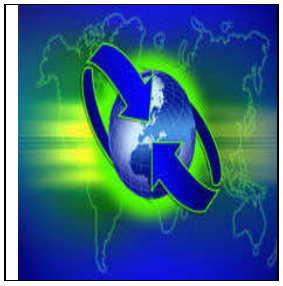
The Environmental Studies Journal: A Multidisciplinary Journal



Awareness and Perception of Sustainability Concept among Infrastructural Development Professionals in FCC Abuja, Nigeria

Surajo Yazid, Marcus Danjuma, Mahmud Abubakar & Abugu, Nkechinyere A.

Geography Department, Faculty of Environmental Sciences, Nasarawa State University, Keffi.

Corresponding Author: Abugu Nkechinyere Anthonia

Email: researcherscreed@gmail.com

Mobile: +2348187930402

Received January, Accepted March, and published March, 2019

Abstract

Rapid urbanization poses several serious challenges for planning infrastructure and a great challenge for urban sustainability. Thus, this study assessed Awareness and Perception of Sustainability Concept among Infrastructural Development Professionals in FCC Abuja. Its objectives were to assess: sustainable construction awareness, source of knowledge and then evaluate the perceptions of construction professional on integration of sustainability in infrastructural development. Data were collected using questionnaire, interview and focus group discussion. Purposive and stratified sampling techniques were used to select professionals from Federal Capital Development Authority (FCDA) and six construction companies in FCC. Data were presented in tables and analysed using descriptive statistics and ANOVA. Results show that majority (86.91%) are aware of the concept of sustainable construction. Though, majority are not ignorant of the concept, their level of knowledge is still at low level, as the level of knowledge as affirmed by respondents are 7.42%, 45.01%, 21.23%, 8.18%, 3.07% for very low, low, moderate, good and very good respectively. The main sources of knowledge is books, as less than a quarter (23.19%) learnt concept of sustainable construction from school, only 15.66% learned communication media, while most people 70.18% have read about it from books. There is a significant variation in respondents' knowledge among the three pillars of sustainability at 95% confidence level. Respondents' knowledge of sustainable construction is mostly on environmental dimension. Respondents had both negative and positive perception of sustainability integration in infrastructure. On the negative sides, only 15.96% perceive integration of sustainability approach as a setback, 72.89% also sees it as ambiguous. It was concluded that majority of infrastructure development professional are not ignorant of sustainable construction, but their level of knowledge and application are still minimal. Sustainable construction is perceived positively and even negatively among professionals. Public enlightenment and commitment by stakeholders was recommended.

Keywords: Sustainable infrastructural development, Awareness and Perception, environmental impact assessment and sources of knowledge and awareness.

Introduction

The term sustainability came to global prominence in 1987 when the United Nations World Commission on Environment and Development (Brundtland commission) published its report ‘’Our Common Future’’ and advanced arguments for human development that is sustainable (Spence & Mulligan, 2015). Sustainability integration approach has emerged as a guiding paradigm to create a new kind of built environment. Since the 1990s, activist/environmentalist approach to planning has grown into the Smart Growth movement, characterized by the focus on more sustainable and less environmentally damaging forms of development (Walters, *et al*., 2007).

The concept of sustainable development has in the past most often been broken out into three constituents’ parts (environmental, social and economic). Environmental sustainability involves making decisions and taking action that are in the interests of protecting the natural environment. Social sustainability is the ability of a social system to function at a defined level of social wellbeing indefinitely. “Economic sustainability "concerns the specification of a set of actions to be taken by present persons that will not diminish the prospects of future persons to enjoy levels of consumption, wealth, utility, or welfare comparable to those enjoyed by present persons"(Bromley, 2008).

The rapidly increasing world population estimated about seven billion people (Blizzard, 2011) has led to great complexities in every aspect of human activities; thus, the United Nations has acknowledged that advancing sustainability knowledge and actions is the only solution. Whereas this knowledge declaration became necessary; this is because people in most part of the developing countries, particularly Nigeria, suffer inferior life because of poverty, inadequate and unsustainable infrastructure development including roads, airports, railways, water supplies, bridges, sewage and poor information systems (Zavrl and Zeren, 2010). The provision of infrastructure projects to meet the growing population in different cities across the world; the built environment and construction activities are increasingly causing environmental degradation and depletion of the natural resource (Daramola and Eziyi, 2010).

