption and one sixth of its fresh water usage. Dimson (1998) in Dahiru (2005) also observed that human habitats (buildings) contribute to environment crises through resources depletion, energy consumption air pollution and waste creation.

Environmental management system is a global standard that seeks to address some of the challenges posed by the activities of organizations, industries etc.

Adoption of ISO 14001 has also been shown to provide both tangible and intangible benefits to companies, such as: cost reductions and savings; improved communication; reduction in fines; improved corporate image; and improvement in operational processes, to name a few (Nee & Wahid, 2010; Ayarkwa Joshua, 2010; West & Manta, 1996; Maxwell, Rothenberg, Briscoe, & Marcus, 1997; Chandrashekar, Dougless, & Avery, 1999; Nattrass & Altmore, 1999; Zingale & Himes, 1999; Darnall, Gallagher, Andrews, & Amaral,

ISO 14001 has been adopted in most South African companies; the standard is presently served by SABS (South African bureau of standards) to about 14 different companies/ industries with building and civil industries inclusive. Although SABS ISO 14001is voluntary in South Africa, most companies are motivated by the fact that it helps them save cost and it increases their business opportunities and companies would rather want their public image increased and be seen as environmentally and socially responsible. SABS (2005).

This paper aims at examining the perception of construction professionals about the prospect of adopting *ISO 14001 in the construction industry* in Nigeria. Part of the research objectives were to:

1. To study existing literatures on adoption and implementation of ISO 14001 as it relates to the construction industry.
2. Find out if construction professionals adopt ISO 14001 for their companies and the reasons why they do so.
3. Identify factors militating against its adoption and the perceived benefit of ISO 14001 to the construction industry in Nigeria.

ENVIRONMENTAL MANAGEMENT PRACTICE AND NIGERIAN CONSTRUCTION INDUSTRY.

According to Famiyeh (2014), Environmental management can be described as a methodology by which organizations acting in a structured manner assess their operations to ensure that they are functioning in an environmentally legitimate way. There are numerous legislations, laws and regulation on environmental practice in the country. The current policy on environment and applicable laws in the country according to Anago (2002), are as follows:

National Policy

Nigeria's National Policy on Environment (1989) sets out the following goals:

- Securing the quality of the environment for health and wellbeing;
- Conserving and using the environment and natural resources for the benefit of present and future generations;
- Restoring, maintaining and enhancing the ecosystem and ecological processes essential for the functioning of the biosphere to preserve biological diversity and the principle of optimum sustainable yield in the use of natural resources;
- Promoting public awareness on the link between development and the environment; and
- International co-operation with countries and international organizations in the protection of the environment.

Applicable Laws

The synopsis of applicable laws traverse; international agreements/ conventions/protocols and national laws, regulations and bye-laws which apply concurrently. They include the following:

a. International Agreements/Conventions (5)

i. 1968 African Convention on conservation of Nature and Natural Resources.

ii. 1972 UN Conference on the Human Environment (Stockholm declaration) which established the nexus between development and environmental integrity.

iii. 1976 Vancouver Conference on Human Settlements. (Habitat I)

iv. 1985 Vienna Convention on protection of the Ozone Layer

v. 1992 UN Conference on Environment and Development (Rio Summit) which produced a suite of five documents:

- Agenda 21 - an action plan for sustainable development in the 21st century.
- The Rio declaration - Principles on healthy environment and equitable development.
- The Convention on Biodiversity.
- The Convention on climate change
- A statement of Forest Principles.

i. 1993 Lugano Convention on Civil Liability for damage resulting from activities dangerous to the Environment.

ii. 1996 Istanbul Conference on Human Settlements (Habitat II) which links quality living with construction and environment, drinking water etc.

iii. Kyoto Accord/Kyoto Protocol on global warming CFCs and

iv. African Charter on Human and People's Rights.

b. Nigerian Legislation

- The 1999 Constitution.

