BREAKING CONTRACTORS' SOCIO-CULTURAL BARRIERS INHIBITING ADAPTATION TO ENVIRONMENTALLY SUSTAINABLE CONSTRUCTION

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Several barriers militate againstadaptation toenvironmentally sustainable construction (ESC). Most of these barriers assume global significance. However, socio-cultural barriers averting the practicing of ESC differ from culture to culture.Thus, the approach for countering the action of such barriers cannot be universalin nature. The aim of this paper is to identify apeculiar approach for disabling socio-cultural barriers that act against contractor'sadaptation to environmentally sustainable construction in an Africansetting.Taking a social constructivism ontological stance, qualitative strategy was adopted to identify the socio-cultural barriers through interviews of twenty-four built environment professionals in large construction companies in Ghana.Resilience Theory, Social Network theory, and Hofstede's Power Distance constructapproachwere used to develop a system fordisabling theaction ofidentified socio-cultural barriers against efforts of contractors to adapt to ESC. The findings of this study enrich the knowledge of internationalcontractors insocio-cultural barriersthat act againstthe practice of ESCin an African setting. The findings also strengthen the organizational strategies of such contractors to overpowersuch socio-cultural barriers.

Keywords - Contractors, environmentally sustainable construction, qualitative strategy, socio-cultural barriers, sub-Saharan region.

I. INTRODUCTION

Environmentally Sustainable Construction (ESC)generally deals with mitigating carbon loss and landscape changes to maintain the biodiversity. Specifically, ESC entails "sound ecosystems to support development objectives including: disaster risk reduction (mitigating flooding and landslides, or buffering tsunamis and storms), preserving resource-based livelihoods and sustaining safe and dependable water supplies" (Roseberry, 2008:11).Lowe and Watts (2011) indicated that ESC is the future of construction industry with Building Research Establishment Environmental Assessment Method (BREEAM) being the driving force. However, there are several barriers that can prevent ESC from happening, especially in the less developed countries. According to DuPlessis (2007), barriers against sustainable construction (SC) in developing countries are problems that need to be addressed in a particular way so that SC can happen in a responsible manner. Bashir et al. (2010) also indicate that barriers are 'factors that could affect the successful implementation' of lean construction. Amekudzie et al. (2011) argues that, the approach for mitigating barriers against the effective achievement of sustainable development goals in all sectors, construction sector included, needs to be embarked upon on a regional basis. Using a universal approach would therefore not be effective and cannot facilitate the achievement of the global goals of sustainable development. Thus, although sustainable development goals are globally pursued, there is no universal way of minimizing the barriers that prevent achievement of the SDGs in all regional economies. Therefore, the objective of this paper is to identify ESC barriers relating to the social-cultural context of a region, sub-Sahara African region in this case. Subsequently, appropriate and particular approach for minimizing effects of such socio-cultural barriers has beendeveloped. Again, it would not be effective to prescribe a multi-sectorial approach for dealing with the barriers. Therefore, in this paper, the focus is on the construction sector, with a particular interest in the operations of contractors.

II. BARRIERS AGAINST SUSTAINABLECONSTRUCTION

There are several barriers that work against smooth adoption of sustainable construction and associated methods. In UK, Pan et al. (2007) identified barriers against house builders' adoption of offsite modern construction methods, a common method of construction associated with sustainable construction. These barriers include perceived higher capital cost, complex interfacing, long lead-in time and delayed planning process. Sustainable construction employs modern methods of construction and could possibly face some of these barriers. Nonetheless, the culture of other regions outside UK could change the nature of such barriers identified by Pan et al.Similar to the barriers identified,Opoku and Fortune (2011) and Shi et al. (2013)also found that, stakeholders have the view that high cost is associated with pursuance of sustainable development. Overcoming these barriers cannotbe championed using universal approach;ESC barriers relating to the cultureof a particular society cannot be overcome using a universal approach. Therefore, the need to identify such barriers become

necessary in the effort to pave way for smooth adaptation of ESC. A further dive into literature indicates that, some of the barriers standing in the way of smooth adaptation to ESC are human-centered. Arthur and Mensah (2006) found that there is lack of the needed human resources required to ensure sustainability in various sectors of some economies.According to Kheni et al. (2010) workers are culturally inclined in their attitudes and these are brought to the sitesthey work in. These authors, through a Health and Safety study in the construction industry,found that management of a construction organization's health and safety relate to the politicaland socio-cultural environments of the national setting in which the businesses operate.However, the study of these authors did not clearly bring out how culturally inclined attitudes pose barriers to ESC.

