Environmental And Social Performance of Construction Firms in Niger Delta Region, Nigeria

OFEM PATRICK ENANG[1], TIMOTHY ADEWUYI[2], MONDAY OTALI[3]
[1] *Department of Civil Engineering, University of Cross River State Calabar, Nigeria*
[2, 3] *Department of Building, University of Uyo, Nigeria*

Abstract- ***There is a general call for the leadership and top management team of construction firms operating in the Niger Delta region of Nigeria to be more committed and ensure environmental sustainability of construction project delivery and overall sustainability of infrastructural development in the Niger Delta region of Nigeria. Therefore, the aim of this study is to assess the level of environmental and social performance of small, medium, and large construction firms in the study area. The study also tested two research hypotheses: (i) There is no significant difference in the level of environmental performance of small, medium, and large construction firms in the study area (ii) There is no significant difference in the level of social performance of small, medium, and large construction firms in the study area. Survey design was adopted for the study. Data were obtained using 721 copies of structured questionnaire. The methods of data analysis were descriptive and inferential statistics. The study found that successful implementation of 6 Rs related with manufacturing/construction such as remanufacturing, recycling, redesign, reduce, recover, and reuse, which ultimately result in cost-effectiveness had moderate level of performance. Other environmental sustainability performance indicators that had moderate level of performance are building designs, construction practices and technologies that are environmentally friendly and sustainable. The overall mean scores of 2.9347 showed that there is moderate level of environmental performance among large construction firms in the study area. The study also found that there is a high level of employee training and development among construction firms in the study area. However, motivation and incentives, infrastructural development, employment level, community and society satisfaction recorded moderate level of performance. The overall mean score of 2.9980 showed that there is moderate level of social performance among construction firms operating in the study area. The study found that there is no significant difference in the level of environmental and social sustainability performance among small, medium and large construction firms in the study area. Based on the findings and conclusion of this study, it is recommended that construction firms operating in the study area should ensure adequate health and safety of the employees, ensure employee job security and satisfaction, and implement pollution control measures to achieve sustainable project delivery and overall sustainability of the built environment in the study area. Moreso, the construction firms should use recyclable materials and ensure reduction of toxic air emissions during infrastructural development in the study area.***

Indexed Terms- ***Assessment; Environmental and Social Performance; Construction Firms; Nigerian Construction Industry***

I. INTRODUCTION

Globally, there is a general demand from construction firms, construction professionals, and other relevant stakeholders in the built environment to work towards achieving sustainable development goals (SDGs) through adequate infrastructure planning and execution that does not harm the ecosystem (Dalibi et al., 2020). The contributions of the building industry to economic, social and environmental development of a nation cannot be overstated. For example, the construction business employs both skilled and unskilled labourers, which is necessary for economic development of every nation (Esezobor, 2016). Furthermore, the

construction industry accounts for more than 10% of national revenue and plays an important role in national economic development (Queiroz et al., 2022). In some countries, the construction industry accounts for 5-7% of total GDP and employs at least 7% of the workforce. It is worth noting that the construction industry (CI) has environmental, economic, and social characteristics, making it intimately related to the three major pillars of sustainability: society, economy, and environment (Bartocci et al., 2017; Beatriz et al., 2018). In Nigeria, the construction industry is a significant contributor to national growth and development (National Bureau of Statistics (NBS), 2018a; NBS, 2018b; Adewuyi and Ujene, 2019). Despite the substantial contributions to national growth and development, there are serious worries regarding the effects of construction industry operations on the environment. Some good examples include high energy consumption, massive waste generation as a result of construction activities, high raw material utilization, and toxic substance emissions into the natural environment (Sirkeck, 2017; Omuh et al., 2018; Jackson et al., 2019; Sheng et al., 2020; Otali, and Monye, 2022).

The sustainability of the natural environment and infrastructure development ranks among the highest priorities and concerns in today's-built environment, influenced by external pressures from government entities, clients, and the public. Additionally, sustainability management has become a crucial area within the contemporary construction sector. The rise in global warming, climate change, and waste has heightened the demand for improved sustainable practices across nearly all industries, including production, construction, transportation, and others various sectors.

Additionally, the environmental quality conservation and preservation attracting great attention globally (Govindan et al., 2015), and greening the business process is oriented to attain the sound environmental performance of the construction firms. Thinking green in practice saves the natural environment from probable deleterious impacts of business process to be used to produce products (Galeazzo et al., 2014). Along with some other indicators, environmental management and performance is a crucial one demonstrating green in the business process. Green practice is preceded by some initiatives linked with environment such as monitoring of environment while deciding about suppliers, selecting ethical and environment friendly source of raw material, a sound system of environment management, eco-design, logistics for collecting and using packages and unused portion of products for recycling purpose, minimization of natural resources consumption (Galeazzo et al., 2014). Reducing excessive usage of power and water, proper usage of resources and controlling rubbish production and pollution, consideration of negative impacts of greenhouse effects are vital issues to be considered in the green approach of business practice (Verrier et al., 2014). Regulatory pressure ensures environmental management results in cost efficiency and green product innovation that ultimately results in profitability (Chan et al., 2016). Since environmental performance is a crucial indicator of sustainable performance, it should be incorporated in crucial decision making to make the business process green. These include reduction of air emissions, reduction of effluent/solid waste, reduction of hazardous/harmful/toxic materials consumption, and reduction of environmental accident (Chin et al., 2015).