At the apex of applicable local laws is the 1999 constitution of the Federal Republic of Nigeria which provides inter alia:

Section 20: "The State shall protect and improve the environment and safeguard the water, air and land, forest and wildlife of Nigeria."

Section 16 (2): The State shall direct its policy towards ensuring:

- The promotion of a planned and balanced economic development;

Section 17 (2) (d) "In furtherance of the social order, exploitation of human or natural resources in any form whatsoever for reasons, other than the goal of the community shall be prevented."

The only deficiency of the constitutional provisions is their non-justiceability. Performance cannot be enforced by legal action since they are categorized under foundational objectives and directive principles of state policy (chapter 2 of the constitution)

- African Charter on Human and Peoples Right (Ratification and Enforcement) Act Cap 10

Article 24: "All Peoples shall have the right to a general satisfactory environment favourable to their development."

- Harmful Wastes (Special Criminal Provisions) Act Cap 165

This law was the immediate reaction to the dumping of toxic waste product in Nigeria in 1988, otherwise known as the Koko incident. Subsequently the Federal Military Government (as it was) promulgated the Federal Environmental Protection Agency (FEPA) Decree No.58 of 1988 (now Cap 131). For the first time, an Agency was set up to oversee the environment with specific powers to:

- Establish such procedures for industrial or agricultural activities in order to minimize damage to the environment from such activities
- Establish such environmental criteria, guidelines, specifications or standards for the protection of the nation¦'s air and inter-state waters as may be necessary to protect the health and welfare of the population from environmental degradation. FEPA also has responsibility for setting standards for water quality, noise control, effluent limitation, ozone protection, control of hazardous substances, etc.
- The Environmental Impact Assessment Act of 1992.
- This is the core legislation that governs environmental impact assessment in respect of proposed projects in Nigeria and flows directly from the provisions of principle 17 of Rio declaration:
- "Environmental Impact assessment as or national instrument shall be undertaken for proposed activities that are likely to have a significant adverse impact on the environment and are subject to a decision of a competent national authority." The Act therefore makes it mandatory that before the final decision is taken or approval given for any activity likely to significantly affect the environment, the effect of such activity shall first be taken into account.

However, this have not been the case, according to Anago (2002), government at all levels have been the main defaulters, as projects are oftentimes awarded before any kind of impact assessment is made. The basic challenge confronting government is how to translate the laudable provisions of the Act into an effective tool for managing the environment. The challenge is crucial because Nigeria, like most developing countries, has "world class" legislation on various issues, which nevertheless suffers failure at the implementation stage.

ISO 14001 seems to be a relatively new concept in the industry. Environmental management system is a globally recognized Management standard and is published by ISO to serve as a framework to limit such Environmental impact and also ensure regulatory compliance. It provides a framework for the company to define and organize their environmental policy by complying with any accepted standard (Grozalez-Benito and Grozalez-Benito, 2005), the first International Standard Organizations (ISO) ISO14001 EMS standard was published in 1996, the standard provides internationally recognized criteria so the organizations can adopt and improve their environmental performances (Hewitt and Robinson, 1998). Companies that have adopted and implemented the standard are mostly in the oil and gas industry, the standard is however gaining popularity among major business as the preferred EMS in the global arena within different industries. With worldwide popularity and growing numbers, the ISO 14001 EMS has become more globally accepted. While Construction industry no doubt provides countless benefit to the society, it however impacts tremendously on the environment in a number of ways; this includes Emission to air, Land contamination, Noise pollution, Waste disposal, Resource consumption and discharge to water. The construction industry in Nigeria is no exception, the industry is considered to be one of the fastest growing construction industries in the continent and have in one way or the other impacted on the environment by increasing waste generation with poor disposal systems, increase air pollution and water among others.