Thus, several recent researches on infrastructure development have focused on sustainability of infrastructure (Alabi, 2012; Baron and Donath, 2016; Abolore, 2018. Alabi (2012) attributed the low level of sustainability of construction projects delivered within the Nigeria Construction Industries, to the low level of awareness of the concept of sustainability among construction participants. Alsanad *et al.,* (2011) also made a similar discovery when assessing the awareness, drivers, actions and barriers of Sustainable Construction (SC) in Kuwait. It was observed that the SC implementation is low, this can be as a result of lack of awareness of the concept within the country. However, Baron and Donath (2016) observed that the major challenge of sustainability implementation in Ethiopia is not that of awareness but appropriateness. It was observed that, while there is awareness about the concept of sustainability, it is not implemented correctly. These studies therefore show that the understanding of the concept of SC in its holistic form can be a major challenge towards achieving SC.

There is considerable research in the area of sustainability and according to Beheiry (2006), greater focus is generally placed on the environmental pillar. While this might have a positive effect on the environment, considering the social and economic dimensions of sustainability is equally important. A similar observation was made by Alabi (2012) who submitted that the issue of sustainability in Nigeria and Malaysia is mostly viewed from the environmental dimension.

One of the major hindrances to the development and implementation of sustainability strategies in the construction sector is poor awareness level. Williams and Dair (2007 noted that many stakeholders in the construction industry do not have sufficient information on sustainability. Elmualim *et al*., (2012) also asserted that managers who are responsible for charting the sustainability cause have little or no information about sustainability. In Nigeria, the knowledge of sustainable construction is below average and the construction sector still oblivious of sustainable construction (Abolore, 2018). It is difficult to develop and implement a concept that is not well understood.

Alabi (2012) opined that in a developing country like Nigeria, there is a low level of awareness in the aspect of sustainability. This situation is rather moderate in Malaysia and Turkey as observed by Abidin (2010) and Akbiyikli *et al*., (2009). This low awareness level in Nigeria can lead to poor performance of building projects in terms of sustainability if not properly checked. Alabi (2012) also discovers that building professionals define sustainability more in terms of effective protection of the environment rather than inclusion of both economic and social features. This was a further confirmation of Beheiry (2006) observation that although considerable research has been and still being carried out in the area of sustainability, greater focus is generally placed on the environmental pillar. Ekung, *et al.,* (2016) however discovered that in terms of project management activities, most construction stakeholders in Nigeria perceived the social dimension of sustainability as the most important sustainability objective in the delivery of sustainable construction. This disparity in both researches further affirms Akbiyikli *et al*., (2009) assertion that the level of sustainability understanding among participants and its implementation in the construction industry is piecemeal and unstructured.

While the federal government in Nigeria is determined to provide infrastructures, the provision of road networks, bridges, water supplies amongst various other infrastructure systems should meet the needs of both the present and future generations. Infrastructures should be developed in a sustainable manner of social, economic and environmental friendliness. Engineering infrastructures has been provided in the districts of Central Area, Maitama, Wuse, Garki, Asokoro, Guzape, Maitama Extension, Apo, Katampe extension, Jabi and Utako while ongoing in the districts of Wuye, Jahi, Kagini, Katampe and Mbora in the Federal Capital City Abuja. To date, this is further reiterated by the commitment of the Federal Executive Council (FEC) by the approval of billions for the provision of engineering infrastructure projects to various districts in the Federal Capital Territory (FCT). According to Mohammed Bello, the FCT Minister, the sum approved in 2017 includes N159 million for the finishing of the engineering design of a sewage line to capture Katampe, Gwarimpa, Kado, and other districts of the FCT, and N2.5 billion for the completion of Kabusa road project that is expected to be completed in one year (Ehikioya, 2017).

Although the infrastructure scheme is expected to be extended to other cities across the country in the future; however, the society and project stakeholders demand that environmental sustainability should be integrated in infrastructure projects to preserve the natural resources and the environment, reduce carbon dioxides emissions and pollution while promoting the efficient and effective use of financial resources to guarantee quality life for the people. Whereas stakeholders in the built environment demand for the construction of sustainable projects due to their increasing benefits and relevance (Zainul, 2009; Robichaud and Anantatmula, 2011); it improves the performance of the projects (Zainul and Pasquire, 2007; Zainul, 2010).

