

Mega Construction Projects: using stakeholder management for enhanced sustainable construction

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ABSTRACT : *The need for mega construction projects development for accelerated socio-economic growth is long overdue for developing countries. Some studies have considered stakeholder management and sustainable construction concepts separately without exploring the simultaneous use for mega projects delivery. This paper reviews the two concepts and suggests a process for enhanced sustainable construction delivery. This study forms part of a broader Ph.D. study on “Development of sustainable stakeholder management framework for construction projects” aimed at improving stakeholder management process and project delivery. A qualitative research method approach was adopted. An extensive literature review on stakeholder management and sustainable construction was conducted using filtering method for four major journals from the institution database. Identified concepts were developed into a conceptual framework and validated using face to face semi-structured interviews involving ten key stakeholders. The findings are that stakeholder management and sustainability concepts are yet to embrace. This paper suggests a seven-step approach for project managers. (1) Embracing stakeholder management and sustainability concepts, (2) identify stakeholder approach and sustainable principle to adopt, (3) identify and classify project stakeholders, (4) engage stakeholders, (5) analyze stakeholders, (6) manage stakeholders and sustainable principle, (7) monitor and support process.*

Keywords: *developing countries; mega projects; stakeholders; stakeholder management; sustainable construction*

I. Introduction

The need for Mega Construction Projects (MCPs) in developing countries is critical for rapid economic growth. Governments, therefore, undertake educational, health, transport infrastructure among others for social and economic interventions. Through these, countries have experienced significant growth. Studies have revealed that the construction industry globally contributes about 5-10% of the gross domestic product (GDP) and 10% employment out of the total working population ^[1]. Ghana has witnessed the rapid development of MCPs in the urban areas, raising the question of sustainable construction (SC). The nature, scale, and complexity of these projects coupled with funding sources have resulted in several individuals, organization and firms' involvement in the project development ^[2]. It is pertinent to note that these stakeholders relate to projects differently based on their salience to the project; urgency, power, and legitimacy. Newcombe ^[3] suggests stakeholders can be proponents or antagonist which raises the question of their management for positive impact on the project. With the construction industry embracing stakeholder management SM, the ability to successfully manage stakeholders, meeting their needs and satisfaction is a critical success factor. Researchers have suggested a systematic approach to identification, engagement, analysis and monitoring ^[4] though there is no such formal approach ^[5].

Du Plessis ^[6] suggests the need to address the impact of these MCPs in a way that they are socially and environmentally responsible, and further indicates the need to tackle these issues at the project development stages when creating these built environments. MCPs undoubtedly require large-scale natural and artificial resources impacting on the environment hence the need for sustainable construction to be employed. MCPs undertaking in development countries face human, managerial, political and sustainability challenges including Ghana. Though there are studies on stakeholder management process and sustainable construction respectively, there is no research on using SM process to achieve SC and besides for developing countries. This study which is a part of a Ph.D. dissertation on “development of sustainable stakeholder management framework for construction projects in developing countries” aims at using SM process to enhance sustainable construction. It

answers the questions; “what constitutes sustainable construction,” “what are the challenges to achieving sustainable construction” and “how stakeholder management can enhance sustainable construction” in developing countries using a qualitative research approach.

II. Literature review

2.1 Developing countries characteristics

Countries are classified “developing” or developed countries” using economic development, education and training provision, political stability, technological development and infrastructure, healthcare, growth rate of population, society demography and culture^[7]. Countries with lower economic and technical development, education, infrastructure, inadequate health care, high population growth rate are considered as “developing countries. The World Bank ^[8] classifies countries with low, lower and upper-middle-income groups based on their Gross National Income (GNI), per capita as developing countries. Infrastructure development is a development intervention, key to economic growth, improved education, better health provision and enhanced socio-cultural life. In Ghana, there is a backlog of infrastructure need for all sectors of the economy as a result of population growth, low education, health, road and administrative infrastructure. Studies have identified that the construction industry contributes about 5-10% of the Gross national product of developing countries and 10% of the total employment. It is, however, pertinent to note that the construction industry of the developing countries are fragmented and dominated by foreign-owned firms. Though implementing MCPs are for rapid transformation of the urban landscape and creation business opportunities, they are characterized by challenges, the external dependence of funding, low technology, human resources and fragmented construction industry. Besides, stakeholders are of different background impact on resources differently, and their management are affected by the environment factors.

