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Investigating Barriers and Drivers of Sustainable Construction Procurement Practice in Kano State

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Studies concerning sustainable procurement have to a great extent focused on construction project delivery. However, in Nigeria, most state governments were not taking environmental issues into consideration in the construction procurement processes. Taking environmental issues in to consideration helps to generate benefits not only to the client, but also to society and the economy, whilst minimizing damage to the environment. This survey, investigates the barriers and drivers of sustainable construction procurement practice in Kano state. Questionnaire was used to obtain data from procurement administrators in ministries and agencies responsible for construction projects delivery across Kano state. 56 questionnaires were distributed and 42 (75%) responses were returned and analyzed using Relative Importance Index (RII). Result of the study has identified twenty (20) barriers limiting the application of sustainable construction procurement practices and top among them include: lack of environmental evaluation criteria in tendering process; negative attitude towards environmental considerations; lack of environmental plan at the procurement stage; and lack of working environment requirements in tendering process. On the other hand, thirteen (13) drivers that provide optimal opportunities for implementing sustainable construction procurement practice were determined and top among them include: improve maintenance and operating cost savings; integration of environmental needs into project needs; improve environmental compliance; promote value for money project and the end-users goals and targets. The findings shed lights on the barriers and drivers of the adoption and implementation of sustainable procurement practice that consolidate the knowledge in the state of the art of sustainable procurement practice in Kano state. Therefore it is recommended that government should emphasis on environmental consideration as a requirement in tendering process in an effort to promote the adoption and implementation of sustainable construction procurement practice.

Keywords: Barriers, Derivers, Construction contract, Environmental consideration, Sustainable procurement.

Introduction

Sustainable procurement is regarded as a fast growing field of interest in the public sector organizations across the world (Johnstone, 2003; Gilbert, 2011). Sustainable construction procurement in this context is a process of meeting the client needs for the development of projects in a way that achieves value for money on a whole life basis in terms of generating benefits not only to the client, but also to society and the economy, whilst minimizing damage to the environment (World Summit on Sustainable Development, 2002). Many studies have shown that governments at all levels are required to promote procurement policies capable of promoting green construction and sustainable environment (Organization for Economic Cooperation and Development (OECD), 2003; Brammer, & Walker, 2007; UNEP, 2008; Dickinson *et al.*, 2008; Idoro, 2012; Ibietan & Ekhosuehi, 2013). African countries and Nigeria in particular stand to gain immensely from the pursuit of efficiency in resource utilization, energy, reducing waste and pollution and

consideration for local communities which are central concerns of sustainability. Study by Dania (2016) indicates that developing countries gain a lot of advantages from the sustainability agenda. More importantly, its adoption and implementation is more prevalent in the developed world. Many questions were raised as to whether sustainable construction offers any business opportunities and lessons to construction industries in the African continent. Numerous publications exist prescribing sustainable construction strategies seemingly deemed suitable for Africa, but very little known about sustainability in the context of Nigerian Construction industry (Idoro, 2012; Ibietan & Ekhosuehi, 2013). Additionally, there is limited number of researches addressing the practice of construction procurement and environmental sustainability and their findings concentrated on efficiency in energy utilization and pollution control. Moreover, no research has investigated aspects of environmental consideration at the procurement stage of construction contract in any particular state in Nigeria. Kano state is one of the most populous states with growing number of environmental challenges that have negative effects on construction contract especially at pre-contract stage (Musa, 2018). To overcome such challenges, this study investigates barriers and drivers of sustainable construction procurement practices in Kano state with a view to promote environmental sustainability consideration in construction contract.