Though, research abound on the awareness of sustainability in infrastructure development, non was done among infrastructure professionals in FCC Abuja and existing research were purely qualitative in approach and thus lack statistical prove. In bit to bridge this gap this study aimed to assess the awareness and perception of sustainability concept among infrastructural development professionals in FCC Abuja was carried out in order to statistically ascertain sustainability knowledge among infrastructure construction professionals and evaluate their perception of the concept in infrastructural development in the Federal Capital City Abuja, Nigeria. The study objectives were to assess: extent of sustainable construction awareness, source of sustainability construction knowledge and then evaluate the perceptions of construction professional on the integration of sustainability in infrastructural development in FCC Abuja.

Material and Methods

Data for this study were obtained through structured questionnaire, interview, focus group discussion and observation. The questionnaires were structured to contain both the close and open-ended questions to appeal to the perceptions of respondents. Purposive and stratified sampling techniques were used to select sample. Firstly, FCDA Engineering Services department and six construction companies (Julius Berger Nigeria PLC, Gilmo Nigeria LTD, Dantata *and* Sawoe Construction Company (Nigeria) Ltd, Ceezali Nigeria Limited, Arab Contractors and Kaakata

Nigeria Limited) in FCT were purposely selected for sampling based on their outstanding and numerous contracts in infrastructure project in FCC. Then, 382 respondents were sampled from these firms for questionnaire administration. Samples were stratified into seven based on number of firms to allow equal representations and reduce bias.

Moreover, an unstructured interview through telephone and face-to-face with experts working in the construction companies and handling the construction of infrastructure projects within FCC were conducted. The interviews were recorded using the voice recorder with the permission of the interviewees; also, notes were taken using pen and paper. The purpose of recording voice is to enable the research to recall any response that was not written down during the interview and then transcript such response(s) to paper. Focus group discussion was also conducted with thirty (30) stakeholders that were selected from among the Managing Directors (MDs) and other Chief Executive Officers (CEOs) of the six construction companies. This caliber of people were chosen as participants because of the belief that they know more about the industry and its operations than any other category of workers, so they are in the best position to provide the details and insight this research requires. Data were analysed using descriptive statistics (mean, percentage pie and bar charts) and presented in tables.

Results and Discussion

Sustainable Construction Awareness among Infrastructure Construction Professionals in FCC Abuja

Table1 present the sustainable construction awareness among infrastructure construction professionals in FCC Abuja.

Table1 shows that out of three hundred and eighty-two samples, three hundred and sixty-seven Responses from 367 respondents, representing 94.07% were valid. Three hundred and thirty-two (332) respondents 84.91% were aware; while thirty five (35) respondents (9.16%) were not aware of the concept of sustainable construction.

Table 1: Awareness of Sustainable Construction among Infrastructure Construction Professionals in FCC Abuja

Firm	Sample Size	Valid	Aware	Not Aware
FCDA	186	182	159	23
Julius Berger	45	35	30	5
Gilmo Nigeria LTD	30	30	28	2
Dantata & Sawoe	30	30	28	2
Ceezali Nigeria Limited	30	30	30	0
Arab Contractors	31	30	29	1
Kaakata Nigeria Limited	30	30	28	2
Total	**382**	**367**	**332**	**35**
Percent	**100**	**94.07**	**84.91**	**9.16**

This suggests high awareness of the concept of sustainable construction among infrastructural development professionals/experts. This contradicts Alabi (2012) which opined "that in a developing country like Nigeria, there is a low level of awareness in the aspect of sustainability" Though, majority are not ignorant of the concept their level of knowledge is still at low level (Table 2).

Table 2: Level of knowledge of Sustainable Construction among Infrastructure Construction Professionals in FCC Abuja

Firm	Respondents	V.low (1)	Low (2)	Moderate (3)	Good (4)	V. Good (5)
FCDA	159	10	95	34	15	5
Julius Berger	30	2	15	10	2	1
Gilmo Nigeria LTD	28	3	16	7	2	0
Dantata & Sawoe	28	4	15	6	2	1
Ceezali	30	3	17	8	2	0
Arab Contractors	29	2	9	10	5	3
Kaakata	28	5	9	8	4	2
Total	**332**	**29**	**176**	**83**	**32**	**12**
Percent	**100**	**8.73**	**53.01**	**25**	**9.64**	**3.61**

Table 2 shows that twenty-nine (29) respondents, representing 8.73% ticked for very low, they have very low knowledge of sustainable construction; one hundred and seventy-six (176) respondents (53%) agreed that they have low knowledge of sustainable construction; eighty-three

(83) respondents (25%) have moderate knowledge, thirty-two(32) respondents (9.64%) have good knowledge and only twelve respondents (3.61%) have very good knowledge of sustainability in infrastructural development.