2.2 Mega Construction Projects (MCPs)

MCPs development continues to increase in many developing countries such as Ghana due to social media and the socio-economic impact. Mega projects definition from different perspectives includes size, complexity, cost and time^[7]. This study agrees with the definition that mega-projects are large scale, significant and complex in nature^[9] transform the landscape rapidly and profoundly, re-image the city by enhancing its attractiveness and competitiveness ^[10] for economic growth. MCPs can involve green or brown sites and includes roads, stadia, shopping malls, housing and educational infrastructure. Besides, MCPs require high design knowledge, skills, and competent human and managerial capabilities^[7, 10]. Referring to project targets of cost, time and quality, MCPs involve a massive investment of billions of dollars, time, established large construction firms and partners to undertake the project.

According to Mok et al.^[2], MCPs raises development challenges: (1) the involvement of numerous stakeholders leading to complex stakeholder interrelationships and conflicting interests; (2) the dynamics and growing capacity leading to high project uncertainty ^[11]; and (3) their governance by a stringent multi-role administrative structure leading to high public attention and controversies ^[11] hence the need for effective stakeholder management. Further challenges identified by researchers include whether MCPs provide lasting benefits ^[10], political, managerial, environmental requirement impact on sustainability ^[7], sustainability and environment^[12] and effective stakeholder management ^[13]. Exploring the effects of SM on construction sustainability is essential since opposing stakeholders’ continue to protest, create impediments to the successful delivery of MCPs.

2.3 Sustainable Construction

Scholars suggest that infrastructure projects of civil engineering nature such as roads, and dams’ construction have a greater impact on sustainable construction^[12] though in practice construction projects development aims at socio-economic interventions rather than sustainable development. Sustainability or sustainable construction has emerged since the UN Millennium Declaration in 2000 and sought that as development ensures improved living standards, there is the maintenance of the ecological systems, proper sanitation, and clean water. The Johannesburg Plan of Implementation, WSSD ^[14] on sustainability was adopted during the UN World Summit, 2002 on Sustainable Development seeking the promotion of integration of economic, social and environmental goals and concerns within policies and strategies^[6]. Sustainable construction focuses attention on the integrity of nature, the welfare of people and the environment. In the developed countries, construction projects are required to meet standards for sustainable construction. Leadership in Energy and Environmental Design LEED advocates for sustainable sites, water efficiency, energy and atmosphere, material, resources and indoor environmental quality for building sustainability. BREEAM^[15] equally evaluates buildings specification, design, construction and use against recognized measured performance related to energy and water use, the internal environment (health and well-being), pollution, transport, materials, waste, ecology and management processes. Construction projects which meet these standards are thus considered sustainable.

Construction is said to be sustainable when it meets environmental challenges, responds to social and cultural demands and delivers economic improvement^[16]. Developing countries encounter several systematic development challenges of low skill levels, institutional incapacities and rapid urbanization resulting in conflict between addressing developmental challenges and adhering to sustainable construction^[6]. Sustainability can be achieved through the long-term solutions to meeting community needs but requires involving multiple community partners in planning, using local materials, equipment and technology. Barrett^[17] suggests that sustainability can be achieved through constraints driving, collaboration and creativity leading to community benefits. Collaboration and creativity are necessary when considering SM role for enhanced MCP sustainability. Mega projects have the greater number of participants hence the difficulty in achieving project set targets^[13].

