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AN APPRAISAL OF THE DUTIES OF STAKEHOLDERS TOWARDS ATTAINING SUSTAINABLE CONSTRUCTION

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Abstract

Sustainable Construction (SC) implies employing the use of renewable and recyclable materials with the aim of reducing waste as well as lowering energy consumption. The main purpose of Sustainable Construction is to reduce the adverse environmental effect of the Construction industry (CI). Various stakeholders have inputs in order to achieve SC as there are several emerging roles and duties that need to be attended to in order to ensure that the benefits of SC is delivered. To this end, this research sought to appraise the stakeholder responsible for carrying some emerging SC duties. Extensive literature was sought to identify new/emerging duties towards achieving SC. A well-structured questionnaire was then distributed to professionals in the CI. A total of 100 questionnaires were administered and 76 was retrieved and analysed using mean item score. The result shows the respondents perception of stakeholders responsible for the emerging SC duties identified. Finally, the notion that sustainable construction must be carried out collaboratively by all Stakeholders in the CI is reaffirmed.

KEYWORDS:
Sustainable construction, Construction industry, Emerging roles, stakeholders

Introduction

Sustainable construction is the creation and responsible management of a healthy built environment based on resource-efficient and ecological principles' (Kibert, 2016). This concept highlights the use of resource-efficient design and construction practices that do not jeopardize the environment's health, as well as the health of building occupants, builders, the

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general public, or future generations (Tennakoon, Waidyasekara & Ekanayake 2020).

The design, construction and maintenance of buildings have an important impact on the environment as well as natural resources (Javier et al, 2012; Jamilus et al, 2013).The construction industry is considered as one of the main sources of environmental pollution in the world. The activities of the construction industry from its design, construction, use, refurbishment and dismantling of built assets is a major consumer of resources and generates considerable waste (Ashworth, 2010). This has geared great attention towards sustainable construction. The objectives of sustainable construction includes reduction, or completely avoid depletion of critical resources like energy, water, raw materials and prevent environmental degradation caused by facilities and infrastructure throughout their life cycle, promote economic growth and create built environments that are comfortable and productive (Hartenberger et al, 2013; Oni, 2015; Wong, 2016). Sustainable construction is a very broad concept and the inputs of various Stakeholders in the construction industry must be put together in order to achieve its benefit (Khaled, Ali & Mohamed 2021). For sustainable construction to be adequately achieved in the construction industry, all stakeholders within the built environment needs to be prominent with sustainable construction principles (Brooks, & Rich, 2016).

LITERATURE REVIEW

Construction Industry stakeholders

In a construction project, stakeholders are individuals, groups, or entire organizations who affect or may be affected by the project's conclusion. Internal and external stakeholders are the two types of stakeholders in sustainable construction. Internal stakeholders are actively involved in decision-making in a company, whereas external stakeholders have a significant impact on the organization (Oke, Abiola-Ogedengbe & Akinseli 2019). Some CI stakeholders are listed below.

Table 1: Some construction industry stakeholders

Stakeholders	Objectives and role
Clients	These are individuals, corporations, or governments who commission construction projects to meet a specific need. The client can participate in either a public or private construction project. Clients also establish the tone for the project and make key decisions that will shape its future.
Contractors and subcontractors	A contractor is a party who oversees a building project and enters into a prime contract with the property

	owner. Contractors are those who participate in or use their knowledge, experience, and resources in the construction process. They carry out building work based on specifications, designs, and contract documents from the relevant parties.
Architect	Architects are specialists who design, plan, and inspect building construction. Architects are involved in more than just architectural design. Their contribution is critical at every stage of the building's construction, from the initial concept to the opening ceremony and beyond. An architect is frequently active with a project after it has been completed, as buildings adapt to integrate new surroundings and ideas.
The Quantity Surveyor	The Quantity Surveyor is the cost specialist who estimate and monitor construction expenses. They ensure that constructions comply with legal and quality requirements. At every level of a project, quantity surveyors are involved. The QS is trusted to ensure that the end product is cost-effective be it residential, commercial, or industrial projects.
Supplier	A supplier is a person or company who sells products or services to another company. A supplier's job in a company is to deliver high-quality products at a reasonable price.

Source: Oke et al., 2019; Richard et al., 2021.

Emerging Sustainable Construction duties

The increasing emphasis on sustainable construction has placed new and unprecedented responsibilities on the CI stakeholders. Some emerging duties have been identified from literature and presented in Table 2 below