It was noted that majority of the few that affirmed good and very good knowledge of the concept are relatively junior staff that have little or no room for decision making in the department. This might not to be unconnected to the fact that two decades ago, environmental issues were not pertinent and sustainability was not issue before the Brundland Commision in 1987. The term Sustainability came to global prominence in 1987 when the United Nations World Commission on Environment and Development (Brundtland commission) published its report Our Common Future and advanced arguments for human development that is sustainable. Consequently, most of the senior staff were not thought issues of sustainability in school, however, some of them have been privileged to attend training and workshops on the concept of sustainable construction while many have only read about sustainable construction in a book (Table 3).

Table 3 present the source of knowledge of sustainable construction among respondents Table 3 shows that seventy-seven (77) respondents (15.65%) know about sustainable construction from school, one hundred and thirty (130) respondents (26.42%) learnt concept of sustainable construction from workshops/training, fifty-two (52) respondents (10.57%) learnt concept of sustainable construction from communication media and two hundred and thirty-three respondents (47.36)% have read about sustainable construction in a book (Figure1).

Figure 1 shows that majority learnt the concept of sustainable construction from book (47.36%), followed by training/workshop (26.42%), school (15.65%) and communication media (10.57%) is the least source of knowledge for sustainable construction. This suggests poor public enlightenment of the concept of sustainable construction.

Table 3: Source of Knowledge of Sustainable Construction among Respondents

Stakeholders	Respondents	From School	Training/ Workshop	Communication Media	Book
FCDA	159	29	75	23	104
Julius Berger Nigeria PLC	30	8	13	11	25
Gilmo Nig. LTD	28	9	9	6	21
Dantata and Sawoe	28	**7**	8	4	20
Ceezali Nig.LTD	30	**7**	9	3	20
Arab Contractors	29	10	7	3	25
Kaakata	28	7	9	2	18
Total	**332**	**77**	**130**	**52**	**233**
Percent	**100**	15.65	26.42	10.57	47.36

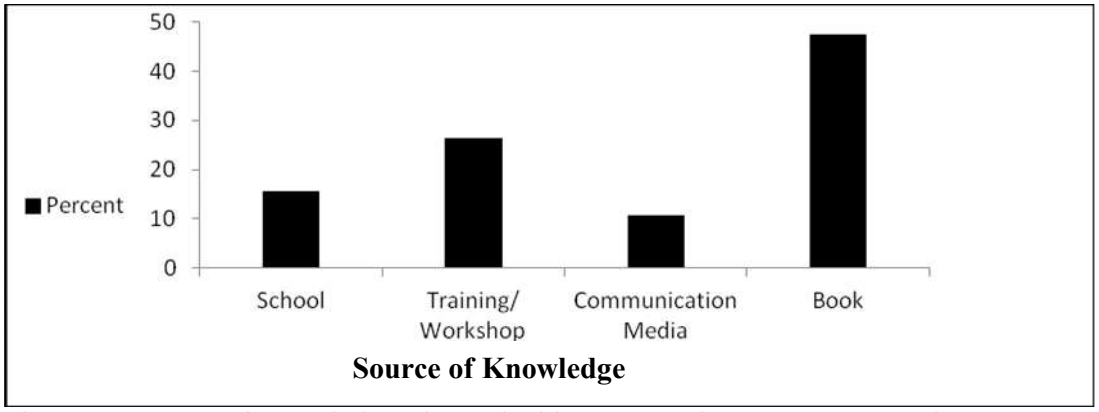


Figure 1: Sources of Knowledge of Sustainable Construction among Respondents
Source: Field Work, 2018

Perceptions of Construction Professional on Integration of Sustainability in Infrastructure Development in FCC Abuja

The integration of sustainability in infrastructure development was viewed in both positive and negative perspectives (Table 4). Table 4 present the perceptions of construction professional on integration of sustainability in infrastructure development in FCC Abuja.

Table 4 presents the perception of respondents on integration of sustainability in infrastructural development. It shows both negative and positive perception of sustainability

integration of infrastructure. On the negative sides, it shows that fifty-three respondents representing only 15.96% perceive integration of sustainability approach as a setback in infrastructural development, 72.89% also sees integration of sustainability as ambiguous approach to infrastructure development. Ambiguity has been a major criticism of sustainable development, for examples, Doughty and Hammond (2004), noted that there is no properly identifiable endgame where development can be definitively said to be sustainable, similarly, Pearce, (2005) has it that sustainability suffer problems of boundary and definition. Many see sustainability as an unachievable concepts as a good number of respondents (one hundred and two) representing 30.75% perceived it as unachievable.

