

Accelerating Sustainable Construction in Nigeria: The Professionals' Perspective

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Abstract

The current effort to bridge the housing and infrastructure gaps in developing countries calls for large scale construction activities. However, the rising global campaign for sustainable construction demands that the challenges be addressed in such a way that is environmentally friendly, socially responsible and economically supportive. The poor attention being paid to sustainable development agenda in the construction processes within the developing countries poses great danger to the future generations. Construction professionals play essential roles in the design and execution of construction projects. Therefore, this paper reviews the implementation of sustainable construction in the developing countries; it explores current thinking and best practices in sustainable construction; and proposes a framework for enabling collaborative training and integrated practice among the professionals towards the implementation of sustainable construction in the developing countries.

Keywords: Sustainable Construction, Professionals, Accelerating, Nigeria, Implementation,

1.0 Introduction

The construction sector is responsible for a large proportion of energy and material consumption, biodiversity loss, waste generation and pollution (CIOB, 2004). Given the peculiar challenges of the developing countries which include enormous housing and infrastructure deficit, rapid urbanisation, ineffective institutions, poor governance, fast growing population and skills shortages among others; therefore, building and infrastructure delivery remain the major pursuit in these countries (Du Plessis, 2007). Against this backdrop, there is a major concern from sustainability perspective on the way these huge construction activities are being carried out. The extant literature reveals that sustainable construction forms a source of competitive advantage and outlines a number of ways and plan of actions mapped out in the pursuit of sustainable development globally. The construction industry is at the very centre of the global challenge in the transition from the traditional way of development to a sustainable economy development agenda. The implications of this are that more commitment is required from the industry stakeholders, such as the professionals to adjust their businesses and practices to capture sustainable construction principles.

However, it remains yet uncharted the plan of actions or the current direction of the professionals in the construction industries of developing countries regarding sustainable construction. In the same vein, there is still a dearth of literature on this important subject of sustainable construction in developing countries. Therefore, this paper focuses on construction professionals' engagement with the sustainable construction, with a view to establishing how the professionals make sense of the sustainable development agenda. It reviews their current practices and challenges; and also proposes a framework for enabling collaborative training and integrated practice towards the realisation of sustainable construction in the developing countries.

2.0 Sustainable Construction

The concept of sustainable construction (a subset of sustainable development) concerns the responsibility of the construction sector of creating the built environment in a sustainable manner (Pearce et al, 2012). That is, in a way that is environmentally friendly, socially responsible and economically supportive. Sustainable construction is centred on the economic, social, and environmental impact of creating a usable structure. In other words, it requires all stakeholders (designers, professionals, contractors and the clients) to imbibe construction practices that will minimise the damages done to the environment. Constructing sustainable buildings reduces the use of raw materials and land, minimises the consumption of energy and water. It also reduces emissions, waste and pollution in the environment (McMahon *et al.*, 2015).

Du plessis (2002) describes sustainable construction as "a holistic process aiming to restore and maintain harmony between the natural and the built environment, and create settlements that affirm human dignity and encourages economic equity" From the foregoing definitions and noting the basic definition of sustainability which According to Brundtland Commission (1999) is "meeting the needs of the present without compromising the ability of future generations to meet their own needs". It therefore follows that human, natural and economic systems are interconnected and that the present generations are indebted to the future generations in terms of earth's resources (Kibert, 2005).

2.1. Principles of Sustainable Construction

Kibert (2007) submits that the tenets of sustainable construction are hinged on seven essential principles as postulated by CIB 1994 which include:

- Reduce resource consumption (Reduce);
- Reuse resources (Reuse);
- Use recyclable resources (Recycle);
- Protect nature (Protect);
- Eliminate toxic (Toxic);
- Apply life-cycle costing (Economics);
- Focus on quality (Quality).