RESEARCH METHOD

The research design employed for this study was the descriptive survey in which respondents were drawn from higher Institutions, professionals in the construction industry (Land Surveyors Town Planners, Architects, Builders, Quantity Surveyors, Engineers and Estate Surveyors) in Nigeria and the prospective beneficiaries of the policy were randomly selected. The areas covered in this research are: The Federal Capital Territory, FCT, Abuja, Kaduna and Kano States, The main research instrument used was a well-structured questionnaire containing closed ended questions with suggested answered measured on a Likert Scale.

A total of 70 questionnaires were administered, and 65 were retrieved, which equates to a response rate of 92.86% achievement and were used for analysis. The questionnaire solicited substantial information on the reasons, benefit and impediment for adopting ISO 14001 in Nigeria, from the various respondents based on their experience. The opinion sampled include, respondents understanding of Environmental management system, the practice of ISO 14001, problems of adopting ISO 14001, benefits derived from adopting the standard, level of importance attached to the benefits and level of awareness of the concept of EMS ISO 14001in Nigeria.

PRESENTATION AND DISCUSSION OF RESULTS

The data obtained are presented and discussed as follows.

Professionals in the built industry

The sample frame consists of participants in the built environment as the study focuses on the construction industry. Table I presented questionnaire response rate.

Table 1: Distribution of questionnaires

Number distributed	70
Number properly completed and returned	65
Percentage response	92.86%

From Table 1 above, it can be observed that the response rate is 92.86%

Table 2: Description of company/ organization

Description of org / company	No. of response	% of response
Consultant	14	21.5
Contractor	30	46.2
Academic construction professional	21	32.3
Total	65	100

Table 2 indicates a breakdown of the questionnaires response rate based on the description of respondent's company/ organization. Responses from regulatory bodies, subcontractors and suppliers were not used for the research. But however the responses of individual professionals were sort for as can be seen the table below.

Table 3: Profession of respondents

Profession	No. Distributed	No. of response	% of response
Architects	15	15	100
Builders	15	15	100
Engineers	15	13	86.6
Estate surveyors	5	3	60
Land surveyors	5	4	80
Quantity surveyors	10	10	100
Town planners	5	5	100
Total	70	65	

Table 3 indicates a breakdown of the questionnaires response rate based on respondent's profession. Architects returned 100%, Builders 100%, Engineers 86.6%, Estate surveyors 60%, Land surveyors 80, Quantity Surveyor 100%, and Town Planner 100%

Type of environmental management policy currently been practiced and implemented in organization/ company

Companies in the industry adopts range of policies that suits their needs, based on these, the questionnaire respondents were asked to choose from the list of environmental policies list which they currently practice and implement.

Table 4: Environmental management policy

Environmental management policy	No. of response	% of response
The Environmental Impact Assessment Act of 1992.	30	46.15
FEPA Decree No.58 of 1988 (now Cap 131).	10	15.38
1996 Istanbul Conference on Human Settlements (Habitat II).	-	-
1993 Lugano Convention.	-	-
Nigeria's National Policy on Environment (1989)	23	35.38
EMS ISO 14001	2	3.07

Table 4 indicates that 46.15% of the respondents currently are using environmental impact assessment. This represents the largest percentage of the respondents in the study. 35.38% of the respondents currently are using the National policy on environment. 15.38% of the respondents are using the FEPA Decree, while only about 3.07% of the respondents are currently practicing and have implemented ISO 14001 standard in their organization. This indicates that organisations will be able to anticipate and mitigate the environmental impacts of proposed projects at the planning and design stages but will not be able to effectively manage the day-to-day environmental impacts arising from construction, operation and decommissioning of such projects

Source of information on ISO 14001 standard

Respondents were asked to specify their source of information about ISO 14001 standard. Table 5 shows the number of responses and their percentages.

Table 5: Source of information on ISO 14001

Source of information	No. of responses	% of responses
EPA	-	-
Media	15	27.27
In-house consultant	-	-
Employees	-	-
Suppliers	-	-
External consultant	-	-
Seminars	35	63.64
Institution (Universities/Polytechnic)	5	9.09

As can be observed from Table 5, 63.64% of the respondents get their information by attending seminars. 27.27 % get their information from the media while 9.09% source their information from their institution of study. Because most of the respondents get their information by attending seminars, this will affect a section of practitioners/ professionals.

