

# Quantity Surveyors Role in Sustainable Development in the Nigerian Construction Industry

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**Key words:** Nigerian Construction Industry, Role, Quantity Surveyor, Sustainable Development.

## SUMMARY

Sustainable development is a critical aspect of the construction industry and has become a global priority as societies strive to balance economic growth, social progress, and environmental protection and Nigeria is no exception as a country with a rapidly growing population and increasing urbanization. The concept of sustainable development is to meet the needs of the present generation without putting in jeopardy the ability of future generations to meet their own needs. The role of quantity surveyors in sustainable development is crucial as they play a vital role in managing costs, resources, and risks associated with construction projects. Quantity surveyors, as professionals specializing in cost management and procurement within the construction industry, are involved in all stages of a construction project, from inception to completion to final account settlement and have a unique position to contribute to sustainable development efforts. The main objective of this paper is to explore the crucial role of quantity surveyors in promoting sustainable practices by integrating sustainability factors into cost estimation, procurement decisions, value engineering, risk assessment, and mitigation in line with sustainable development to balance economic, environmental and social needs, allowing prosperity for now and future generations. The significance of the paper is to identify quantity surveying competencies in contributing to sustainable construction. The paper will begin by providing an overview of the concept of sustainable development and highlighting the need for interdisciplinary collaboration and the integration of sustainability principles into various sectors, including construction. The paper will also delve into the specific contributions that quantity surveyors can make towards sustainable development through their expertise in cost management and whole life costing and how quantity surveyors can incorporate sustainable practices into the profession. To conclude, this conference paper will emphasize on the indispensable role of quantity surveyors in advancing sustainable development within the construction industry. Their expertise in cost management, procurement, and stakeholder engagement positions them as key agents for driving positive change. By integrating sustainability principles into their practices, quantity surveyors can contribute significantly to achieving a more sustainable and resilient built environment.

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## 1. INTRODUCTION

Sustainable development has emerged as a critical approach in the modern era due to the pressing need to address environmental challenges and promote responsible resource utilization. It goes beyond traditional construction practices by considering the long-term impact of buildings and infrastructure on the environment, society, and the economy. Integrating sustainability factors in construction is crucial to ensure that construction projects are economically viable while minimizing their negative ecological consequences. This delicate equilibrium between cost and environmental impact is essential for achieving a sustainable built environment and safeguarding the well-being of current and future generations (Markevich, 2023).

According to Asif et al., (2007), the construction industry is a major contributor to climate change, as it is responsible for almost half of the global greenhouse gases and consumes 40% of the materials entering the global economy. The issue of sustainable built environment cannot be overemphasized in recent times that the entire world is being faced with the global phenomenon of climate change and other environmental challenges (Wao, & Flood, 2016). Tackling environmental sustainability therefore requires that a holistic approach should be sought by addressing all three principles of sustainable development namely social, economic and environmental. This is because relying on the collaboration of all stakeholders to quantify and interpret emissions throughout the building lifecycle is a key indicator of responsible use of resources and energy and this will go a long way in attaining a sustainable built environment (Sodagar and Fieldson, 2011).

Sustainable building practices have been adopted more widely around the world as people have become more aware of the enormous impact that the construction industry has on the surroundings in terms of resource usage, indoor air quality, related human health, and land use (Wao, & Flood, 2016). A sustainable or green building is defined as "the process of creating constructions and using procedures that are ecologically sound and resource-efficient throughout a life cycle of a building, from siting to layout, building, functionality, preservation, remodeling, and dismantling (Zainul-Abidin, 2010). A green building is one that, uses a careful integrative and holistic strategy that reduces energy utilization, enhances daylight, has a high level of thermal and indoor air comfort, preserves water, reuses components and intercepts with recycled material, lessens site interruptions, and typically offers a high extent of occupant comfort (Zainul-Abidin, 2010). The benefits of green construction technology include lower operating costs; lower utility prices, higher productivity linked to cleaner air and quality of life elements, and increased status (Wao, & Flood, 2016). The building industry has the greatest potential to reduce greenhouse gas emissions globally (Asif et al., 2007). Green building practices expand upon and complement

the traditional building design considerations of economics, usability, longevity, and pleasure. The result of green building is a sustainable built environment which is a major requirement for the sustainable development of any nation.