Table 2: Emerging SC duties

Emerging SC duties	Responsibilities Involved
Protect health and safety of those involved with the project	This involves training everyone involved to be well-behaved and safety conscious, as well as rewarding employees for safe behaviour.
Put in place appropriate environmental management systems.	Identify waste reduction opportunities, such as raw materials, utility use, and trash disposal expenses. Profits should rise. Reduce

	the danger of being fined for not following environmental regulations. Ascertain that all operations have procedures in place to reduce their environmental impact
Educate clients on benefit of sustainable approach	enables people to develop the knowledge, values and skills to participate in decisions about the way we do things individually and collectively, both locally and globally, that will improve the quality of life now without damaging the planet for the future.
Communicate with local community about proposed project	Inform and educate the public about your project and its construction.
Ensure employees are updated with recent consideration of environment efficiency	Ensure that personnel are up to date on recent environmental efficiency considerations.
Include on site environmental performance requirements in tender documents.	Make adequate implementation of environmental obligation known to all parties involved both on site and in tender documents.
Operate contracts in a non-adversarial way with other stakeholders	Ensure contracts are void of disputes and disagreements over changes to the specification and quality.
Use recyclable materials	These includes materials that prevents pollution, reduces the need to harvest new raw materials, saves energy, reduce greenhouse gas emissions, saves money, reduces the amount of waste that ends up in landfills, and allows products to be used to their fullest extent.
Engage and train all those involved with the project	Every participant of the project is sufficiently informed on the process and procedure required for them to deliver the project.
Demand forms of contract which foster partnership	Ensure that positive relationship is maintained during and after the project.

Plan construction activities to minimize negative environmental impact.	Properly Dispose of Waste, Utilize Reusable Technology and Expedite Your Project.
Source materials locally	Material obtained from a defined radius around a project site, helping to support the local economy and reducing transportation costs and energy.
Encourage innovation	Addition of value to activities.

Source: Oke & Aigbavboa, 2017; Yu et al., 2018; Sustainability report 2019.

METHODOLOGY

The data gathering instrument for this study was a well-structured closed-ended research questionnaire. This method was chosen for the study because it allowed for the objective and precise collection of each respondent's opinion and knowledge of Stakeholder Duties for Sustainable Construction. A total of one hundred (100) questionnaires were distributed, and seventy-six (76) responses were received, however only sixty-nine (69) were deemed valid for analysis. In order to achieve the study's goal, 5-point Liker scales were utilized to rank the relevant stakeholder responsible for the listed duties. To focus more on people having professional membership qualifications, a targeted sampling strategy was used. As a result, the findings were analyzed using mean item score (MIS) and descriptive statistics of percentage.

DATA ANALYSIS

The category of respondents with doctorate degree were 21.66% of the total respondents while 35% had a master's degree, 31.66 had Bachelor's degree and 11.66 had Higher National Diploma as their highest educational qualification. The classification shows that the highest number of respondents has a master's degree as their highest educational qualification. Another observation made was that 56.66% of the respondents had higher academic qualifications above a Bachelor degree against 43.2% who had only first degrees or Higher National Diploma as their highest educational qualification.

Furthermore, 26% of the respondents were with a Government Organization, 8.3% were with a Client Organization, 13.3% were with a Contracting Organization, 31.66% were with a Consultants Organization while 20% indicated their organization as others. Majority of those who indicated their organization as others specified it to be in the academia.

Also, 16.66% of the respondents have less than five years' experience, 40% have five to ten years' experience, 21.66 have ten to fifteen years' experience and also 21.66% have more than fifteen years' experience. Respondents with five to ten years' experience are the highest but those with eleven to fifteen years and more

than fifteen years have the same number of respondents. This means that those with experience of eleven years and above are about 43% of the respondents

Duties of professionals towards achieving sustainable construction.
The table below presents various duties to be carried out in the construction industry and the percentage distribution of responses regarding the professional who should be responsible for carrying out the duty.

Table 3: Percentage distribution of the duties of professionals towards achieving sustainable construction.

Duties to be carried out in the construction industry	Client	Architect	QS	Contractor	Supplier
Protect health and safety of those involved with the project	22	5	5	63	5
Put in place appropriate environmental management systems.	24	19	27	29	2
Educate clients on benefit of sustainable approach.	0	47	47	6	0
Communicate with local community about proposed project	51	17	12	19	2
Ensure employees are updated with recent consideration of environment efficiency.	10	15	31	42	2
Include on site environmental performance requirements in tender documents.	12	10	61	17	0
Operate contracts in a non-adversarial way with other stakeholders.	8	15	46	25	5
Use recyclable materials	0	20	20	49	10
Engage and train all those involved with the project	10	14	24	53	0
Demand forms of contract which foster partnership	20	10	49	17	3
Plan construction activities to minimize negative environmental impact.	5	19	39	37	0

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Source materials locally	3	12	8	41	36
Encourage innovation	15	51	12	8	14