Reasons for adopting ISO 14001

Organization/ company now seeks for better ways to enhance their competitive edge in the 21st century by adopting globally recognized standards/ systems which impact on their operations in both tangible and intangible ways. Based on these, the questionnaire respondents were asked to indicate on a five point Likert scale, where 1 = 'strongly disagree', and 5 = 'strongly agree', both quantifiable and non-quantifiable reasons which are perceived to lead organizations/ companies to the adoption of an EMS.

Table 6: Perceived reasons for adopting ISO 14001 in the construction industry

S/no	Reasons	Frequency Responses					$\sum f$	$\sum fx$	Mean x'
		1	2	3	4	5			
a	High waste disposal costs	25	18	10	12	-	65	139	2.14
b	International trade barriers	15	15	15	15	5	65	130	2.69
c	To comply with existing regulatory requirements	20	25	10	10	-	65	140	2.15
d	Pressure from the customers	8	20	9	8	7	52	142	2.73
e	Pressure from the suppliers	30	9	10	8	-	57	59	1.93
f	Pressure from the employees	21	10	11	5	-	47	69	2.00
g	Pressure from the community	30	15	15	5	-	57	58	1.92
h	To identify potential areas for improvement	1	5	15	11	18	50	190	3.80
i	To monitor set targets	-	18	17	8	-	43	119	2.77
j	To benchmark with other organizations	6	1	15	9	17	48	174	3.63
k	To satisfy insurance, finance and other lending criteria	20	20	10	5	-	55	95	2.00
l	To explore market for 'green' products	17	15	13	5	-	50	96	2.12
m	Improved corporate image	7	5	15	11	16	48	186	3.88
n	To avoid liability costs from spills	2	22	10	-	-	55	117	2.13
o	To ensure continual identification and implementation of cleaner production opportunities.	20	20	10	-	5	55	100	2.00
	GRAND MEAN								2.53

As can be observed improved corporate image averaged 3.88 meaning the respondents have strongly agree as a reason for adopting ISO 14001. To identify potential areas for improvement averaged 3.80. To benchmark with other organizations averaged 3.63. To monitor set targets averaged 2.77. Pressure from the customers averaged 2.73. International trade barriers averaged 2.69. To comply with existing regulatory requirements averaged 2.15. High waste disposal costs averaged 2.14. To avoid liability costs from spills averaged 2.13. To explore market for 'green' product averaged 2.12. To ensure continual identification and implementation of cleaner production opportunities averaged 2.09. Pressure form employees and to satisfy insurance, finance and other lending criteria averaged 2.00. Pressure from supplier averaged 1.93. Pressure from community averaged 1.92. The grand mean of the perceived reasons for adopting ISO 14001 averaged 2.53; this indicates that even though the respondents rarely used the standard they are however optimistic that when adopted it will help boost their cooperate image, help them identify potential areas for improvement and help them bridge any international trade barrier.

Benefit for adopting ISO 14001

The reason for the adoption of a system or standard by an organization possibly cannot be segregated form any perceived benefit from its implementation and practice. Organizations expect both quantifiable and unquantifiable benefits from EMS implementation and certification. The questionnaire respondents were thus asked to reflect back on the various benefits expected before the adoption of EMS. These benefits could voluntarily drive the organizations or pressure them, depending on the nature of their business and stakeholders, to implement new systems and standards. Respondents were asked to rate each benefit listed in the questionnaire on a five point Likert scale where 1 = 'strongly disagree', and 5 = 'strongly agree'. From the responses obtained, the mean was calculated and the results are presented in Table 7.