Furthermore, there is need for firms to have strong social networks as a source of motivation for partners to exchange and share knowledge. These initiatives undoubtedly demand a collaborative effort from internal and external stakeholders. The social performance dimension targets plan that are aimed to positively influencing all present and future relationships with stakeholders. The focus is on assuring stakeholders' loyalty to the company. Indicators of social performance include employee training and development, employee occupational health and safety, employee job security and satisfaction, community and society satisfaction, supplier commitment and initiative, and motivation and incentives. In addition, Rostamnezhad and Thaheem (2022) identified many social sustainability indicators in the construction sector. These include education and training, health and safety of stakeholders, jobs and employment, rewards and incentives, community participation and engagement, and equity and human rights. There is a paradigm

shift that requires construction professionals, and top management of construction firms to find models, metrics and tools to articulate the extent and the ways to solve the sustainability related issues in the construction sector. Construction stakeholders worldwide are transforming their organisational structures to implement sustainable building practices that boost economic, social, and environmental sustainability in addition to health and safety at corporate and project level (Frank and Du, 2018).

The Niger Delta region, located in the southern part of Nigeria, has some peculiar characteristics ranging from the climate, terrain, vegetation, culture, economic activities and value system. The Niger Delta region of Nigeria produces a significant portion of the aggregate oil wealth of Nigeria. Since 1956 when oil was first discovered in Oloibiri in Southern Nigeria, the Niger Delta region has accounted for over 90 per cent of Nigeria's oil income (Otali, 2018). However, the region has perennially suffered from environmental neglect, crumbling infrastructures and services, high unemployment, social deprivation, abject poverty and endemic conflict. This has led to calls for firms operating in the Niger Delta to demonstrate the impact of their investments in Nigeria by undertaking increased community development initiatives that provide direct social benefits such as local employment, new infrastructure, schools, and improved health care delivery (Ijaiya, 2014). Niger Delta region of Nigeria is severely affected by the environmental degeneration due to economic activities and oil exploration over the years. According to Kadafa (2012), oil exploration and exploitation which has been on-going for several decades in the Niger Delta, has had disastrous impacts on the environment in the region and has adversely affected people inhabiting that region. The study noted that the region has been rendered as one of the five most severely petroleum damaged ecosystems in the world. Similarly, Ite et al. (2013) observed that the bulk proven oil reserves of the region have encouraged the influx of visitors and multinational oil corporations whose operations have created serious threats to the livelihood of the coastal communities in the Niger Delta region. Destruction of habitats, loss of biodiversity, ecosystem destruction, destruction of farmland to access onshore sites and marine resource areas, and water pollution all have extensive implications on the people's livelihood in the region. Apart from the environmental degeneration suffered due to oil exploration, the fact that several construction activities which have been on to accommodate the activities and growing population, also add to the degeneration of the environment. Asad and Khalfan (2007) reported that construction has a significant effect on people's quality of life; construction outputs affect the nature, function and appearance of the towns and countryside in which people live and work.

However, the rising global campaign for sustainable construction demands that the challenges be addressed to promote environmentally friendly, social responsibility and economic support. The poor attention being paid to sustainable development agenda in the developing countries poses great danger to present and future generations. It remains unknown, the plan of actions or the current direction of the stakeholders in the construction industries of developing countries regarding sustainability. Otali, Akaninyene, and Nnamani (2018) posited that environmental sustainability performance of construction firms operating in the Niger Delta region of Nigeria is at the moderate level. The study advocated the need for the leadership of construction firms and top management team of construction firms operating in the Niger Delta region of Nigeria to be more committed and ensure environmental sustainability of construction project delivery and overall sustainability of infrastructural development in the Niger Delta region of Nigeria. The demand is in line with Oni (2015) who posited that the extent of implementation of sustainable construction principles is at the moderate level. Therefore, this study is set to assess the level of environmental, and social performance of small, medium, and large construction firms in the study area. This study tested two research hypotheses: (i) There is no significant variation in the level of environmental performance among small, medium, and large construction firms in the study area (ii) There is no significant variation in the level of social performance among small, medium, and large construction firms in the study area.