Contrary to the view and opinions of those that perceived sustainability negatively, two hundred and seventy-nine (279) respondents (84.04%) sees it as a way-forward, two hundred and thirty(230) respondents (69.28%) opined that sustainable construction is achievable. However, forty-eight (48) respondents which is only 14.46%) respondents perceived it as a simple and easy approach (Figure 2). Figure 2 presents respondents' perception on integration of sustainability in infrastructure development in FCC Abuja.

Figure 2 shows that majority perceive integration of sustainability in infrastructure as the way- forward. Among those that were optimistic that sustainable construction is the way-forward, noting that it will bring about cost savings in the long run. Many disagreed that it is 'easy and simple'. In the words of Afolabi (2016) "adopting new ways of doing things requires implementing new processes, investments in acquiring new skills and oftentimes adopting new techniques and technologies". Conscious action is required to address the parallel concerns of improving the quality of life through buildings and infrastructure on the one hand and mitigating potential negative impacts emanating throughout the construction lifecycle. Technologies, legislation, incentives and assessment methods are required to drive sustainability in construction.

At course of focus group discussion, participants were asked their perception on the integration of sustainability in infrastructure development. A lot of them were very positive on

sustainability integration into infrastructure as majority emphasized the need for climate resilience infrastructure. Participants were also concern on people oriented development.

Table 4: Respondents' Perception on Integration of Sustainability in Infrastructure Development in FCC Abuja

How do you perceive integration of sustainability in infrastructural development?

Firm	Respondents	Negative			Positive		
		Setback	Unachievable	Ambiguous	Way-forward	Achiev-Able	Simple and Easy
FCDA	159	14	30	98	145	129	14
Julius Berger	30	5	12	25	25	18	6
Gilmo Nigeria LTD	28	4	13	23	24	15	8
Dantata *and* Sawoe Ltd	28	6	10	21	22	18	6
Ceezali Nigeria Limited	30	12	12	27	18	18	5
Arab Contractors	29	4	10	28	25	19	4
Kaakata Nigeria Limited	28	8	15	20	20	13	5
Total	**332**	**53**	**102**	**242**	**279**	**230**	**48**
Percent	**100**	**15.96**	**30.72**	**72.89**	**84.04**	**69.28**	**14.46**

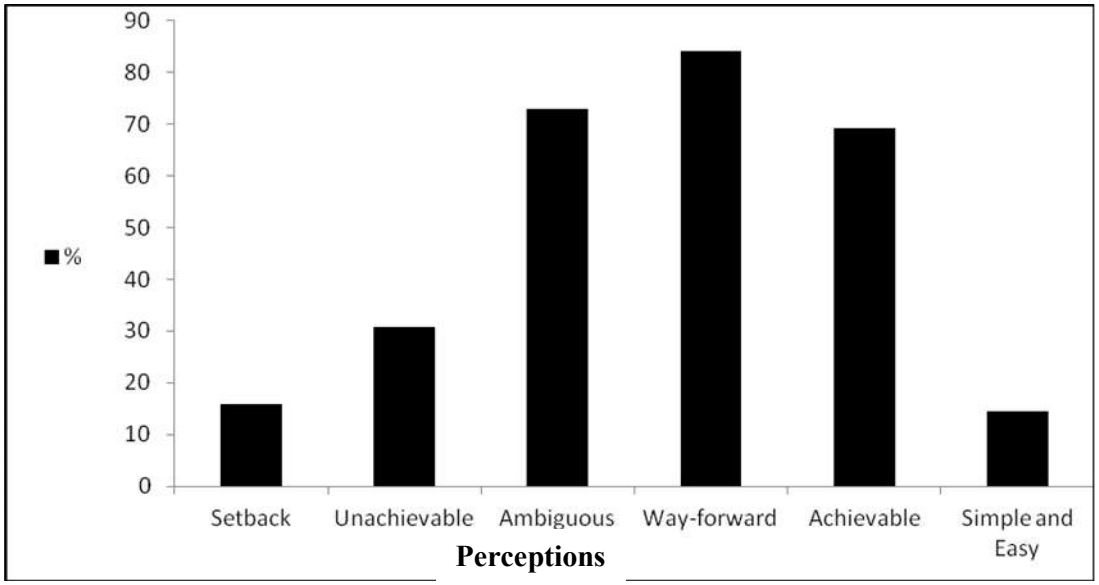


Figure 2: Respondents' Perception on Integration of Sustainability in Infrastructure Development in FCC Abuja (Source: Field Work, 2018)

Overall interest lies on been environmentally conscious in design, implementation and use of infrastructure. Sustainability was seen as a 'forewarning and proactive approach that curtail damages in midst of development'. According to a participant Engineer Nickolas Eke, "man must use resources to satisfy his need but sustainability encourages balance in resource use". Though, majority expressed interest in sustainable integration of infrastructure, some were naïve and see neither reason nor need for the concept of sustainability. Some in this category explained that without been told that common sense will take care of the all the aspects of sustainability where possible.