2.4 Stakeholder management SM

Studies have identified and classified project stakeholders differently following the first introduction of stakeholder concept by the Stanford Research Institute in 1963 which defined stakeholders as groups or individuals who are crucial for organizations survival and can affect the achievement of its objectives. Freeman^[18] therefore defined stakeholders as those that affect or can affect a project with whom an organization interacts or has interdependencies^[19]. Stakeholders are classified severally depending on their relationship, role among others. Primary stakeholders include project owner, sponsor, design and construction teams while secondary stakeholders with latent potentials include government establishment, planning authorities, community, pressure groups, media and trade unions that are not essential to project survival but rather are affected by project outcome^[19].

Though many kinds of literature suggest stakeholder identification as the first step in SM, Eyiah-Botwe^[20] suggests stakeholder education and embracement for developing. The construction industry has now embraced SM considering the several stakeholders, each having role, requirements and interest^[21]. Increasing diversity, power, influence and impact on project outcome^[22]. Researchers have suggested the existence of several SM approaches, however, Lock^[4] states a process of identifying stakeholders, gathering information about stakeholders and analysing their influence as a systematic approach^[4]. Two major concepts for stakeholder management adopted by several researchers are stakeholder salience; power, legitimacy and claim urgency^[23] and stakeholder circle; identification of stakeholders, prioritisation, visualisation, engagement and monitoring effect of their involvement^[24].

2.5 Stakeholder engagement and sustainability

Studies on the impact of stakeholder engagement in achieving sustainability for developed countries suggest a 6-step process as follows; identify key stakeholders, relate to stakeholder with sustainability principles, prioritise stakeholder, manage stakeholder, measure stakeholder performance and put targets into action^[16]. Othman^[7], identified challenges relating to MCPs and sustainability in developing countries to include engineering design and technical challenges and client performing organization. It is pertinent noting that stakeholder issues are associated with the diverse stakeholders involved, their cultural background and the culture of the project location in context^[2]. There is, therefore, the need to increase the economic sustainability for the whole life cycle of a building while decreasing the negative environmental impact.

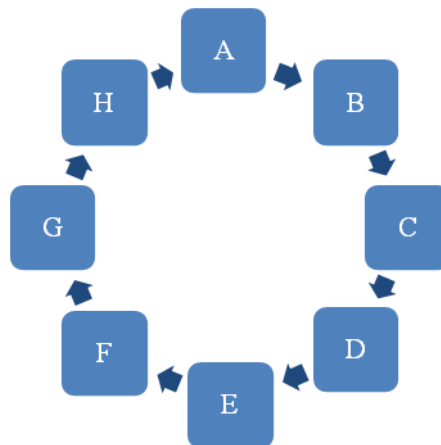
III. Method

The primary research objective is to explore the use of SM process as a tool for achieving enhanced sustainable construction. A qualitative research approach for theoretical data was first adopted. Three research questions were formulated to address the research aim of examining the use of SM to enhance sustainable development. Firstly an extensive literature review using a filtering method to identify research related to stakeholder management and sustainability from Elsevier, Emerald, Science Direct and Sustainability (Open Access) journals from the institutional database, using a combination of keywords such as stakeholder management, sustainability and mega- construction projects. Three key stakeholder management framework and models were identified as relevant for the study namely, stakeholder salience model, stakeholder circle and stakeholder engagement framework for sustainability in developed countries. Secondly, there was the development of a conceptual framework (process) based on the models identified as theoretical frameworks. Following the literature review, the six-stage process was developed into an eight-stage process and validated using the structured interview technique. A set of 20 questions was developed for the qualitative interview and forwarded to the selected interviewees. Ten (10) key stakeholders were interviewed face-face 10 with interview lasting a maximum of an hour and a minimum forty-five minutes (Table 1). Key stakeholders interviewed had participated in the Accra Airport City Project, which is an MCP involving about 40 complex and interrelated projects. The interview was conducted by two research assistants and the recorded response compared. Keywords were coded, recorded as findings, analysed and used to validate the framework.