II. METHODOLOGY

Survey design was adopted for the study. The study adopted random sampling technique. Data were obtained using 721 copies of structured questionnaire. The descriptive method of data analysis was employed while Kruskal-Wallis test, a non-parametric equivalent of ANOVA, was used to test the postulated hypotheses of the study. Simple percentage was used to analyse the number of questionnaires distributed and questionnaire returned. The simple percentage was also used to analyse the respondents' characteristics. Mean score was used to determine the level of environmental, and social performance of construction firms operating in the study area. Using a 5-point Likert scale, the decision rule in this study is that any environmental, and social performance indicator with an overall mean score of 1.0-1.49, 1.5-2.49, 2.5-3.49, 3.5-4.49, and 4.5-5.0 is considered to have a very low level of performance; low level of performance, moderate level of performance, high level of performance; and very high level of performance respectively as adopted from Ogenma (2018).

III. RESULTS AND DISCUSSION

The various demographic characteristics of the respondents of the study were analysed, including the data collected for the objectives of the study. The respective outcomes of the analyses are discussed alongside the implications of the derived results.

3.1 Questionnaire Distribution and Response Rate of the Study

The questionnaire was administered among the construction firms operating in Niger Delta, Nigeria. The results of analysis are presented accordingly. The result in Figure 1 revealed the number of questionnaires distributed in Abia, Akwa Ibom, Bayelsa, Cross River, Delta, Edo, Imo, and Rivers States indicating 117, 139, 97, 143, 133, 149, 105, 142, and 154, respectively. From the questionnaire distributed, the response rate ranges between 52.0% and 72.2%. Bayelsa State received the highest response rate of 72.2% while Ondo State got the least rate of 51.9 %. In all, an overall response rate of 62.1% was achieved. Groves (2006) noted that a response rate of at least 50 percent is considered adequate for analysis and reporting. a response of 60 percent is good and a response rate of 70 percent is very good. On the other hand, Assad et al. (2020) explained the consensus of many previous researchers in the field of construction management that the range of 20% to 30% is acceptable as construction industry is known for lack of participation in questionnaire survey. Therefore, the response rate of 62.1% achieved by this study satisfied the condition of acceptable response rate in the field of this study. Hence, the overall response rate of 62.1% in this study is considered very good and adequate.

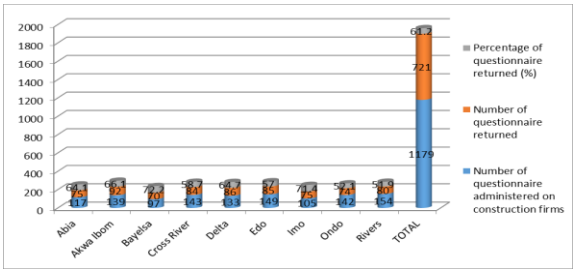

Figure 1: Questionnaire distribution and response rate of the study

3.2 Respondents' Characteristics

As part of ascertaining the reliability of data collected for a study, it is important to obtain necessary demographic information of the respondents. The practice was ensured in the process of conducting this study and the various results of the analysed demographic traits of the respondents of this study are captured and presented as follows:

3.2.1 Level of Educational Qualification of the Respondents

The level of educational qualification of the respondents was examined. The result presented in Figure 2 shows that 39.0% of the respondents have doctorate degree, while 50.9% of the respondents have masters' degree, also 8.3% hold Bachelor's degree, while 1.8% and have Higher Diploma degree and related qualification. This infers that the respondents that partook in this study are well educated and knowledgeable. Hence, data derived from them are valid and dependable.

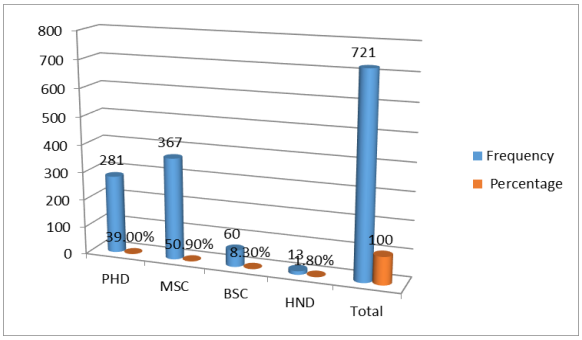

Figure 2: Level of educational qualification of the respondents

3.2.2 Overall Years of Experience of the Respondents Within the Organisation

Moreover, the overall years of experience of the respondents within the organisation was analysed and presented in Figure 3. The result showed that 38.3%, 34.4%, 34.3%, and 5.0% of the respondents have years of experience with the organizations in the range of 1– 10years, 11– 20years, 21-30years, and 30years and above total correspondingly.