Sustainable Construction Procurement

Dania (2016) emphasized that the traditional approach to environmental management has evolved from pollution control, which can be seen as an end of pipe approach, to clean production approaches. However, to make the shift to a sustainable society, even more radical changes are needed. Changes need to be made at the environmental level (Ibietan & Ekhosuehi, 2013). Sustainable construction procurement was defined as the integration of environmental considerations into construction procurement actions (UNEP, 2008). In the context of green construction, construction procurement by public sector authorities should follow rules of sustainable procurement policies that include environmental criteria in procurement decisions (OECD, 2003). Sustainable construction procurement preferences can be formulated as mandatory environmental requirements (Hyacinth, *et al.*, 2017). However, environmental criteria may also be considered in the tender evaluation, alongside other criteria such as price, technique and organization. Since the first green housing initiatives appeared during the 1980s and 1990s, sustainable construction procurement policies and programmes have now been implemented in many countries throughout the world (Kamann, 2004). European construction procurement system do applied environmental preferences in their procurements and three different steps in the construction process have been suggested for applying environmental criteria (ICLEI European Secretariat, 2007). The steps should be: in the preliminary design/architectural drawings; in the tendering for the construction contract; and in the tendering for the building services such as heating, ventilation and air conditioning.

Barriers of Sustainable Procurement Practice

Nigeria recognizes that it faces many challenges in moving its economy to a more environmentally friendly, green and sustainable path (Musa, 2018). In this regards the country advocates that necessary conditions must be established at the state levels to make it possible for the country to move towards a green economy within the framework of the sustainable environment. Lack of environmental data is generally regarded as a main barrier to green procurement (Wild & Li, 2011). Literature had identifies barriers to the development and implementation of sustainable construction procurement approach which varies from countries to countries and from sectors to sectors. For example, Varnas *et al.* (2009) conducted a study in the UK construction industry and discovered that financial constraints was found to be the most severe factor limiting the application of sustainable construction procurement

practice. While other part of the world ranks project quality and availability of sustainably produced alternatives as a priority factors (Manzini & Vezzoli, 2002). Although, a study conducted by Dania (2016) discovered that lack of environmental evaluation criteria in tendering processes and financial constraints in the form of cost, lack of budget, and lack of resources, pose the largest barrier to the implementation of sustainable procurement practices. Other factors that negatively influence sustainable construction procurement practice include: lack of awareness, decentralized project structures, time pressures, conflicting priorities, and cultural attitude such as the mindset and commitment of the government officials (Gilbert, 2011). Lack of top management commitment, concern about the quality of sustainable projects, and availability of experts were also identified as constraints factors (Hyacinth *et al.*, 2017). Several studies have realized the barriers to sustainable procurement practice as: lack of political support and government regulations, the lack of contract management, and conflicting environment/social factors (Rwelamila *et al.*, 2000; Johnstone, 2003; Forster & Miller, 2004; Dickinson *et al.*, 2008; Varnas *et al.*, 2009).

Drivers of Sustainable Construction Procurement Practice

Drivers to the implementation of sustainable construction procurement practices were identified in the literature and include: improving efficiency and transparency, improving compliance, financial savings, meeting goals and targets, improving the work environment, and contributing to the modernization and international competitiveness of local industry (Dickinson *et al*., 2008). Thus reducing the use of natural resources including improving the quality of air and water and improve maintenance and operating cost savings (Russel, 1998; Johnstone, 2003; UNEP, 2008; Dania, 2016). Wild & Li (2011) have identified seven interdependent factors that influence the implementation and success of sustainable construction procurement practices: leadership, policy and programs, organizational strategy, organizational culture, capacity building, supply-side and finance. Studies have also identified the five common aspects of sustainable procurement practices and these include: concern for the environment, diversity, philanthropy, human rights, and the safety implications of the project to the environment (Rwelamila *et al*., 2000; Carter, 2008). Kamann (2004) observed that identifying stakeholders in an organization whether local, regional, international, large or small informs the development and implementation of sustainable procurement strategy thereby leading to operational excellence and project innovation and leadership. Gilbert (2011) noted that sustainable procurement requires commitment at all societal levels including the sustainable procurement of public construction project.