The principles of sustainable construction apply throughout the entire life cycle of the construction from planning to deconstruction. The principles also apply to the resources (land, materials, water, energy and ecosystem) required for creating and operating the structure during its entire life cycle. The consideration of the various aspects of sustainability namely, environmental, social, economic, technical and political; also the dynamics and synergies between them are essential in order to maximise the solutions to complex building and infrastructure challenges (Kibert, 2007). The construction industry is at the very centre of the global challenge in transiting from the traditional way of development to a sustainable economy. This therefore demands more dedication from stakeholders in developing businesses and practices with sustainable products and services.

2.2. Sustainable Construction in Developing Countries

Du Plessis (2007) posits that most developing countries are faced with the serious developmental challenges such as housing and infrastructure shortages, poor governance, high level poverty, ineffective institutions, high rate of urbanisation, weak economy and low human development index. The Construction activities in these developing nations of the world are somewhat paradoxical. On one hand, they attempt to plug the gaps in housing and infrastructure needed for social-economic growth; on the other hand these activities are plundering the environment, socially harmful and economically destructive. With sustainability becoming a serious global issue, it is essential that the developing countries give the much needed attention to it, given the negative implications its neglect poses. However, Thorpe and Ryan, (2007) contend that it is worrisome to note that there is little or no evidence in extant literature on the advancement made in sustainable construction by the developing countries of the world. In order to implement sustainable construction, a responsive, efficient and viable construction sector is essential to drive the implementation process. The stakeholders in the construction industry also have vital roles to play in the actualisation of sustainable construction.

2.3. Implementing sustainable Construction

The construction industry is client driven, and as such the level of awareness and adoption of sustainable construction by clients play a significant role in the implementation. Construction professionals form a group of key stakeholders in achieving sustainable construction (Hakkinen and Belloni, 2011). The implementation process of sustainable construction has been slowed down given the fact that most construction firms saddled with the task are of the opinion that, it will result in increased risks, they are ignorant about the market value of such higher initial cost, they face difficulties in securing financial assistance from funding institutions and there is lack of clients' awareness of sustainable construction (Zhou and Lowe, 2003).

2.4. Challenges of Sustainable Construction

Barriers to sustainable construction practices were identified by Williams and Dair (2007) to include perceived cost implications, stakeholders' lack of consideration of sustainability, inadequate expertise in sustainable designs, clients' reluctance, a lack of the right information, non availability of sustainable construction materials, and inadequate capacity for execution of sustainable construction projects. Zhou and Lowe (2003) assert that, sustainable construction is faced with other barriers such as the ignorance of its economic benefits, absence of appropriate building regulations and planning policies that enforce sustainable construction. Perceived higher cost of sustainable construction compared with traditional approach in terms of capital has been further argued as one of the major barriers to the implementation of sustainable construction (Sodagar and Fieldson, 2008; Hakkinen and Belloni, 2011). The wrong perception that sustainable construction will cost more reduces investors and construction organisations' interest (Zhou and Lowe, 2003). However, the perception that sustainable buildings cost more is actually not true. The issue of higher cost involvement in sustainable construction is addressed with the adoption of whole life cycle costing technique which emphasises long term

perspective of cost rather than short; and prioritises value over cost (Al-Yami, and Price, 2006). On the long run, the whole life cost of such building is cheaper.

3.0. The Proposed Framework for Fast Tracking Sustainable Construction

Global evidence indicates that improvement is actualised and sustained through integrated approach by combining specific measures and processes. The essence of this research is to develop approaches that would incorporate best practices for improving the interpersonal relationship between construction professionals to fast track the implementation of sustainable construction in developing countries. Against this backdrop is a framework proposed. The proposed framework is labelled Professionals Integrating Sustainable Construction, PISC Framework. The framework identifies critical aspects of professional training and practices and develops measures for improving them in order to achieve the desired integration and implementation of sustainable construction.

3.1. Professionals Integrating Sustainable Construction (PISC Framework)

Professional bodies are made up of groups of people whose thinking and values towards sustainable development are essentially informed by their education and training, and also by their professional practice and networking with colleagues. Arguably, if there should be any strategy for integrating sustainability thinking into these groups of people, certainly it should start from the perspective of their initial training and moulding and then, through the continuous professional development managed by their professional bodies. The framework is therefore developed to capture sustainable construction principles and infuse them into the following areas: Initial professional development; continuous professional development; certification in sustainable construction and professional practice.