Furthermore, Hakkinen and Belloni(2011) found that some clients lack understanding and the needed mechanisms for steering the achievement of sustainability. In Nigeria,Adegbite et al., (2012) identified the lack of requisite human resources for pursuing sustainable construction as a barrier. In Ghana,Mensah and Ameyaw(2012) have also found that, among the professionals in the construction industry, there is low level of awareness of the benefits associated with ensuring sustainability in the construction industry.

The existence of human centered barriers, within the area of study, raises the need for critical considerationof socio-cultural issues that affect the performance of professionals in the construction industry. These situations, which oppose adaptation to ESC, clearly buttress the need for establishing strong guidelines for minimizing human centered socio-cultural barriers among contractors in the construction industry. Also, factors that have led to the low level of awareness of sustainability practices and associated benefits, amongst construction professionals in the sub-Saharan region, remain faintly discovered.Such factors need to be investigated in order to identify ways of enabling BEprofessional'sadaptation to ESC in, especially, the sub-Saharan region.

III. THEORETICAL BACKGROUND AND CONSTRUCT

To properly formulate guidelines for minimizing socio-cultural barriers, the building up of a theoretical pedestal is necessary. A theoretical background would underpin the discourse on how social actors can adapt to changing environment and demands produced by sustainable development and associated ESC, amidst barriers. Hence, two relevant theories; Resilience Theory (RT) and Social Network Theory(SNT), were identified. The Hofstede's Power Distance Construct was also espoused,as it was found to be relevant to the discourse on behavior of BE professionals regarding adaptation to ESC.

Resilience Theory (RT) Expositions

"Resilience is the capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function, structure, identity and feedbacks" (Walker et al., 2004:2).Resilience is also known to be the capacity of a social-ecological system to change in a changing world whiles maintaining its functionality (Walker and Salt, 2006).Folke et al. (2010:3) defined social-ecological system as: "An integrated system of ecosystems and human society with reciprocal feedback and interdependence." Thus, the construction industry can be regarded as social-ecological system(Tan et al., 2011). Pisano (2012) highlighted the need for a social actor to possess adaptive capacity, which is a key theme in resilience thinking. This requires contractors to develop the capacity to influence resilience in a manner that will lead to effective adjustment to the demands of ESC.These expositions from the RT indicate that, to adapt to a new situation, contractors' and clients' BE professionals, within the social-ecological system, need to change attitude and entrenched practices. Construction organizations should be able to undergo the required changes without having effect onbusiness and organizational functionality(Gonsalves and Mohan, 2012).

Overcoming ESC socio-cultural barriers: elucidations from Social Network Theory (SNT)

Effective social network among BE professionals is essential for promoting sustainability. The discourse on SNT indicates that two elements are needed for improving social network, which will support the promotion of sustainability. These elements are centrality and density of the networks (Sarkis et al., 2010; Sarkis and Lai, 2011). According to Sarkis et al. (2010), the density of a network denotes the relative number of ties in that network whilescentrality connotes the position of an individual or organization in a social network and the ability to control dissemination of information. These elements are relevantto facilitating management of external pressures that may arise from the social ties defined by the SNT.Some of the external pressures come as socio-cultural barriers. Thus, it has become critical to employ an empirical method to dig deeper into entrenched professional and organizational cultural practices that present themselves as ESC barriers in social networks in the construction industry.

Hofstede Power Distance (PD) Construct and the nature of socio-cultural relationships in the Sub-Saharan region

Power distance is identified as a construct that provides a deeper understanding of the role that socio-cultural values play in utilizing intra-

organizational relationships. Power Distance is defined as: "…a value that differentiates individuals, groups, organizations, and nations based on the degree to which inequalities are accepted either as unavoidable or as functional" (Daniels and Greguras, 2014:1).According to Hofstede (1982) Power Distance (PD) construct, the presence of greater power distance as an organizational culture, yields less involvement of subordinates; smaller power distance involves a lot of consultation of subordinates in decisions making. For instance Bochner and Hesketh (1994) found superior-subordinate relationship construct, among others, to be relevant to influencing group achievement at high and low levels in a multi-cultural organization in Australia. Other authors have applied the PD construct to investigate usefulness of intra-organizational relationship. Hale and Fields (2007) applied PD construct and found that 'servant leadership', which is an essential quality of effective leadership, is far significantly less in Ghana (a developing country) when compared to that of USA (a developed country).It is worthy to note that this 'servant leadership' quality portrays a smaller power distance of the Hofstede's PD construct.