In Nigeria, some of the drivers of sustainable construction procurement practice were embedded in its policy tagged Nigeria's pathway to sustainable development through green economy. In this context, the country will continue to pursue policies and measures to promote a more environmentally sound economy in the context of sustainable development. According to country report to the Rio + 20 Summit (2012) such policies and measures will be based on the following key principles and approaches:

- Recognizing the economic and social values of environmental resources;
- Conserving resources and restoring damaged environments and eco-systems;
- Setting up targets and standards to control environmental degradation;
- Enabling prices to better reflect their environmental value, while ensuring access to basic goods and services;
- Improving the critical regulatory and strategic policymaking roles of the public sector to re-orient various economic and social sectors towards a sustainable development pathway;
- Enhancing the role of the private sector to take a sustainable development pathway, while at the same time being able to operate in an intensely competitive environment;
- Addressing the link between livelihoods and living conditions of rural communities and

the environment. Government will ensure that the pursuit of sustainable development and green economy incorporates the right of rural communities to a clean environment that enables them to have a sound basis for their livelihoods and their living conditions in accordance with global practices.

- Addressing unsustainable consumption patterns and the link to environment, poverty and equity.
- Promoting food security, sustainable agriculture and rural livelihoods resilience to reduce national vulnerability to climate change.
- Strengthening national institutional and legal mechanisms to support policies and efforts towards sustainable development.

Nigeria, as a member of the United Nations (UN), is actively involved in the processes leading to the United Nations conference on sustainable development (country report to the Rio + 20 Summit, 2012). Green economy in the context of sustainable development is timely and an impetus for the country to strengthen activities that will reverse environmental degradation and sustain the environment.

Kano state has recently introduced the use of due process procurement framework to execute capital projects capable of supporting environmental objective in terms of achieving value for money projects. The state was characterized by rapid urbanization and industrial activities: these increasingly impact on the environment but there are many issues related to business strategy and environmental issues that are relatively unknown and/or understudied. Green environment procurement policy does exist in Kano but little is known about the integration of this policy and the extent to which environmental considerations are embedded where the construction procurement administrators embrace them. The government procurement preference program favours domestic providers. The adoption and implementation of sustainable procurement policies by the state government in the due process procurement practice should offer substantial opportunities to reduce the adverse environmental and social impact of business operations in the state.

Research Methods

The target population for this study was the procurement administrators working in ministries and agencies in Kano state. The rationale for selecting them was to achieve the research question of 'how they view and use sustainable procurement practice in construction project contract. The data used in this study are in two parts – responses from a questionnaire and interview series. Whereas the questionnaire aimed at achieving an overall picture of the application of environmental preferences in the procurement of construction contracts in Kano state. The interview was targeted to professionals in the built environment (such as architects, quantity surveyors, engineers, and project managers) and the questionnaire was design to seek responses from the procurement administrators. The main purpose of the interviews was to achieve a deeper understanding of the reasons for applying environmental consideration and its application in the procurement processes. Moreover, the structured interview was also used to collect factual information on sustainable procurement as well as opinions of professionals within the built environment. Thus, a review of the literature merged with the interview data generated from the professionals informed the barriers and drivers of sustainable procurement practice. These were used to design a questionnaire to seek respondents' opinion on the factors influencing the adoption of sustainable construction procurement practice in Kano state.

The population sampling of this study was determined based on (Glenn, 1992) formula considering the targeted population is unknown and large.

$n = ((z^2pq)/d^2)$

Where;

n = the desired sample size

z = the ordinate on the normal curve corresponding to αor the standard normal deviate.

For the purpose of this study, a confidence level of 90% was adopted.

Usually a 90% level of confidence has $\alpha = 0.10$ and critical value of $z\alpha/2 = 1.64$.
p = the proportion in the target population estimated to have a particular characteristics (normal between the range of 0.1- 0.5)
q = 1.0 – p
d = degree of accuracy corresponding to the confidence level and Z selected.
The sample size is determined using the following parameters,
z = 1.64, d = 0.1, p = 0.3, q = 0.7
Sample size n = $[(1.64)^2 \times 0.3 \times 0.7] / (0.1)^2 = 56.4$
Thus, this study considered 56 sample size.