The PISC framework is to serve as an enabler of the integration of sustainable construction principles into the training and practices of construction professionals. Thus, it serves as a rallying point for reshaping the thinking and philosophy of operations of the various professionals involved in building and infrastructure delivery towards sustainable development. The overall goal of the framework is to build a sustainable society by facilitating the transition from the current traditional construction to sustainable construction practices among professionals in the built environment disciplines. It also seeks to make sustainable construction attractive and acceptable to the professionals through a concerted effort geared towards a paradigm shift and passionate commitment to sustainable construction initiatives. The framework is hinged on global best practices in sustainable construction and project team integration. It also took clues from Agenda 21- the United Nations guidelines for sustainable construction in developing countries. A best practice is a technique or approach that has consistently shown successful results. It could also mean a strategy or technique that has shown through experience to deliver desired results (Measham et al., 2007). Global best practice suggests that a sustainable society is a place where:

- Any materials extracted from the earth should not go beyond the level the environment can absorb, diffuse or reprocess; or otherwise neutralise their dangerous impacts on the environment and human beings.
- The production and use of artificial substances should not go beyond the ability of the environment to absorb, diffuse or recycle; or else neutralise their dangerous impacts on the environment and human beings.
- The natural diversity and productivity of ecosystems should not be endangered.
- A healthy economy is maintained, which accurately represents the value of natural, human, social and manufactured capital.
- Effort is directed towards development and deployment of human knowledge, skills and health to the optimal level.
- The needs of every human is recognised and respected in the course of social progress and justice.
- Future generations is given due consideration.
- Institutions and bodies encourage stewardship of natural resources and human development.

4.0. Implementation of the Framework

The framework is proposed to be implemented in six (6) levels of integration as discussed below:

- Initial Professional Development (IPD)
- Professional Qualifying Examinations (PQE)
- Continuous Professional Development (CPD)
- Inter Professional Conferences (IPC)
- Certification in Sustainable Construction (CSC)

- Professional Integrated Practice (PIP)

Initial Professional Development (IDP) is the first level of implementation, where sustainable development principles are integrated into the training curriculum of construction professionals in the higher institutions of learning, that is, the universities and polytechnics. This would afford the undergraduates to appreciate and imbibe sustainable construction principles from the foundational training received in their respective professions. The second level is at the Professional Qualifying Examinations (PQE). The syllabi of the professional examinations conducted for the graduates of various construction related disciplines before they could attain professional status should be reviewed to capture sustainable construction principles. So that the process of studying for and writing the professional examinations would have further built into the young practitioners the tenets and philosophies of sustainable construction. Definitely, this would impact their post qualification practices positively. Continuous Professional Development (CPD) is the third level of implementation and integration. This comes in form of workshops, seminars, short trainings and conferences where emerging issues in the profession are discussed. It affords participants to learn new developments, refresh themselves and also serve as a forum for professional networking. Sustainable construction should be included in such programmes in order to continually entrench the sustainability mindset into the practice of the various professions. There is the need for professional bodies within the construction industry to develop strong synergy between themselves in order to advance the course of sustainable construction. This informs the fourth level of implementation of the PISC Framework, which is the Inter Professional Conferences (IPC). The fifth level of the implementation strategies concerns the development of a specialised Certification programme in Sustainable Construction (CSC) for any willing practitioner within construction industry. This would be jointly developed and managed by all the professional institutions; and holders of the certificate would be accorded high regard in the field of sustainable construction. They would form the group of front liners, leaders of thoughts and advisers on policy issues in sustainable construction. The sixth and the last level of implementation is the Professional Integrated Practice (PIP). This captures the strategic approaches for enhancing professional team interpersonal relationship in practice. There are five of such strategic approaches. They include seamless philosophy of operation; effective communication system; adoption of no blame culture; development of trust between team members, and team flexibility and responsiveness to change. These are discussed in following sections.