There is no doubt that Quantity Surveyors are the cost experts in the construction industry, therefore they have to be alive to traditional roles to ensure a sustainable built environment in addition to the ever changing construction trend to make them relevant in the construction industry. Quantity Surveyors therefore need to be well equipped with knowledge and skills about sustainability and sufficient data base for cost comparisons and estimation. This therefore calls for the Quantity Surveyors and other professionals in the construction industry to redouble their effort in the way and manner building are constructed and the need to reduce cost escalations and construction time frame in order to produce buildings that can adapt well to our environment and that are also cost efficient.

The research method employed for this paper is a literature review focusing on the traditional roles of Quantity Surveyors and their roles in sustainable built environment which include among others life cycle costing, value engineering and cost comparison of different building materials. In addressing the issue of sustainability in built environment; three research questions were looked into, these are, why the need for sustainable buildings, what is sustainable building all about, and how can we obtain sustainable building?

## **2. CONCEPT OF SUSTAINABLE DEVELOPMENT**

Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs (World Commission on Environment and Development, 1987). Sustainable development or construction, also known as green or eco-friendly construction, is an approach that aims to create buildings and infrastructure that minimize their environmental impact, conserve resources, and promote social and economic well-being. Key principles of sustainable construction involve integrating principles of environmental responsibility, energy efficiency, resource efficiency, and social sustainability throughout the entire lifecycle of a construction project as detailed below:

- Environmental Responsibility: Minimizing the use of non-renewable resources, reducing greenhouse gas emissions, and protecting ecosystems and biodiversity.
- Energy Efficiency: Designing and constructing buildings to optimize energy performance, reduce energy consumption, and promote the use of renewable energy sources.
- Resource Efficiency: Promoting the efficient use of materials, minimizing waste generation, and encouraging recycling and reuse of materials.
- Social Sustainability: Creating buildings that enhance the well-being and comfort of occupants, prioritize occupant health and safety, and promote equitable access to resources and amenities.

Literature has also revealed that the construction industry contributes to the economy if sustainability is pursued in the development of all facets of nations. As a result, the necessity to implement sustainable construction is imperative as “what we build today will provide the

built environment of the future and will influence the ability of future generations to meet their need”. Several countries’ policies on sustainable development are developed along with global initiatives. Initiatives such as the 1992 Earth Summit (UN Conference on Environmental and Development) deliberated on ways of accomplishing sustainable development, setting Agenda 21 as the action plan. Several developed countries have gone on to develop their various national sustainable development strategies. In order for nations to be able to attain their own sustainable development, Zainul-Abidin, (2010) suggested a way for attaining sustainable construction, which encompasses all stakeholders such as; government, developers, clients, buyers/end users, contractors, consultants. This route begins with awareness, interest and knowledge of sustainable construction. This situation may reduce the drive of construction firms to promote sustainable construction practices. In Nigeria, it has been found that there are no empirical data about what drives’ construction businesses in the direction of sustainable construction. Sustainable construction cannot be discussed without discussing the impact of sustainability on construction. The impact of sustainability involves finding a balance between economic growth, environmental protection, and social progress. The concept acknowledges that human well-being and prosperity depend on the responsible management of natural resources, social equity, and environmental protection.

## **2.1 Pillars of Sustainable Development**

Sustainable development can be visualized in three dimensions which serve as the pillars:

- **Economic Development:** Sustainable development seeks to promote economic growth that is inclusive, equitable, and environmentally sustainable. It emphasizes the need for efficient use of resources, innovation, and investment in clean technologies to support long-term economic prosperity.
- **Social Development:** Social equity and inclusion are fundamental aspects of sustainable development. It aims to address poverty, inequality, and social exclusion by ensuring access to education, healthcare, and basic human rights for all members of society.
- **Environmental Protection:** Environmental sustainability is a core principle of sustainable development. It involves conserving natural resources, reducing pollution, mitigating climate change, and preserving biodiversity to safeguard the planet for future generations.

## **2.2 Benefits and Challenges of Sustainable Development**

### **2.2.1 Benefits**

There is no doubt that the impact of sustainability on construction brings numerous benefits. Firstly, sustainable buildings have lower energy consumption and operational costs, leading to long-term savings for owners and occupants. Secondly, sustainable construction practices reduce environmental impact by conserving resources, minimizing waste generation, and lowering greenhouse gas emissions. Thirdly, sustainable buildings provide healthier indoor

environments with improved air quality and natural lighting, positively impacting occupants' well-being.