Questionnaire design and procedure

A questionnaire was designed and self-administered to 56 procurement administrators at various ministries and agencies involved in the procurements of construction contract in Kano state. Information about the projects was obtained from ministries and agencies responsible for construction projects delivery. The main criteria for selecting the projects were: time for procurement of main construction contract; estimated contract cost; and environmental considerations included in the survey. The questionnaire consisted of seven classification questions as described by Oppenheim (1992) and six other, factual questions focusing on how environmental issues were considered in the procurements. Multiple-choice questions were chosen in order to make the questionnaire easy to answer. The other questions referred to whether or not environmental issues were considered in the procurement, the type of environmental issues applied, whether project-specific environmental issues had been considered, whether environmental evaluation criteria had been applied and the way the environmental requirements were monitored during procurement processes.

Analyses of the questionnaire responses

Out of 56 questionnaires distributed, only 42 (75%) responses were returned and this is adequate for the analysis. Of the remaining 42 responses, 26 of the respondents were involved in building projects, 12 from civil engineering projects and 4 of the respondents answered that the projects were both civil engineering and building projects. These have been included in both categories in the analyses, as well as in the tables in the next section.

Forty two (42) respondents were the procurement administrators involved in both building and civil engineering projects working in the various ministries and agencies as shown in Table 3. Six (6) respondents were from ministry of works, housing & transport, five (5) were from ministry of education, six (6) from ministry for local government, ministry of health (4), ministry of environment (4), ministry of agriculture (4), ministry of land (4), due process bureau (5), and Kano Urban Planning & Development Authority (KNUPDA) (4). Some of the respondents had answered that majority of the contract were design, bid, build contracting system been used and few uses both design and build contracts, i.e. a contract where the contractor is responsible for both the design and the construction, and other contracts had been used in the project. Some contracts were performed by the client organization itself. However, the majority of the projects could be regarded as design bid build contracts.

Table 1: The Questionnaire Responses

Questionnaires	Frequency	Percentage
Returned & Usable	42	75%
Non-Returned	11	19.64%
In-complete	03	5.36%
Total	56	100%

Table 2: Survey of responses on the project types

Project types	Frequency	Percentages
Building projects	26	61.91%
Civil engineering projects	12	28.57%
Building/civil engineering	04	9.52%
Total	42	100%

Table 3: Questionnaire Received from Respondents' Organizations

Respondents' Organizations	Frequency of responses
Ministry of works, Housing & transport	6
Ministry of education	5
Ministry for local government	6
Ministry of Health	4
Ministry of Environment	4
Ministry of Agriculture	4
Ministry of Land	4
Due process Bureau	5
Kano Urban Planning & Development Authority (KNUPDA)	4
Total	42

In the analyses, four main themes in the questionnaire responses were targeted: barriers of sustainable procurement practice; and drivers that promote sustainable procurement practice. When the two parameters were studied, the projects were organized according to their: project type, i.e. building or civil engineering construction project; type of contractual arrangement, i.e. design and build contract or other type. For each of the three categories, differences in the application of project specific preferences and evaluation criteria were analyzed. The four projects that were both building and civil engineering projects were included in both categories.

Data Analyses

Relative Importance Index (RII) was used to calculate the value for each factor (as barrier/or deriver of the adoption and implementation of sustainable procurement practice) in order of importance and RII value is calculated through this formula:

$$\textit{Relative importance index (RII)} = \Sigma w / (A \times N) \text{ - - - }, \ (0 \leq index \leq 1)$$

Where w = weighting given to each factor by the respondents and ranges from 1 to 5 where 1 is not significant and 5 is extremely significant, A = highest weight, and N = total number of respondents.