Source: Researcher's analysis

From the table above, 22 % of respondents believe it is the client's responsibility to protect the health and safety of those involved in the project, 5% believe it is the Architect's responsibility, 5% believe it is the QS's responsibility, 63 % believe it is the Contractor's responsibility, and 5% believe it is the Supplier's responsibility. 24 % of respondents say it is the client's responsibility to put in place adequate environmental management systems, 19 % believe it is the architect's responsibility, and 27 % believe it is the QS's responsibility. It is the Contractor's responsibility, according to 29% of respondents, and the Supplier's responsibility, according to 2%. To inform clients about the advantages of a long-term strategy It is not the client's responsibility, according to none of the responses. 47 % feel it is the responsibility of the architect, 47 % believe it is the responsibility of the QS, 6% believe it is the responsibility of the contractor, and none believe it is the responsibility of the supplier. 51 % of respondents believe it is the client's responsibility to communicate with the local community about the proposed project, 17 % believe it is the architect's responsibility, 12 % believe it is the QS's responsibility, 19 % believe it is the Contractor's responsibility, and 2% believe it is the Supplier's responsibility. To keep employees informed about recent environmental efficiency considerations 10% of respondents believe it is the client's responsibility, 15% believe it is the architect's responsibility, 31% believe it is the QS's responsibility, 42% believe it is the Contractor's responsibility, and 2% believe it is the Supplier's responsibility. 12 % of respondents believe it is the client's responsibility to include on-site environmental performance requirements in tender documents, 10% believe it is the architect's responsibility, 61 % believe it is the QS's responsibility, 17 % believe it is the Contractor's responsibility, and none believe it is the Supplier's responsibility. To operate contracts with other stakeholders in a non-adversarial manner. 8 % of respondents believe it is the client's responsibility, 15% believe it is the architect's responsibility, 46% believe it is the QS's responsibility, 25% believe it is the Contractor's responsibility, and 5% believe it is the Supplier's responsibility. To use recyclable materials, none of the respondents believe it is the client's responsibility, 20% believe it is the architect's responsibility, and 20% believe it is the QS's responsibility. It is the Contractor's responsibility, according to 49% of respondents, and the Supplier's responsibility, according to 10% of respondents. All project participants must be engaged and trained. 10 % of respondents feel it is the client's responsibility, 14 % believe it is the architect's responsibility, 24 % believe it is the QS's responsibility, 53 % believe it is the Contractor's responsibility, and none believe it is the Supplier's responsibility. To demand contract forms that encourage collaboration. Twenty % of respondents believe it is the client's responsibility, ten % believe it is the architect's

responsibility, 49 % believe it is the QS's responsibility, seventeen % believe it is the Contractor's responsibility, and three % believe it is the Supplier's responsibility. 5 % of respondents say it is the client's responsibility to plan construction operations to minimize negative environmental impact, 19 % believe it is the architect's responsibility, and 39 % believe it is the QS's responsibility. It is the Contractor's responsibility, according to 37% of respondents, and the Supplier's responsibility is unknown. 3 % of respondents say it is the client's responsibility to source materials locally, while 12 % believe it is the architect's responsibility and 8% believe it is the QS's responsibility. It is the Contractor's responsibility, according to 41% of respondents, and the Supplier's responsibility, according to 36% of respondents. To Promote Innovation 15 % of respondents say it is the client's responsibility, 51 % believe it is the architect's responsibility, and 12 % believe it is the QS's responsibility. 8 % of respondents say it is the Contractor's responsibility, while 14% believe it is the Supplier's responsibility.

DISCUSSION OF FINDINGS

Duties of the client: Clients might be individuals, corporations, or governments who commission construction projects to meet a specific need. Clients are expected to take actions such as being aware of sustainable construction principles and diversifying their understanding of sustainable construction in order to make it a reality. Clients must also be willing to embrace and use sustainable construction methods. According to the responses to the questions, the clients should be responsible for communicating with the local community about the proposed project.

Duties of architect: Architects are the professionals who design, plan and review the construction of building. The respondents believe that the architect should be responsible to educate clients and stakeholders on benefits of sustainable approach as well as encourage innovation. The architect is a vital professional in delivering the benefits of sustainable construction.

Duties of quantity surveyor: The QS is the cost expert in the construction industry and a key important player in ensuring sustainable construction is delivered. The duties expected of the QS includes educating clients on benefits of sustainable approach (both QS and architects have same rank in this duty) include on site environmental performance requirement in tender documents, operate contracts in a non-adversarial way with other stakeholder, demand form of contract which foster partnership and plan construction activities to minimize Negative environment impact.

Duties of the contractor: Contractors are those who participate in or use their knowledge, experience, and resources in the construction process. The contractor should be responsible for protecting the health and safety of all project participants, implementing appropriate environmental management systems, ensuring that employees are up to date on recent environmental considerations,

recycling materials, engaging and training all project participants, and sourcing materials locally. All of these are critical sustainable practices, and the contractor must stay current in order to perform these tasks efficiently.
Duties of supplier: The supplier is responsible for the delivery of physical supplies such as building materials, goods, plant and so on either directly to the client, contractor or subcontractor. Although from the respondents responses, there is no direct duty to the supplier but the supplier must work with the professionals to ensure that materials supplied are relevant and adequate to achieve the objective of sustainable construction.

CONCLUSIONS AND RECOMMENDATION

Results of the questionnaire survey showed the various stakeholders and how they should be responsible for carrying out the emerging SC duties. Furthermore, the contractor has more responsibilities which include protecting the health and safety of all project participants, implementing appropriate environmental management systems, ensuring that employees are up to date on recent environmental considerations, recycling materials, engaging and training all project participants, and sourcing materials locally. Although, Sustainable construction has to be jointly carried out by all stakeholders in the construction industry and it is also important that stakeholders should be aware of these duties as well as to make necessary arrangement to perform their responsibility.

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