The power distance cultural dimension presents an essential basis for probinginto socio-cultural barriers relating to ESC practices in the construction industry. Such a probe within Sub-Saharan construction organizational settings becomes very important in light of the argument that the form of worker-to-worker relationship that dominates in most construction industries in sub-Saharan Africa takes the form of master-apprenticeship relationship (Kheni et al., 2006). This creates a socio-cultural behaviour that demands routine respect from subordinates for their masters.The presence of this form of social-cultural behaviour in Sub-Saharan construction industry intra-organizational relationships requires investigation in order to minimize the possible effects and subsequently promote ESC adaptation.

IV. RESEARCH METHODOLOGY

In view of the need to probe into issues that are based on human-to-human relationships and experience, and find explanations and dimensions of social actions, the social constructivism stance was taken in this study (Creswell, 2013). Furthermore, considering the objective to obtain a detailed understanding of human relations and experiences and how to overcome social challenges, qualitative strategy was adopted (Bazeley and Jackson, 2013).Purposive sampling method was employed to select BE professionals that met the following selection criteria: working in large construction firms; having international working experience; availability for interview; and willingness to speak on the subject matter.In all, face-to-face interviews of 24 BE professionals in 24 construction organizations were conducted. Each interview lasted for an average of 1¼ hours. Transcribed qualitative data from audio recordings were analysed using thematic template qualitative analytical technique (King, 2012). The analysis involved development of an initial template of high order and lower order codes determined a priori. With the aid of NVivo software analysis, the codes were eventually modified, whilst some were added, as newly emerging codes, resulting in a final template. The final template contained final higher order and lower order codes which form the basis for the discussion of the findings in this study.

V. FINDINGS

Socio-cultural values in intra-organizational relationships

The influence of socio-cultural values manifested itself in the interview data regarding the usefulness of intra-organizational relationship in fostering adaptation to ESC. The master-apprenticeship relationship, which is dominant in the sub-Saharan Africa,producesa behaviour that has a tendency of not permitting frequent discussions on new concepts and practices, such as ESC, to foster deeper understanding and appreciation.

This emerged from the interview as described in Table 1.The 'subordinate-to-subordinate relationship discussions', which was found to be prevalent in the construction organizations, isobserved to be a useful tool for discussing new practices such as ESC. However, there will be difficulty in implementing ESC practices when there is less 'superior-to-subordinate relationship discussions' since the power to implement lies with superiors.

Table 1 Characteristics of contractors' intra-organizational relationships

	Superior-to-subordinate relationship	Subordinate-to-subordinate relationship
Positive characteristics	Prior understanding of management (superiors) triggers discussions at subordinate level	-Cordial and not being antagonistic towards each other making learning effective -Communication and information sharing is regular -Team building on site is interpersonal allowing effective information transfer and understanding - Good working relationships in the Africa/Ghana culture -Use of gang headship facilitate effective learning

Negative characteristics	-Bosses do not accept advice directly -Difficulty in accepting information from newly employed supervisors	-Some not receptive to new ideas -Current trend of engaging subcontractors more frequently than permanent workers
Approaches for utilizing relationships	-Use of 'tool box' meetings to discuss Personal Safety Information (PSI) -Develop organizational culture that rewards compliant workers and penalizes non-compliant ones -Use top-bottom approach to always disseminate policies about ESC -Appointing Environmental Officer to handle all ESC information	

Source: Authors' field study (2016)

A statement from the interviews describes the influence of socio-cultural behaviour on construction practices in the quotation below:

"In Africa or Ghana, we have good personal working relations with our colleagues. So, if some of the leader or headmen or supervisor or ground workers are trained, because of our culture in relating with colleague workers, it will help in transmitting the ESC practices. There must be training of few and our culture will do the rest" – R09

Furthermore, a statement, as quoted below, gives a description of the role that a typical socio-cultural behaviour of people in this study plays in learning and adapting to new ways of doing things.