Table 4: Barriers to sustainable procurement practice

Barriers to Sustainable Procurement	RII	Ranking
Lack of environmental evaluation criteria in tendering process	2.54	1
Negative attitude towards environmental considerations	2.51	2
Lack of environmental plan at the procurement stage	2.49	3
Lack of working environment requirements in tendering process	2.46	4
Lack of top management commitment	2.42	5
Lack of guidance on environmental sustainability	2.40	6
Lack of societal pressure on environmental considerations	2.39	7
In availability of professionals with technical know how	2.37	8
Lack of involvement of end-users to explore their preferences	2.35	9
Lack of provision to monitor environmental criteria	2.33	10
Conflicting Priorities among stakeholders	2.32	11
Lack of in-depth awareness of the sustainability concept	2.30	12
Organizational negative attitude/culture	2.26	13
Lack of long term view on the relevance of the project	2.24	14
Conflicting environmental /social factors	2.22	15
Divergent of interests among stakeholders	2.20	16
Lack of political support	2.18	17
Lack of requirements regarding use of material	2.16	18
Cultural, Economic, Social and Technological barriers	2.13	19
Inadequate information on environmental preferences	2.11	20

Table 4 shows twenty (20) constraint factors as barriers to the application of sustainability concept into the procurement process of public construction projects in Kano state. RII value was used and ranked the factors in order of importance. The top ten (10) constraint factors were assessed and include: lack of environmental evaluation criteria in tendering process (RII of 2.54); negative attitude towards environmental considerations (RII of 2.51); lack of environmental plan at the procurement stage (RII of 2.49); lack of working environment requirements in tendering process (RII of 2.46); lack of top management commitment (RII of 2.42); lack of guidance on environmental sustainability (RII of 2.40); lack of societal pressure on environmental considerations (RII of 2.39); unavailability of professionals with technical knowhow (RII of 2.37); lack of involvement of end-users to explore their preferences (RII of 2.35); and lack of provision to monitor environmental criteria (RII of 2.33). The least ten (10) factors were also computed and include (table 4): conflicting Priorities among stakeholders (RII of 2.32); lack of in-depth awareness of the sustainability concept (2.30); organizational negative attitude/culture (RII of 2.26); lack of long term view on the relevance of the project (RII of 2.24); conflicting environmental /social factors RII of (2.22); divergent of interests among stakeholders (2.20); lack of political support (RII of 2.18); lack of requirements regarding use of material (2.16); cultural, Economic, Social and Technological barriers (RII of 2.13); and inadequate information on environmental preferences (RII of 2.11).

Table 5 shows the identified thirteen (13) motivating factors as drivers that positively influenced the application of sustainable procurement process in construction contract in Kano state. RII value was used and ranked the factors in order of importance. Five (5) top ranked factors in order of importance include: improve maintenance and operating cost savings (RII of 2.16); integration of environmental needs into project needs (RII of 2.14); Improve environmental compliance (RII of 2.13); promote value for money project (RII of 2.11); promote the end-users goals and targets (RII of 2.09). Other drivers in promoting sustainable procurement practice include: improve environmental standard/public image (RII of 2.08); alleviation of environmental problem (RII of 2.05); alleviation of social problem (RII of 2.02); improve working conditions in terms of labour standard, health & safety (RII of 2.01); improve working conditions: improve total quality management (RII of 2.00). Promote the use of local content in building development (RII of 1.97); encourage foreign investment (RII of 1.94); and promotion of employment generation (RII of 1.92) has been the least ranked factors in order of priority.

Table 5: Drivers of sustainable procurement practice

Drivers	RII	Ranking
Improve maintenance and operating cost savings	2.16	1
Integration of environmental needs into project needs	2.14	2
Improve environmental compliance	2.13	3
Promote value for money project	2.11	4
Promote the end-users goals and targets	2.09	5
Improve environmental standard/public image	2.08	6
Alleviation of environmental problem	2.05	7
Alleviation of social problem	2.02	8
Improve working conditions: labour standard, health & safety	2.01	9
Improve Total Quality Management	2.00	10
Promote the use of local content in building development	1.97	11
Encourage foreign investment	1.94	12
Promote employment generation	1.92	13