Figure 1 Theoretical framework Bal et al., (2013)



Figure 2 Conceptual framework by author



A-embrace SM and SC concepts, B-identify and classify project stakeholders, C-identify stakeholder approach and sustainable construction concept to adopt, D-engage key stakeholders, E-analyze stakeholders, F-manage stakeholders and sustainable principle, G-measure targets/ performance, H-monitor and support process with remedial actions. The findings from the interview were recorded and discussed using the stages involved in the course of managing stakeholders.

IV. Findings and Analysis

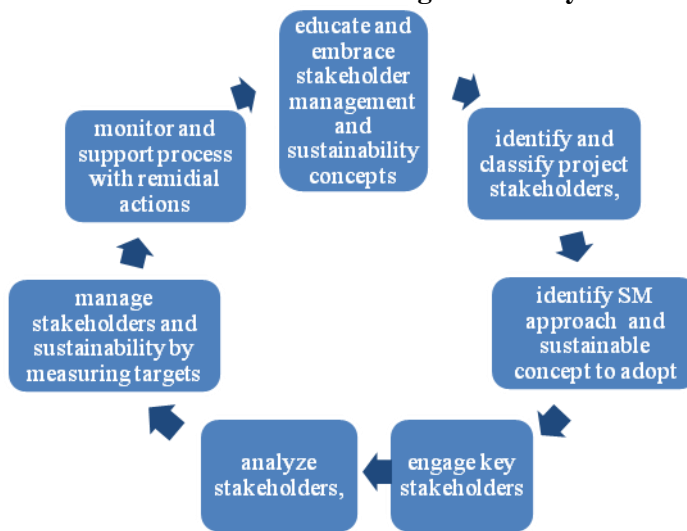


Table 1 Research participant’s information and response

Role of interviewee	Organization	Mega Project worked on	Experience A min of	Duration interviewed	Response
Architect 1	Design firm	Shopping mall	30 yrs	1 hr	Excellent
Architect 2	Design firm	New University	20yrs	50 min	Good
Project Manager 1	Design firm	Airport City	20yrs	45 minutes	Average
Project Manager 2	PM firm	Hostel complex	30 yrs	1 hr	Good
Developer	Prop Developer	Hostel complex	20yrs	45 minutes	Good
Contractor	Construction firm	Several	30yrs	30 minutes	Average
Environmentalist	EPA	Several	10yrs	1 hr	Good
Quantity Surveyor	QS firm	Shopping mall	20yrs	45 mins	Good
Engineer	Engineering Firm	Roads, Office Bldg	30yrs	45 mins	Good
Planning officer	Town Planning	Several projects	20yrs	1 hr	Excellent

4.1 Embracing stakeholder management and sustainability concepts

Interviewees were of the opinion that key stakeholders should adopt stakeholder management SM and sustainable construction SC principles as a motivation for implementation. Majority was of the view that though it is a new

concept to stakeholders in developing countries but has impacted project delivery in developing countries hence needs consideration. Project managers also believe that key stakeholders will consider SM and SC if they are mandatory design requirements. Architect 1 stated that *“there is no way project managers or team leaders will employ stakeholder management and sustainability principles unless they have embraced it.”* The developer and client agreed that SM and SC concepts are beneficial, they are not project goals. To achieve sustainable construction, key stakeholders in the construction industry in developing countries must understand the process, the active role it plays and impact as embraced in the developed countries. Asked further, interviewees suggested the need to enhance education through the professional bodies and educational institutions.

4.2 Identifying and classifying project stakeholders

The research found out that project managers do identify key project stakeholders as part of the project management process but not stakeholder management process. According to interviewees, the project manager who is usually an architect, the client or developers will categorize the key stakeholders using their roles and responsibilities. However depending on the procurement approach stakeholders, individuals or firms may be invited or selected through competitive bidding. On the challenge of identification, Project Manager 2 stated: *“you may be unfortunate to have a difficulty stakeholders to work with because they have won the bid.”* The study also identified that all stakeholders may not be identified at the initial stages making the identification process difficult. Project manager 1 suggested the best way as having all stakeholders identified at the project planning stage which is rather not the case. The planning officer mentioned that stakeholders may change depending on project nature and procurement approach. Interviewees agreed that developed countries the design and build, partnering and PFI procurement strategies aided the implementation of SM. According to the contractor, there was no formal stakeholder classification^[5] or official documentation, rather mental records are kept. Respondents agreed that the developer, client, and the sponsors were the primary concerned key stakeholders. The project manager 1 stated, *“it is the person who gives you job and pays you that matters most”* agreeing with literature that designers and project managers consider client’s interest above all^[3].