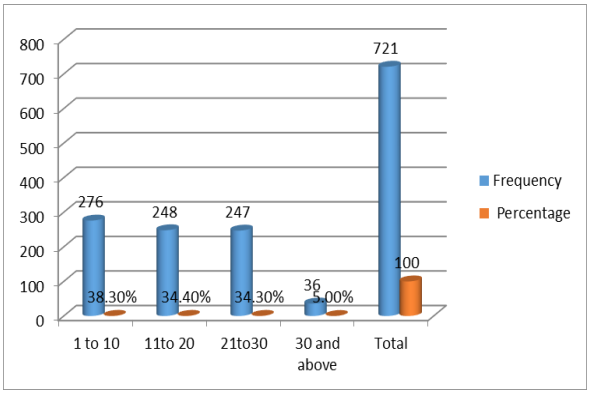

Figure 3: Overall years of experience of the respondents within the organization

3.2.3 Overall Years of Experience in the Construction Sector

Moreso, the results in Figure 4 shows that 23.3%, 34.3%, 29.0%, and 13.5% of the respondents have 1–10years, 11 – 20years, 21-30years, and 30years and above overall years of experience in the construction sector respectively. It infers that majority of the respondents considered in this study have worked more 20 years with their respective organizations and in the industry. Therefore, the information gotten from them are reliable.

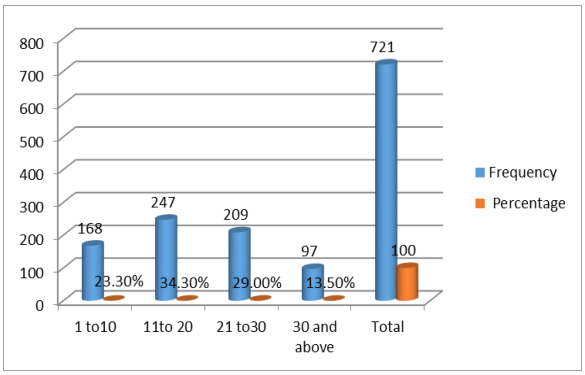

Figure 4: Overall Years of Experience in the Construction Sector

3.2.4 Level of Professional Qualification of the Respondents

The level of professional qualification of the respondents was analysed and presented in Figure 5. The results revealed that 14.7%, 10.7%, 10.1%, 17.6%, 4.3%, 42.6%, 77.3% of the respondents are Project Managers, Quantity Surveyor, Builder, Construction Manager, Procurement personnel/officer, and Engineering (Civil, Mechanical, Electrical) respectively.

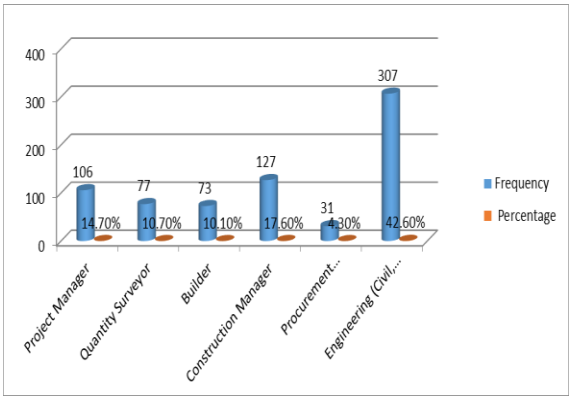

Figure 5: Level of professional qualification of the respondents

3.2.5 Professional Development of the Respondents

The extent of professional development of the respondents is seen in their level of registration in their various professions. The result in Figure 6 reveals 48.7%, 3.1%, 11.7%, 18.3%,18.2%, and 0.1% of the respondent are COREN, CORBON, ARCON, NSE, NICE, QSRBN members respectively. This revealed a high level of professional commitment and development on the part of the respondents.

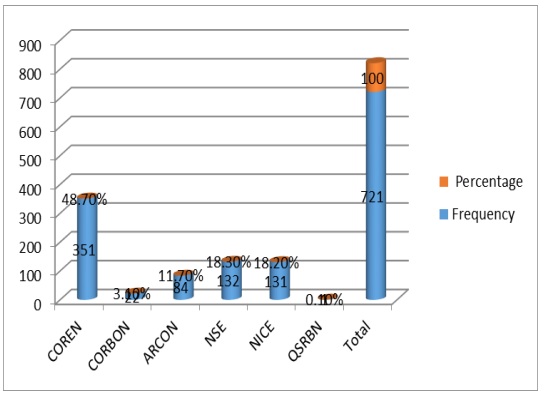

Figure 6: Professional development of the respondents

3.2. 6 Grade of membership

The result in Figure 7 showed that 56.2%, 33.6% and 10.3% are Corporate, Associate and Fellow cadre respectively of their professional bodies. This implies that the respondents are people who have worked and committed themselves in construction practice, hence their contributions and responses are reliable. Furthermore, to show that the respondents have always involved in continuous professional development (CPD).