"Socially, we are more sociable, and Africans like to help one another. Here if you are able to convince somebody about the benefits, he will do it. But over there [developed countries] they need law to get convinced to do something. Before you can convince them you have to show them a regulatory body that ensures that" – R16

Clearly, people in Ghana, the study country, value social relationships. The quotations above, which were highlighted during the coding of the interview data, indicate the effective way by which most cultures in Africa, which is contrary to the cultures in most developed countries such as UK and USA, learn, get convinced and adapt to new ways of doing things. Through explanations from a fellow colleague to whom one is related, a person gets more convinced to change from old to new ways of doing things. Apparently, the indication here is that, by the culture of the respondents in this study, more value is put on information transmitted through social ties than by non-social channels. This finding reveals that a mere establishment of ESC regulations and laws without consideration of the socio-cultural tendencies of the people for which the regulations are made, could pose adaptation difficulties.

From Table 1, the relationship utilization approaches emanating from the analysis, emphasize the need for ensuring the SNT centrality element in contractors' intra-organizational social network structure. The centrality of such social ties, which is necessary for transmitting and implementing ESC information, can be enhanced by utilizing superior-to-subordinate relationship discussionsfrequently. In this relationship kind, there is smaller PD, which can accelerate effective adaptation to ESC.

Utilization of inter-organizational relationship among contractors

From the thematic analysis, the trend that emerged indicate thatthe participating contractors lack interest in being part of a network of contractors both locally and internationally. The low level of this inter organizational relationships was mostly attributed to the competitive relationship that has been created between contractors in the construction industry. In the view of interviewees, networking with other contractors may cause sharing of organizational 'secrets' that strengthen a contractor's competitiveness. Thus, a competitive advantage could be lost. Tan et al. (2011) argue that contractor's international competitiveness can be improved through adoption of sustainability practices. Ironically, respondents see the use of social networking of construction organizations to learn about the emerging concept of ESC, as a threat to competitiveness. In the situation emerging from this study, contractors see the end-product of networking to be loss of competitive advantage, rather than the possibility of learning and understanding ESC in order to gain competitive advantage.

In some existing literature, the use of inter-organizational relationships to foster sustainability practices in most developed countries have been discoursed (Zuo et al., 2012; ENCORD, 2010). Also, the ability of inter-organizational relationships to influence the output of an organization has been emphasized by the SNT (Jones et al., 1997). The influence of inter-organizational relationships to foster effective adaption to ESC can therefore not be downplayed. To advance understanding of the essence of inter-organizational relationship to enabling adaption to ESC, density and centrality elements of the SNT need to be deployed as discussed in the ensuing sections.

Relationship density and centrality of contractors' social network structure.

In this study, a situation of sparse social network, (a network structure with few or no ties) was realized. The usefulness of social networks to promote understanding and practicing of ESC was clearly

acknowledged by all interviewees. However, challenges that face the thriving of such social networks in the construction industry dominated this theme of the interview discussions. These challenges are indicated in Box 1.

Box 1 Challenges leading to low density of contractors' social network structure

- Lack of understanding of the collective nature of efforts in sustaining the environment
- Most of the inter-organizational relationships not actually considered to be beneficial to organizational goals
- Few organizations can be trusted and relied on when in relationship
- Local contractors associations normally turn into a 'one man affair' shrinking interest

Source: Authors' field data (2016)

The challenges identified, as given in Box 1, indicates that resistance to change, which is an essential RT element for adapting to new practices, is prevalent among the construction organizations. Furthermore, the findings from this research buttressed the relevance of network density to fostering understanding of ESC among contractors and other stakeholders. However, ignoring centrality of the relationships could be detrimental to the objectives of the relationship. When relationship centrality is not well managed, it is possible for negative influences to pervade the sustainability goals of contractors within a given social network structure. Investigating the presence and usefulness of the centrality element of SNT in the inter-organizational relationships of construction organizations was therefore an important theme set a priori in analysing the interview data. Centrality was faintly recognized among the contractors. This could be emanating from the sparse inter-organizational relationships as far as both local and international networks are concerned. Relationships between individual BE professionals in different organizations was however more prevalent than organization-to-organization relationships. Principles that can ensure centrality or control in contractors' social network structure emerged from the interview results. These are indicated in Figure 1.