Discussion

In this study the result of a survey of sustainable procurement practices in Kano state was presented. To reveal constraint factors as barriers to the application of sustainability concept into the procurement process on the one hand and factors as drivers that positively influenced the application of sustainable procurement process in construction contract on other hand. The study discovered that lack of environmental evaluation criteria in tendering process with RII value of 2.54 was determined to be the top ranked factor negatively influencing the adoption and implementation of sustainable procurement practice in public construction project delivery in Kano state. This clearly indicates that the absence of environmental evaluation criteria as a requirement in tendering process formed parts of the constraint to the application of sustainable procurement. From other studies it is known that the existence of environmental evaluation criteria in tendering process is important if a governmental body is to be able to take advantage of providing optimal opportunities for implementing sustainable construction procurement practice (Dania, 2016; Hyacinth *et al.*, 2017; Carter *et al.*, 2008). This is also in line with Johnstone (2003) who found that capabilities which enable public sector to develop a more strategic approach to environmental evaluation criteria in tendering processes are also important for sustainable procurement practice. Negative attitude towards environmental considerations with RII value of 2.51was the second top ranked factor limiting the application of sustainable procurement practice in Kano state. This means that public sectors were not given attention to environmental considerations during the tendering processes as part of the assessment requirement. The finding corroborates with the findings of Gilbert (2011) that cultural attitude such as the mindset and commitment of the government officials has been a constraint factor that negatively influences the practice of sustainable procurement in most of the developing countries. Lack of environmental plan at the procurement stage with RII value of 2.49 is another constraint to the application of sustainable procurement practice. This is clearly indicates that there is no working environmental requirements in tendering process which becomes a problem to the application of sustainable procurement practice as suggested by Wild and Li, (2011).

Improvement in maintenance and operating cost savings with RII value of 2.16 was found to be the most important motivating factor deriving the application of sustainable procurement in construction contract in Kano state. This is in line with the previous findings of Russel (1998) and Johnstone (2003) that improving maintenance and operating cost savings were the key motivating factor responsible in deriving the implementation of sustainable procurement practice in most developed and developing nations. Integration of environmental needs and compliance were also an important motivating factor positively influencing the adoption and implementation of sustainable procurement practice. The finding is in agreement with the previous findings of Dickinson *et al*. (2008) that environmental compliance forms an important motivating factor deriving the application of sustainable procurement and contributes to the modernization and international competitiveness of local construction industry. Promotion of value for money project and the achievement of end-users goals and targets were identified as motivating factors influencing the application of sustainable procurement. Respondents were in agreement on the fact that application of sustainable procurement embedded on the achievement of value for money and end users goals and targets. This is also in line with findings of Varnas *et al.* (2009) who found that adoption and implementation of sustainable procurement embedded on motivating factors geared towards promoting value for money project and achievement of end users goals and targets.

Conclusion

In today's global environment, majority of public organizations across the world seek sustainable outcomes through their procurement process. By incorporating

sustainability principles and practices in the evaluation of tender process, procurement has the potential to improve maintenance and operating cost savings. It also improves environmental compliance that virtually reduces negative outcomes for society, the natural environment and the economy. Furthermore, sustainable procurement practice promotes the integration of the end-users goals and targets into the project needs and thus translate into achieving value for money project. The survey has revealed twenty (20) barriers that negatively influence the application of sustainable procurement practice in Kano state. In an effort to abridge these barriers, thirteen (13) derivers in forms of motivating factors were determined with a view to promote the application of sustainable procurement practice. Though, sustainable procurement requires commitment at all societal levels including professionals within the built environment. Therefore the study shed lights on the barriers and drivers that facilitate the application of sustainable procurement practice for consolidating the knowledge in the state of the art of sustainable procurement practice in Kano State.

Recommendations

The study is exploratory and one of the first in-depth studies on the barriers and drivers of sustainable construction procurement implementation in the Nigerian construction sector. Based on the study outcome, the following were recommended in an effort to promote the adoption and implementation of sustainable procurement practice, government should:

1. provide environmental evaluation criteria in tendering process
2. need to emphasis on environmental consideration as a requirement in tender processing
3. need to incorporate environmental plan into the project plan at the design stage
4. need to sensitize on the importance of environmental sustainability
5. need to put pressure on environmental considerations in tendering processes
6. need to have an active sustainability driver to be injected into the construction sector to ensure the achievement of sustainable development goals on infrastructure development.

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