Table 7: Perceived Benefit/Prospect of adoption of ISO 14001

S/no	Benefit	Frequency Responses					$\sum f$	$\sum fx$	Mean $\bar{x}$
		1	2	3	4	5			
a	Waste reduction	-	20	15	15	5	55	170	3.09
b	Cost savings from waste reduction/ disposal	-	25	15	10	5	55	160	2.91
c	Protection from prosecutions, fines and legal fees	-	35	15	10	-	60	160	2.58
d	Reduction in cleanup costs	19	11	5	5	-	40	76	1.90
e	Establish and monitor cleaner production/ eco-efficiency	16	16	18	10	5	65	167	2.57
f	Leniency in international trade barriers	3	22	13	7	5	50	139	2.78
g	Reduction in organization risks (health, safety and environment)	3	25	15	9	6	58	164	2.83
h	Decrease in insurance costs	16	14	22	8	-	60	142	2.37
i	Compliance to legislation	18	20	10	7	10	65	166	2.55
j	Market and competitive advantage	-	35	15	5	5	60	160	2.67
k	Fulfilling customers expectation	10	30	10	10	-	60	110	2.33
l	Good will from the customer and community	17	13	10	10	-	50	117	2.34
m	Morale building within the organization	10	30	10	10	5	65	165	2.51
	GRAND MEAN								2.57

As can be observed in Table 7 above, waste reduction averaged 3.09; this suggests that the respondents strongly agree it is a benefit. Cost savings from waste reduction/ disposal averaged 2.91. Reduction in organization risks averaged 2.83. Leniency in international trade barriers averaged 2.78. Protection from prosecutions, fines and legal fees averaged 2.58.

Establish and monitor cleaner production/ eco-efficiency averaged 2.57. Reduction in clean-up costs averaged 1.90. The grand mean averaged 2.83, this indicates that the respondents agree with the perceived benefits and there in prospect in adopting ISO 14001.

Impediments to adopting ISO 14001

Some impediments militating against the adoption of ISO 14001 identified from literature were assessed with respect to their severity or importance on a five point Likert scale. Table 6 presents the result. Table 6 indicates responses from questionnaire on the factors impeding the adoption of ISO 14001 standard in the construction industry in Nigeria, on a scale of 1 to 5 ranging from 'strongly disagree' to 'strongly agree'.

Table 8 shows the responses from the questionnaire on the impediments or barriers to adopting ISO 1400. Implementing environmental laws averaged 2.85, indicating that it is an impediment to a successful adoption of the standard. Awareness among practitioners averaged 2.72. Lack of motivation averaged 2.69. Training of contractors averaged 2.59. Resistance from the employees due to changes in operating procedures and external auditors/ consultants costs averaged 2.44. Documentation averaged 2.42. Internal audit costs averaged 2.41. Time lost by employees averaged 2.30. The grand mean averaged 2.54 which indicates the agreement of the factors as impediments to adopting ISO 14001.

Table 8: Impediments to adopting ISO 14001

S/no	Impediments	Frequency Responses					∑f	∑fx	Mean x̄
		1	2	3	4	5			
a	Documentation (cost, time for preparation)	9	20	20	6	-	55	133	2.42
b	External auditors/ consultants costs	8	15	18	5	-	46	112	2.44
c	Awareness among practitioners	-	23	18	9	-	50	136	2.72
d	Internal audit costs	17	14	10	10	3	54	130	2.41
e	Implementing environmental laws	5	20	25	10	5	65	185	2.85
f	Training of contractors	4	20	15	5	2	46	115	2.59
g	Resistance from the employees due to changes in operating procedures	5	24	23	3	-	55	134	2.44
h	Time lost by employees	10	20	15	5	-	50	115	2.30
i	Lack of motivation	-	23	17	8	-	48	129	2.69
	GRAND MEAN								2.54

SUMMARY OF RESULTS

The study found that:

- EIA is more common among the respondents, about 46.15% of the respondents currently practice and have implemented EIA act of 1992. While 2% currently practice and have implemented ISO 14001.
- Most of the respondents 63.64% get their information by attending seminars.