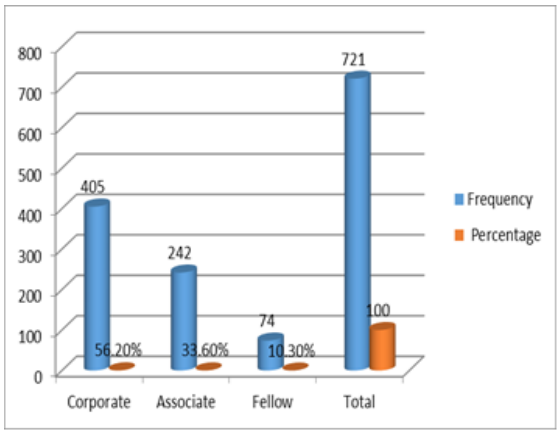

Figure 7: Grade of membership

3.2.7 Member of Professional Body

Figure 8 shows the percentage of the respondents who are members of professional bodies. The results reveal 97.8% are registered members of one or more profession, while 2.2% are not members of any professional body.

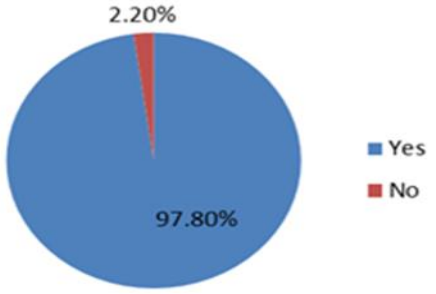

Figure 8: Member of Professional Body

3.2.8 Age of Construction Firms

The analysis of the age of construction firms that were sampled in this study showed that age of the firms ranged between the intervals of 1-5, 6-10, 11-15, 16-20 and above 20 years with their percentage distribution of 17.6%, 29.1%, 23.4%, 20.6% and 9.1% respectively. Figure 9 reveals that majority of the construction firms have age ranging between 11-15 has 23.4 % while 16-20 has 20.6%. It implies that the majority fall within the age range of 11-15 years. Figure 9 also shows that more than 95% of the firms have practiced for over ten (10) years. It thus implies that the work experiences of the construction firms are satisfactory, and their responses can be trusted on.

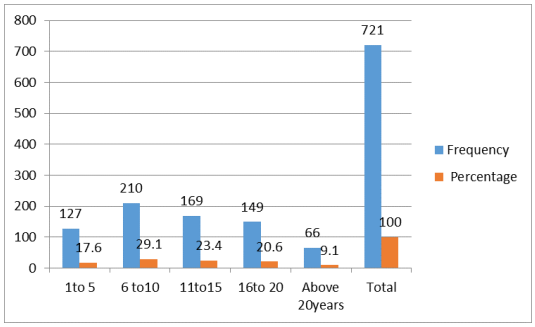

Figure 9: Age of Construction Firms

3.3 Environmental Performance of Construction Firms in Niger Delta, Nigeria

Table 1 reveals the environmental performance of small, medium, and large construction firms in the Niger Delta region. The decision rule is that any environmental performance indicator with mean ranges between 1.0 – 1.49 is of very low performance, 1.5 – 2.49 is of low performance, 2.5 – 3.49 is of moderate performance, 3.5 – 4.49 is having high performance and 4.5 – 5.0 is viewed as having very high performance. The result in Table 1 reveals

that the following environmental performance indicators recorded moderate level of performance as rated by the construction firms. These include successful implementation of 6 Rs related with manufacturing/construction such as remanufacturing, recycle, redesign, reduce, recover, and reuse, which ultimately result in cost-effectiveness (MS = 3.2464), building designs, construction practices and technologies that are environment friendly and sustainable (MS = 3.1471), implementation of environmental management programmes and the use of certified professionals (MS = 3.0899), the inclusion of sustainability and other environmental management measure in tendering requirement (MS =3.0732), effective communication of sustainability and other environmental management issues among contractors, suppliers and other professionals engaged by the organization (MS = 3.0711), the use of innovative features and renewable energy forms such as solar panels. (MS = 3.0672), use of standardized management systems such as ISO 14001 or environmental management system in your organization (MS =3.0551). and reduction of environmental accident (MS= 2.7566). Other environmental sustainability indicators that recorded moderate performance are minimization of natural resources consumption (MS = 2.7564), proper usage of resources and controlling rubbish production and pollution (MS = 2.7518), reduction of hazardous/harmful/toxic materials consumption (MS = 2.6750), reduction of effluent/solid waste (MS = 2.5823), reducing excessive usage of power and water (MS = 2.5530). recycling level and reuse of residuals (MS = 2.5412), number of environmental lawsuits (MS = 2.5175), and use of recyclable materials (MS = 2.5023). However, reduction of carbon emissions into the air (MS = 2.4307) recorded low level of performance. This implies that there is high level of carbon emissions during construction projects delivery in the study area. The overall mean score of 2.8128 showed that there is moderate level of environmental performance among construction firms operating in the study area. It connotes that the extent to which construction firms ensure environmental sustainability during project delivery/infrastructural development in the Nigerian construction industry is still at moderate level.