4.1 Professional Integrated Practice (PIP) for Sustainable Construction

Hakkinen and Belloni (2011) submit that given the complex and fragmented nature of the construction industry, there is the general inclination to resist change; especially the kind of paradigm shift engendered by sustainable construction. Integration between professional team members in a project is not encouraged by the traditional construction approach. To a large extent, success in construction project delivery is hinged on effective integration of the knowledge and experiences of many people working together as a team. The need to bring together people from different backgrounds and divers skills, knowledge and expertise as a team for project success further reinforces the issue of professional team integration (Moore and Dainty, 1999; Baiden, Price and Dainty, 2006). It has also been argued that professional team integration is an ongoing concern in the construction industry (Cicmil and Marshall, 2005), this is due to cultural differences, lack of trust, and complications connected with the design – construction divide. The process of integration in a team does not happen automatically. The implementation of sustainable construction essentially calls for a close working relationship between project team members from design to execution and completion.

4.1.1 Strategies for Enhancing Professional Team Integration

From the foregoing argument, therefore, in order to advance the course of sustainable construction projects by professional team, and achieve desired success, it is imperative to adopt and encourage strategies that help in improving professional team integrated practice. These are detailed below.

4.1.1.1 Adoption of Seamless Philosophy of Operation

Ibrahim et al. (2011) submit that seamless philosophy of operation with no organisational boundaries is vital to professional team integration. This is a practice that minimises boundaries between individuals and team members working collaboratively towards the realisation of the project goals. Emphasis on professional boundaries in project delivery usually slows down the progress of construction projects. The philosophy of seamless operation informed the Integrated Project Team (IPT) initiative, which is a design to bring diverse group of people together for the purpose of achieving a common goal in project delivery (Moore and Dainty, 2001). Professionals operating with this philosophy easily synergise to share skills, knowledge and expertise towards the implementation of sustainable construction projects.

4.1.1.2 Establishment of Effective Communication System

Effective communication has been identified as an essential means for integrating professional team to achieving overall success of construction projects. Communication barriers between project teams had been found to be contributing to the construction team failure in their duties to implement project design (Cheng et al., 2010; El-Gohary and El-Diraby, 2010). The establishment of effective communication system within a construction professional team is imperative for the actualisation of sustainable construction. The point here is to see that the right information reaches the appropriate team members at the right time. The lack of information or a response from project stakeholders becomes critical for progressing with project decisions. This can be realised by engaging different techniques and tools such as information communication technology (ICT), web based system, project group on social media like Facebook and Whatsapp, and others communication channels that could facilitate easy flow of information and encourage open communication among the project team. The important issue here is to ensure that the essential information is passed across to the right team members at the right time. The lack of information or a response from project stakeholders becomes critical for progressing with project decisions.

4.1.1.3 Development of Trust between Team Members

Potential causes of tensions and problems among project team members are lack of trust and suspicion (Cicmil and Marshall, 2005). If these persist in the course of the project execution, it may seriously affect the project or lead to total project failure (Rahman et al., 2007). One of the most important distinguishing factors in the collaborative approach to construction project delivery is the need to trust other members of the team and believe that they are working towards the achievement of the overall interest and goal of the project. It is vital for construction companies and professionals to develop trust and understanding with their working partners. Developing trust, Dainty et al. (2003) argues may sometimes necessitate some cultural changes or attitudinal shift for members in the team. Therefore, the development of trust between construction professionals for proper integration is highly essential in order to implement sustainable construction in the developing countries like Nigeria.

4.1.1.4 Adoption of No Blame Culture

Adoption of a 'no blame' culture is a key factor of team integrated practice in construction projects delivery. Joint responsibility for success and any setback or mistake that may arise in the course of the project execution is imperative to project team integration and overall success of the project (Baiden et al., 2006). Shifting of blame or finger pointing is destructive to team spirit that is needed for the realisation of project goals. No blame culture, cooperative spirit and promotion of joint resolution of conflicts and problems are highly essential to effective performance of the project team. The working environment should be supportive, cooperative and friendly such that admittance of faults is made easy since everyone in the team believes that no one is above mistake.