4.3 Stakeholder management approach and Sustainability Concept to adopt

According to interviewees, key stakeholders approach are not aimed at achieving sustainable construction as that has not been the project goals. Respondents agreed that the different stakeholders have different interests that needed to be addressed. The developer suggested that the differences in the project types and objectives require that every project is considered separately. According to the engineer, if the project client is the government the approach is different from a private investor since government project has several stakeholders who may not be permanent on the project. The client interviewed further suggested that governments undertake projects for political objective *“There is nothing like stakeholder consultation, can’t you see road works done on the night before an election?”* According to the contractor interviewed, clients are the best stakeholders to initiate sustainable construction. The statement was confirmed by Project Manager (1) who believes that financial gains drive private developers rather than any other goal. The study, therefore, identified the need for different approaches to be considered by project managers to achieve enhanced SM and SC principles by considering all the sustainability-related criteria. Interviewees further agreed that stakeholders have a role in developing a sustainability strategy that suits a particular project and that by involving them, there is the likelihood of achieving goals.

4.4 Engaging key stakeholders

Internal stakeholders interviewed agreed that stakeholder engagement is critical to a project success. Project managers stated that they do consider some stakeholder engagements; consultants meetings, workshops, site meetings and community gatherings. According to the engineer, road construction, dams and community projects require a lot of stakeholder consultation. The study identified that MCPs have a lot of media attention and political objectives and tend to have opposing stakeholder, groups. Interviewees mentioned stakeholder meetings as necessary for the dialogue on mutual interest, clarifying the project values and benefits. Project managers prefer engaging project stakeholders in the planning and decision-making process to reduce conflicts. According to a project manager, the difficulty includes the differences in culture, language barrier, and work ethics. *“Don’t you notice that the Chinese are winning all the mega construction projects in the country?”* was the question asked by Architect (2)? When he was asked to explain further, he mentioned that *“Chinese approach to construction appears to be much simpler than the European contractors hence they can bid lower and still execute the project.* Engaging key stakeholder as part of stakeholder management aims at identifying stakeholder needs and interest which will constitute stakeholder satisfaction which is necessary for successful project delivery. The client and the developer agree that it is a platform to receive information and also consult for enhanced collaboration. Interviewees agreed that SC targets consider project goals and stakeholder satisfaction goals and can be achieved through effective communication when participants are giving the right information.

4.5 Analyzing key stakeholders

Analysing key stakeholders for the mega-construction project is essential due to the several stakeholders involved. According to the project managers interviewed, the stakeholders involved may typically not have worked together. It is necessary to consider the different approaches to the project execution and interest of all the stakeholders especially during the initial stages of the project thoroughly. According to project manager 1, it is important to understand every stakeholder to formulate a communication strategy to ensure that work maximum output and sustainability targets are achieved. According to the contractor *“each of us contractors has a way of going about our work, we consider our company ethics, our business partners especially our financiers and relate differently to our chain supply chain firms”*. The study also identified through the interview that, stakeholder roles and attitudes are affected by the culture and practices of the particular location in context^[2]. Analysing stakeholders are critical however participants revealed that there is no such framework and suggested the need for a uniform, a flexible and sustainable framework which can be adopted. An interviewee remarked, *“Don’t expect that framework for advanced countries to work here in Ghana.”*