Furthermore, 5 (29.4%) of the environmental sustainability performance indicators recorded low level of performance among small construction firms. These indicators include number of environmental lawsuits, use of recyclable materials, recycling level and reuse of residuals, reduction of air emissions, and reduction of effluent/solid waste). The study showed that the remaining 12 (70.6%) of the environmental sustainability performance indicators recorded moderate level of performance among small construction firms in the study area. The overall mean scores of 2.7555 showed that there is moderate level of environmental performance among small construction firms in the study area. It implies that the extent to which small construction firms ensure environmental sustainability during project delivery/infrastructural development in the Nigerian construction industry is still at moderate level.

Moreso, 3 (17.6%) of the environmental sustainability performance indicators recorded low level of performance among medium construction firms. These include Recycling level and reuse of residuals, reducing excessive usage of power and water, and reduction of air emissions. The study revealed that the remaining 14 (82.3%) of the environmental sustainability performance indicators recorded moderate level of performance among medium construction firms in the study area. The overall mean scores of 2.7482 showed that there is moderate level of environmental performance among medium construction firms in the study area. It implies that the extent to which medium construction firms ensure environmental sustainability during project delivery/infrastructural development in the Nigerian construction industry is still at moderate level.

In addition, 1 (5.9%) of the environmental sustainability performance indicators recorded low level of performance among large construction firms. The only environmental sustainability indicator that recorded low level of performance among large construction firms is reducing excessive usage of power and water. The study revealed that the remaining 16 (94.1%) of the environmental sustainability performance indicators recorded moderate level of performance among large construction firms in the study area. The overall

mean scores of 2.9347 showed that there is moderate level of environmental performance among large construction firms in the study area. It implies that the extent to which large construction firms ensure environmental sustainability during project delivery/infrastructural development in the Nigerian construction industry is still at moderate level. The current level of environment performance indicated that there is need for improvement in the environment performance of the construction firms, and the overall sustainability of the Nigerian built environment. This study is in tandem with Otali, Akaninyene and Nnamani (2018) who posited that environmental sustainability performance of construction firms operating in the Niger Delta region of Nigeria is at the moderate level. This is also in agreement with the study of Govindan et al., 2015) who posited that the environmental sustainability is of great importance throughout the world and there is need to improve the green in business process so as to attain the sound environmental sustainability performance of firms. Furthermore, it is also in alignment with Munir and Baird (2016), who posited that stakeholders in the construction sector have expressed great concern over environmental performance and have called for frequent performance measurement to help them track the industry's progress and identify areas that require improvement.

Table 1: Environmental Performance of Construction Firms in the Niger Delta, Nigeria

Environmental Performance Indicators	Mean score				Rank	Remark
	Small Firm	Medium Firm	Large Firm	Combined		
Number of environmental lawsuits	2.1033	2.5525	2.8968	2.5175	15	MLP
Use of recyclable materials	2.2800	2.6237	2.6032	2.5023	16	MLP
Recycling level and reuse of residuals	2.4500	2.3085	2.8651	2.5412	14	MLP
Building designs, construction practices and technologies that are environment friendly and sustainable	3.0533	2.9593	3.4286	3.1471	2	MLP
Effective communication of sustainability and other environmental management issues among contractors, suppliers and other professionals engaged by the organization	2.9333	2.9864	3.2937	3.0711	5	MLP
Standardized management systems such as ISO 14001 or environmental management system in your organization	2.9767	2.8712	3.3175	3.0551	7	MLP
Implementation of environmental management programmes and the use of certified professionals	2.9333	3.0508	3.2857	3.0899	3	MLP
The inclusion of sustainability and other environmental management measure in tendering requirement	2.9533	3.0441	3.2222	3.0732	4	MLP
The use of innovative features and renewable energy forms such as solar panels.	3.1900	2.9322	3.0794	3.0672	6	MLP

Successful implementation of 6 Rs related with manufacturing/construction such as remanufacturing, recycle, redesign, reduce, recover, and reuse, which ultimately result in cost-effectiveness.	3.2867	2.9763	3.4762	3.2464	1	MLP
Minimization of natural resources consumption	2.7500	2.7254	2.7937	2.7564	9	MLP
Reducing excessive usage of power and water	2.6767	2.4983	2.4841	2.5530	13	MLP
Proper usage of resources and controlling rubbish production and pollution	2.7833	2.8373	2.6349	2.7518	10	MLP
Reduction of air emissions	2.4133	2.3390	2.5397	2.4307	17	LLP
Reduction of effluent/solid waste	2.4667	2.6373	2.6429	2.5823	12	MLP
Reduction of hazardous/harmful/toxic materials consumption	2.7333	2.5458	2.7460	2.6750	11	MLP
Reduction of environmental accident	2.8600	2.8305	2.5794	2.7566	8	MLP
Combined Mean	2.7555	2.7482	2.9347	2.8128		MLP

3.4 Kruskal Wallis Test for Comparing the Environmental performance of Construction Firms

Table 2 shows the result of Kruskal Wallis test that was conducted to test the hypothesis which states that there is no significant variation in the environmental performance of construction firms in the Nigerian construction industry. The p-value of 0.314 is greater than 0.05 significance level, hence the hypothesis was accepted. This indicates that there is no significant variation in the environmental performance of construction firms in the Nigerian construction industry.