Conclusion

With growing demand of infrastructure due to population growth and urbanization, coupled with consequences of climate change such as flooding, erosion and wind storm integration of sustainability should be the way forward to overcome short supply of infrastructure now and in the future. Data from the survey shows that majority of infrastructure development professional are not ignorant of sustainable construction, but the level of knowledge and application are still minimal. Sustainable construction is perceived positively and even negatively among professionals. It is perceived as ambiguous and unachievable by some respondents while others see it as not only achievable but as the way-forward. Therefore, to achieve sustainability in infrastructural development, there is need for more public enlightenment and commitment by stakeholders.

References

Abidin, N. Z. (2010). Sustainable Construction Practices in Malaysia. 385-398.

Abolore, A.A.(2018) Comparative study of environmental sustainability in building construction in Nigeria and Malaysia. *Journal of Emerging Trends in Economics and Management Science (JETEMS). 3*(6), 951-961.

Akbiyikli, R.; Dikmen S. Uand Eaton D. (2009). Sustainability and the Turkish construction

cluster: A general overview: *Proceedings of the Construction and Building Research Conference of the Royal Institution of Chartered Surveyors*, University of Cape Town, 10-11 September .

Alabi, A. A. (2012). Comparative Study of Environmental Sustainability in Building Construction in Nigeria and Malaysia. *Journal of Emerging Trends in Economics and Management Sciences,* Vol. 3 No. 6 pp. 951961.

Alsand, S., Gale, A and Edwards, R. (2011). Challenges of sustainable construction in Kuwait: Investigating level of awareness of Kuwait Stakeholders. *World Academy of Science, Engineering and Technology* , 59, 2197-2204.

Baron, N and Donath, D. (2016). Learning from Ethiopia – A discussion on sustainable building. In Proc. *of SBE16 Hamburg International Conference on Sustainable Built Environment Strategies – Stakeholders – Success factors*, Held from 7th to 11th March in Hamburg, Germany.

Beheiry, S. (2006). *Measuring Sustainability*. The American University of Sharjah, Sharjah, UAE. Available on: www.scheller.gatech.edu/centers .

Blizzard, J. (2011). A Design framework for Sustainable Infrastructure. All Theses. Paper 1181. Masters Thesis: Clemson University. Retrieved from http://tigerprints. clemson.Edu/thesis

Ehikioya, A. (2017). FEC approves N2.65bn for FCT road, sewage projects. Retrieved from http://thenationonlineng.net/fec-approves-n2-65bn-fct-road-sewage-projects.

Ekung, S., Oaikhena, E. and Ejekwu, T. (2016). Validated Indicators of Sustainability in Construction Project Management Activities -Stakeholders' Perception, *In Ebohon, O. J., Ayeni, D. A, Egbu, C. O, and Omole, F. K. Procs. of the Joint International Conference (JIC) on 21st Century Human Habitat: Issues, Sustainability and Development*, 21-24 March, Akure, Nigeria, 765-774.

Elmualim, A., Valle, R and Kwawu, W. (2012). Discerning policy and drivers for

sustainable. facilities management practice *International Journal of Sustainable Built Environment* 16–25.

Robichaud, L. B., and Anantatmula, V. S. (2011). Greening Project Management Practices for Sustainable Construction. *Journal of Management in Engineering*. *27*(1), 48-61

Williams, K. and Dair, C. (2007). What is stopping sustainable building in England? Barriers experienced by stakeholders in delivering sustainable developments. *Sustainable Development, 15:* 135-147.

Zainul A. N., and Pasquire, C. L. (2007). Revolutionize Value Management: A Mode Towards Sustainability. *International Journal of Project Management*. 25:275-282.

Zainul A. N. (2009). Sustainable Construction in Malaysia–Developers' Awareness. *Journal of Construction Engineering, Technology and Management,* 6 (2):130-140.

Zainul A. N. (2010). Investigating the awareness and application of sustainable construction concept by Malaysian developers. *Habitat International,* 34: 421-426.