4.1.1.5 Team Flexibility and Adaptation to Change

Baiden et al. (2006) asserts that the need to operate a flexible team and the team's readiness to respond to change is very important to the team integration for success in project execution. Flexibility here concerns the degree of responsiveness of the team members to any changes that may arise during the course of the project execution. Sufficient room for flexibility and reasonable level of adaptability is required in the manner the project is managed. Allowance must be given to accommodate new members into the team during the course of the project which may be necessitated by some inevitable factors. This should not be allowed to affect the functionality of the team and the overall success of the project.

4.2 Conclusion

The current implementation state of sustainable construction in Nigeria, a typical example of the developing countries has been critiqued. Arguably, this study is insufficient to fully address the challenges of implementing sustainable construction in the developing countries. The barriers to sustainable construction were analysed and a framework for enabling the integration of professionals towards the implementation of sustainable construction was proposed. There is the need for effective synergy between construction professionals; and there has to be a genuine collaborative training and integrated practice among the professionals to fast track the implementation of sustainable construction in Nigeria.

References

Al-Yami, A. M. and Price, A. D. F. (2006). A framework for implementing sustainable construction in building briefing project. In: Boyd, D. (Ed) *Proceedings of the 22 nd Annual ARCOM Conference*, 4–6 September, 2006, Birmingham, UK, Association of Researchers in Construction Management, 327–337

- Baloi, D. (2003). Sustainable construction: challenges and opportunities. In: Greenwood, D J (Ed.), *19 th Annual ARCOM Conference*, 3–5 September 2003, University of Brighton, Association of Researchers in Construction Management, Vol. 1, 289–97.
- Baiden, B. K. Price, A. D. F. and Dainty, A. R. J. (2003). Looking beyond processes: human factors in team integration,” In: Greenwood, D J (Ed.), *19th Annual ARCOM Conference*, 3-5 September 2003 University of Brighton. Association of Researchers in Construction Management, vol. 1, pp. 233 – 242.
- Baiden, B. K. Price, A.D.F. and Dainty, A.R.J. (2006). The extent of team integration within construction projects, *International Journal of Project Management*, vol. 24, no. 2, pp. 13 – 23.
- Baiden, B. K. and Price, A. D. F. (2011). The effect of integration on project delivery team effectiveness, *International Journal of Project Management*, vol. 29, no. 2, pp. 129 – 136.
- Bansal, P. (2005). Evolving sustainably: a longitudinal study of corporate sustainable development, *Strategic Management Journal*, Vol. 26 No. 3, pp. 197–218.
- Brandon, P. S. and Lombardi, P. (2011). *Evaluating Sustainable Development in the Built Environment*, 2nd edition, Oxford: Wiley-Blackwell
- Brundtland Commission, (1999). Report on World Commission on the Environment and Development.
- Cheng, J. C. P. Law, K. H. Bjornsson, H. Jones, A. and Sriram, R.A. (2010). Service oriented framework for construction supply chain integration, *Automation in Construction*, vol. 19, no. 2, pp. 245 – 260.
- Cicmil, S. and D. Marshall, D (2005). Insights into collaboration at the project level: complexity, social interaction and procurement mechanisms. *Building Research & Information*, Vol. 33, no. 6, pp. 523 – 535.
- CIB (1994). Report on *First International Conference of CIB TG 16 on Sustainable Construction*, Tampa, Florida, 6-9 November.
- CIOB, (2004) *Sustainability and Construction*, Chartered Institute of Building, Ascot.
- Constructing Excellence (2004). *Effective Teamwork: A Best Practice Guide for the Construction Industry*, Constructing Excellence, London,
- Dainty, A. R. Briscoe, G. H. and Millet, S. J. (2001). New perspectives on construction supply chain integration, *Supply Chain Management: An International Journal*, vol. 6, no. 4, pp. 163 – 173.
- Du Plessis, C. (2002) Agenda 21 for Sustainable Construction in Developing Countries. Pretoria, South Africa: *The CSIR Building and Construction Technology*
- Du Plessis, C. (2007). A strategic framework for sustainable construction in developing countries, *Construction Management and Economics*, vol. 25, pp. 67-76.
- Eley, J. (2011) *Sustainability Building: The Client’s Role*, London: RIBA Publishing
- El-Gohary N. M. and El-Diraby, T. E. (2010). Dynamic knowledge-based process integration portal for collaborative construction, *Journal of Construction Engineering and Management*, Vol. 136, No. 3, Pp. 316 – 328.
- Hakkinen, T. and Belloni, K. (2011). Barriers and drivers for sustainable building, *Building Research and Information*, 39:3, 239–255.
- Ibrahim, C. K. I. Costello, S. B. and Wilkinson, S. (2011) Key Relationship Oriented Indicators of Team Integration in Construction Projects, *International Journal of Innovation, Management and Technology*, Vol. 2, No.6, Pp. 441-446.
- Kibert, C. J. (2005) *Sustainable construction: green building design and delivery*. Hoboken, New Jersey: John Wiley and Sons, Inc.