Table 2: Kruskal Wallis Test Result

Type of Construction Firm	Mean Rank	Decision @ 0.05 Sig. level.
Small Firm	24.06	
Medium Firm	23.47	
Large firm	30.47	
Chi- Square	2.320	
D.F	2	
P-Value	0.314	Accepted

3.5 Social Performance of Construction Firms in Niger Delta, Nigeria

Table 3 shows the social performance of small, medium, and large construction firms operating in the study area. The decision rule is that any social performance indicator whose mean falls between 1.0 – 1.49 is of very low performance, 1.5 – 2.49 is of low performance, 2.5 – 3.49 is of moderate performance, 3.5 – 4.49 is having high performance and 4.5 – 5.0 is regarded as having very high performance.

The result in Table 3 reveals that there is high level of employee training and development (MS = 3.5967) among small construction firms. The following social performance indicators recorded moderate level of performance among small construction firms. These include infrastructural development (MS = 3.4667), employment Level (MS = 3.4633), motivation and incentives (MS = 3.3033), community and society satisfaction (MS = 3.2500), public and private sector investment (MS = 3.2367). Other social performance indicators that had moderate level of performance include Standard of living (MS = 3.1667), supplier commitment and initiative (MS = 3.1400), peace and security (MS= 2.9133), human health standard (MS = 2.6467), Employee occupational health and safety (MS =

2.5900), biodiversity and eco-system stability (MS = 2.5433), and employee job security and satisfaction (MS = 2.5033). However, pollution control (MS = 2.4667), and poverty reduction (MS = 2.4567) recorded a low level of performance among small construction firms in the study area. The overall mean score of 2.9829 showed that there is moderate level of social sustainability performance among small construction firms in the study area. It connotes that the extent to which small construction firms ensure social sustainability, and overall well-being of the stakeholders during project delivery/infrastructural development in the Nigerian construction industry is still at moderate level.

The results showed that there is high level of employee training and development (MS =3.5847) among medium construction firms. The following set of social performance indicators recorded moderate level of performance among medium construction firms. They include motivation and incentives (MS = 3.2678), infrastructural development (MS = 3.2407), public and private sector investment (MS = 3.1254), employment Level (MS = 3.0475), supplier commitment and initiative (MS = 3.0203), community and society satisfaction (MS = 2.8712), standard of living (MS= 2.8136), biodiversity and eco-system stability (MS=2.7898), poverty reduction (MS= 2.7288), human health standard (MS = 2.6068), employee occupational health and safety (MS = 2.5288), and employee job security and satisfaction (MS = 2.5153). However, peace and security (MS = 2.4915), and pollution control (MS = 2.4441) recorded a low level of performance among medium construction firms in the Nigerian construction sector. The overall mean score of 2.8718 showed that there is moderate level of social performance among medium construction firms in the study area. It connotes that the extent to which medium construction firms ensure social sustainability during project delivery/infrastructural development in the Nigerian construction industry is still at moderate level.

The results in Table 3 showed that there is high level of employee training and development (MS = 3.6077), and Motivation and incentives (MS = 3.5952) among large construction firms in the Nigerian construction industry. The following set of social performance indicators have moderate level of performance among large constructions in the Nigerian construction industry. They include community and society satisfaction (MS = 3.4524), infrastructural development (MS = 3.3571), supplier commitment and initiative (MS = 3.3254), employment Level (MS = 3.3175), poverty reduction (MS = 3.2143), public and private sector investment (MS = 3.2063), peace and security (MS = 3.1349), standard of living (MS= 3.0794), biodiversity and eco-system stability (MS = 2.8571), employee occupational health and safety (MS = 2.8095), human health standard (MS = 2.7857), employee job security and satisfaction (MS = 2.7460), and pollution control (MS = 2.6429). The overall mean score of 3.1460 showed that there is moderate level of social performance among large construction firms in the study area. It connotes that the extent to which large construction firms ensure social sustainability during project delivery/infrastructural development in the Nigerian construction industry is still at moderate level.

The combined mean score in table 3 implies that there is high level of employee training and development (MS = 3.6077). However, other social performance indicators recorded moderate level of performance. These include Motivation and incentives (MS = 3.3888), infrastructural development (MS = 3.3548), Employment Level (MS= 3.2761), community and society satisfaction (MS = 3.1912), public and private sector investment (MS = 3.1895), supplier commitment and initiative (MS = 3.1619), standard of living (MS = 3.0199), peace and security (MS = 2.8466), Poverty reduction (MS = 2.7999), biodiversity and eco-system stability (MS = 2.7301), human health standard (MS = 2.6797), employee occupational health and safety (MS= 2.6428), employee job security and satisfaction (MS = 2.5882), and pollution control (MS = 2.5179). The overall mean score of 2.9980 showed that there is moderate level of social performance among construction firms operating in the study area. It connotes that the extent to which construction firms ensure social sustainability during project delivery/infrastructural development in the Nigerian construction industry is still at moderate level. This study is in agreement with Rostamnezhad and Thaheem (2022) who identified education and

training, health and safety of workers and other stakeholders, jobs and employment, rewards and incentives, community participation and engagement in construction project delivery, and equity and human rights as key performance indicators for measuring the social sustainability performance of construction firms.