Figure 1 Principles of ensuring centrality in construction organizations' Social Network Structure
Authors' field data (2016)

From Figure 1, the principles of ensuring centrality, as found from the interviews, aim at increasing organization's control over both dissemination and sourcing of ESC-related information. In order to facilitate contractor's adaptation to ESC, relationship formed with other organizations as well as the associated information flow should contribute to meeting the goal of achieving sustainability. There is an indication from the interviews that without these principles, centrality could be compromised amidst increased density. The socio-cultural barriers revealed in Figure 2 exist in both inter and intra organizational relationships of contractors. To overcome these barriers, towards achieving successful adaptation to ESC, the barrier breakers outlined in Figure 2, based on the theoretical expositions discussed in this paper, must be deployed by contractors.

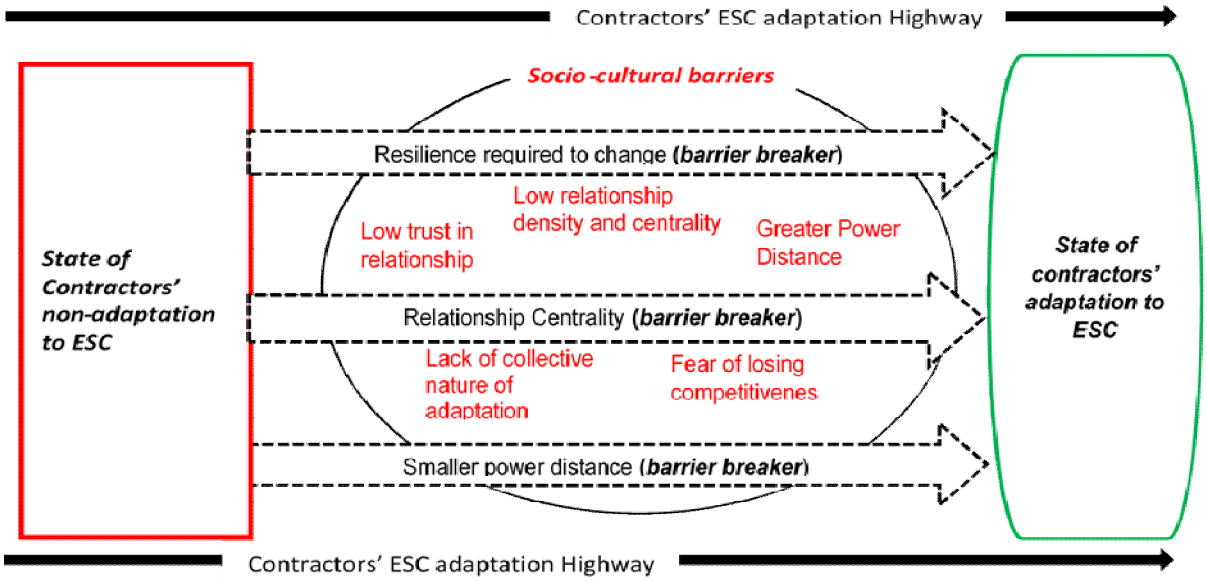


Figure 2Approach for overcoming contractor's socio-cultural barriers acting against ESC
(Authors' construct, 2018)

CONCLUSION

The findings indicate that influence of socio-cultural tendencies on contractors'BE professionals inter-organizational and intra-organizational relationships cannot be ignored in the pursuance of sustainable construction goals. It is imperative for practitioners to note that barriers that militate against contractor's BE professionals' successful practicing of ESC change in character with change in culture. Thus, for professionals whose practice cuts across cultures and nations, it is necessary to bear in mind the presence of socio-cultural barriers that may present a challenge alien to home country practices. With the emergence of new practices in the construction industry, contractors require resilience to overcome challenges associatedwith adaptation to new practices such as ESC.To improve upon professionalism and high ethics in the construction industry across the globe, it is imperative for construction industry practitioners to be aware of the roles that organizational and industry culture play in achieving successful sustainable construction management.Competence of BE professionals needs to be demonstrated by deploying the, resilience element of RT, SNT principles of centrality, and smaller PD to facilitate adaptation to ESC practices.As a long term benefit,there will be improved BE professional relationships and ethical practicesthat will enhance mitigation of socio-cultural barriersthat act against adaption to ESC.

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