Kibert, C. J. (2007), The next generation of sustainable construction, *Building Research & Information*, Vol. 35 No6, Pp. 595–601.

Manoliadis, O., Tsolas, I. and Nakou, A. (2006), Sustainable construction and drivers of change in Greece: a Delphi study, *Construction Management and Economics*, Vol. 24 No 2, Pp. 113–120.

McMahon, M; Marks, H. and Wallace, O. (2015) What is sustainable construction, available online from: <http://www.wisegeek.com/what-is-sustainable-construction>.

Measham, T.G., Kelly, G.J. and Smith, F.P. (2007). Best management practice: a case study of defining BMP for Dryland Salinity. *Geography Research*. Vol. 45 No3 Pp. 262-272.

Moore D. R. and Dainty, A. R. J.(1999) Integrated project teams' performance in managing unexpected change events, *Team Performance Management*, vol. 5, no. 7, pp. 212 – 222.

Moore, D. R. and Dainty, A. R. J. (2001) Intra-team boundaries as inhibitors of performance improvement in UK design and build projects: a call for change, *Construction Management and Economics*, vol. 19, no. 6, pp. 559 – 562.

Thorpe, D. and Ryan, N. (2007). Responding to global issues: sustainability and innovation in the Australian SME residential building construction sector, *ICCPM/ICCEM*, 5th International conference on construction project management / 2nd international conference on construction engineering and management, held in Singapore 1-2 March.

Pearce, A.R., Ahn, Y.H. and Hanmiglobal, (2012). *Sustainable Buildings and Infrastructure: Paths to the Future*, Routledge, Oxon, Abingdon, Oxon

Rahman, M. M., Kumaraswamy, M. M. and Ling, F. Y. Y. (2007). Building a relational contracting culture and integrated teams, *Canadian Journal of Civil Engineering*, vol. 34, Pp. 75 – 88.

Sodagar, B. and Fieldson, R. (2008), Towards a sustainable construction practice. *Construction Information Quarterly*, vol.10, Pp. 101–108.

UNDESA, (2010). Buildings and construction as tools for promoting more sustainable patterns of consumption and production, in Taipale, K. (Ed.), Marrakech Task Force on Sustainable Buildings and Construction, *Sustainable Development Innovation Briefs*, Issue 9, March 2010, New York: United Nations Department of Economic and Social Affairs, Available at: <http://www.un.org/esa/> [Accessed: 2 July, 2015]

Williams, K., and Dair, C. (2007). What is stopping sustainable building in England? Barriers experienced by stakeholders in delivering sustainable developments. *Sustainable Development*, Vol. 15, No. 3, Pp.135-147.

Zhou, L. and Lowe D. J. (2003), Economic Challenges of Sustainable Construction, In: Proverbs, D. (Ed) *Proceedings of the RICS Foundation Construction and Building Research Conference (COBRA 2003)*, 1–2 September 2003, Wolverhampton-UK, The RICS Foundation.