Table 3: Social Performance of Small, Medium, and Large Construction Firms

Social Performance indicators	Mean score				Rank	Remark
	Small Firm	Medium Firm	Large Firm	Combined		
Employment Level	3.4633	3.04 75	3.3175	3.2761	4	MLP
Infrastructural development	3.4667	3.24 07	3.3571	3.3548	3	MLP
Standard of living	3.1667	2.81 36	3.0794	3.0199	8	MLP
Public and private sector investment	3.2367	3.12 54	3.2063	3.1895	6	MLP
Peace and security	2.9133	2.49 15	3.1349	2.8466	9	MLP
Biodiversity and eco-system stability	2.5433	2.78 98	2.8571	2.7301	11	MLP
Poverty reduction	2.4567	2.72 88	3.2143	2.7999	10	MLP
Human health standard	2.6467	2.60 68	2.7857	2.6797	12	MLP
Pollution control	2.4667	2.44 41	2.6429	2.5179	15	MLP
Employee training and development	3.5967	3.58 47	3.6667	3.607	1	HLP
Employee occupational health and safety	2.5900	2.52 88	2.8095	2.6428	13	MLP
Employee job security and satisfaction	2.5033	2.51 53	2.7460	2.5882	14	MLP
Community and society satisfaction	3.2500	2.87 12	3.4524	3.1912	5	MLP
Supplier commitment and initiative	3.1400	3.02 03	3.3254	3.1619	7	MLP
Motivation and incentives	3.3033	3.26 78	3.5952	3.3888	2	MLP
Combined Mean	2.9829	2.87 18	3.1460	2.9980		MLP

3.6 Kruskal Wallis Test for Comparing the Level of Social performance of Construction Firms in the Nigerian Construction Industry

Table 4 shows the result of Kruskal Wallis test that was conducted to test the hypothesis which states that there is no significant variation in the social performance of construction firms in the Nigerian construction industry. The p-value of 0.113 is greater than 0.05 significance level, hence the hypothesis was accepted. This indicates that there is no significant variation in the social performance of

construction firms in the Nigerian construction industry.

Table 4: Kruskal Wallis Test for Comparing the Level of Social performance of Construction Firms in the Nigerian Construction Industry

Social performance of Construction Firms	Mean Rank	Decision@ 0.05 Sig. level
Small Firm	22.60	Accepted
Medium Firm	18.20	
Large firm	28.20	
Chi- Square	4.369	
D. F.	2	
P-Value	0.113	

3.7 Conclusion and Recommendations

This study assessed the environmental and social performance of construction firms in the Nigerian Construction Industry. This study also tested two research hypotheses. The study found that successful implementation of 6 Rs related with manufacturing/construction such as remanufacturing, recycle, redesign, reduce, recover, and reuse, which ultimately result in cost-effectiveness had moderate level of performance. Other environmental sustainability performance indicators that had moderate level of performance are building designs, construction practices and technologies that are environment friendly and sustainable, implementation of environmental management programmes and the use of certified professionals, the inclusion of sustainability and other environmental management measure in tendering requirement, effective communication of sustainability and other environmental management issues among contractors, suppliers and other professionals engaged by the organization, and the use of innovative features and renewable energy forms such as solar panels recorded moderate level of environmental sustainability performance. The bottom three of the environmental sustainability performance indicators include number of environmental lawsuits, use of recyclable materials, and reduction of air emissions. The study concluded that there is moderate level of environmental performance among construction firms operating in the study area. It is also concluded that there is no significant difference in the environmental performance among construction firms in the Nigerian construction industry.

The study found that there is high level of employee training and development among construction firms in the study area. However, motivation and incentives, infrastructural development, employment level, community and society satisfaction, public and private sector investment, supplier commitment and initiative, standard of living, peace and security, poverty reduction, biodiversity and eco-system stability, and human health standard recorded moderate level of performance. The least rated social performance indicators are employee occupational health and safety, employee job security and satisfaction, and pollution control. The study concluded that there is moderate level of social performance among construction firms operating in the study area. It is also concluded that there is no significant difference in the social performance among construction firms in the Nigerian construction industry. Based on the findings and conclusion of this study, it is recommended that construction firms operating in the study area should ensure adequate health and safety of the employees, ensure employee job security and satisfaction, and implement pollution control measures to achieve sustainable project delivery and overall sustainability of the built environment in the study area. Moreso, the construction firms should use of recyclable materials and ensure reduction of toxic air emissions during infrastructural development in the study area.

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