4.6 Managing stakeholders and sustainable principles

Managing stakeholders are about maintaining the relationship between the major stakeholder who may be working for the first time to achieve a project shared goal. According to Architect 1, projects have related conflicts and hence it is necessary to manage relationships. Project managers mentioned the relationship between suppliers, sub-contractors, and the main contractor, client and consultants as necessary for management. Also, interviewees agreed that there were power structures and politics in project development in developing countries which require that project managers understand the power structures in organizations involved to achieve project goals. According to project manager (1), *“you don’t have just to take the word of the managing director without the approval of the board of directors, or you may never be paid”*. Participants seem to agree that private clients and developers are reluctant adhering to sustainable construction if perceived as an extra cost item without necessary bringing returns, are committed to economic goals rather than social and environmental objectives hence the need to continually dialogue with clients on sustainability-related targets^[25].

4.7 Measuring, monitoring performance, supporting process with remedial actions

The primary objective of this study is to use SM as a tool to achieve sustainable construction, therefore measuring goals is critical. Research participants suggested the need to set up sustainability-related performance targets frequently referred as Key Performance Indicators KPIs at the project planning stage. According to research interviewees, these KPIs are related to BREEAM or LEED which are recognized internationally and that many key stakeholders are conversant. An architect interviewed mentioned that big business always have their KPIs as a quality control measure, and since this may differ from others, there is the need to have standard KPIs for a project. The environmentalist stated that they had their KPIs which should be the minimum standard. *“How can we allow for individual KPIs”* was the question asked by the project manager 1.

Since KPIs for sustainable construction are intended to achieve social and environmental goals, it is necessary to have and assess KPIs on stakeholder basis for adherence or otherwise. Setting up KPIs according to the contractor is in their interest since the careful use of resources, effective management of waste and ability to recycle waste reduces the project cost. A project manager who is not an architect asked, *“Are you sure that architects are concerned about sustainable construction with all these glass buildings that are designed in the tropics?”* Designers, contractors, and suppliers play a critical role in achieving KPIs related to sustainable development and hence must be monitored. Participants suggested that it is not enough having KPIs for a project since this has been the case but managing stakeholders to adhere to KPIs. According to the planning officer and the environmentalist, *“we have all these nicely written in our books, even if they promise to implement we don’t see that in their project”*, *“what they submit to us to get approval for development permit is different from the reality on the ground”* respectively. Stakeholders agreed that those found to fall short of the agreed KPIs were compelled to implement remedial actions by revising designs, specifications or work methods. There is the need to consider the entire SM process to address KPIs militating factors.

V. Conclusion

This study discussed stakeholder management SM, sustainable construction SC concepts and explored their convergent for achieving mega construction projects MCPs sustainability in developing countries. MCPs are development intervention and aim at economic growth rather than environmental and social policies. MCPs have stakeholders who require efficient SM to achieve project goals. There are key performance indicators such as BREEAM and LEED, which are not adhered to by developing countries.

The research further explored the possibility of using stakeholder management to enhance the achievement of sustainable construction. It found out that MCPs key stakeholders first require education to embrace both SM and SC concepts as accepted by the construction industries in developed countries. Stakeholders should be

identified and classified to enable project managers rank stakeholders' interests, roles and influence about sustainability targets and to establish the grounds for stakeholder engagement. SM is essential; project priorities are set, and that stakeholders are clearly informed at the project planning stage. Engaging stakeholders provide a platform to address all interests and conflicts relating to sustainability KPIs. There is the need for analyzing stakeholders, monitoring stakeholder behavior, performance relating to project goals and introducing remedial actions during the project implementation.

This paper concludes that sustainable construction can be achieved using Stakeholder management process. The following process is recommended: educate and embrace (stakeholder management and sustainable development), identify stakeholder approach and sustainable principle to adopt, identify and classify project stakeholders, engage stakeholders, analyze stakeholders, employ stakeholder management and sustainable principle, monitor and support the process. As part of the contribution to the body of knowledge, this study has identified and proposes the use of SM as a tool for achieving sustainable construction in developing countries. The study is limited by the scope and the number of research participants involved. The authors declare no conflict of interest.

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