### 2.2.2 Challenges

However, there are also challenges associated with implementing sustainability in construction. One major challenge is the initial cost of sustainable materials and technologies. While some sustainable options may be more expensive upfront, their long-term benefits often outweigh the initial investment. Additionally, there may be a lack of awareness or resistance to change within the industry that can hinder widespread adoption of sustainable practices. Overcoming these challenges requires collaboration among stakeholders, government support through regulations or incentives, and continued research and development in sustainable technologies.

## **3. ROLE OF QUANTITY SURVEYOR**

Quantity Surveying is a synthesis of several disciplines, including cost management, construction technology, economics, law, management, and many others (Panojan et al., 2019). According to Dada and Jagboro (2015), the quantity surveying profession is no longer in its infancy. Quantity surveying plays a pivotal role in achieving sustainable construction goals by effectively managing costs, resources, and environmental impact throughout the entire construction lifecycle. Quantity surveyors are professionals who possess expertise in cost estimation, cost control, and procurement within the construction industry. Traditionally, their primary focus has been on financial aspects, but in the context of sustainable construction, their role expands to include environmental considerations as well. By integrating sustainability into their core responsibilities, quantity surveyors act as catalysts for change within the construction industry. Their expertise in cost management, procurement, and risk assessment, combined with a focus on sustainability, allows them to contribute significantly to achieving sustainable construction goals while balancing cost and environmental impact (Markevich, 2023).

### **3.1 Traditional Role of Quantity Surveyor**

Quantity surveyors are professionals who specialize in the financial management of construction projects. They play a crucial role in various stages of the project lifecycle, including pre-construction, construction, and post-construction (Markevich, 2023). Traditional quantity surveying services in relation to the building delivery process thus include the following (not in order of significance) (Wong, 2017):

- Feasibility studies
- Measurements
- Cost planning and estimating
- Procurement strategizing and management
- Construction financial controlling
- Preparation of BOQ and tender documents
- Preparing of financial statements
- Preparation of payment assessments and invoices (including interim payments)
- Assessment of variations
- Cost Control
- Value Engineering

### **3.2 Emerging Role of Quantity Surveyor in Sustainable Development**

The role of a Quantity Surveyor has evolved significantly over the years, and with the growing emphasis on sustainable development, this profession is expected to undergo further transformation. Seah (2009), states that, the world today presents different opportunities for the quantity surveyor as compared to the past. As the world continues to focus on reducing its environmental impact and adopting more sustainable practices, the Quantity Surveyor's role must also adapt to these emerging areas of innovation to stay relevant in the construction industry. Aside from the traditional roles of the QS, Seah (2009) has identified the following as the expanded or evolving role of a Quantity Surveyor towards achieving sustainable construction as discussed below:

- **Integration of Life Cycle Cost Analysis (LCCA):** Life Cycle Cost Analysis (LCCA) is a valuable tool for Quantity Surveyors to assess the long-term costs and environmental impact of construction projects. LCCA is a process for evaluating the total economic cost of an asset by analyzing initial costs and discounted future expenditures such as maintenance, operational, user, and social costs over the service life or life cycle of an asset (Rahman, et al. 2004). By incorporating LCCA into their decision-making process, Quantity Surveyors can help stakeholders make informed choices about the most sustainable and cost-effective options. This approach considers not only the initial construction costs but also the ongoing maintenance, operation, and disposal costs throughout the entire life cycle of a building or infrastructure project.

- **Adoption of Green Building Practices and Materials:** Green building practices and materials are becoming increasingly important in sustainable development. Quantity Surveyors can play a significant role in promoting these practices by identifying and specifying eco-friendly materials, such as recycled or locally sourced products. They can also help clients understand the financial benefits of incorporating green features, such as energy efficiency, water conservation, and indoor air quality. This will enable them to make informed decisions about the most sustainable and cost-effective options for their projects.
- **Embracing Digital Technologies:** Digital technologies, such as Building Information Modeling (BIM), Virtual Reality (VR), and Artificial Intelligence (AI), are transforming the construction industry and providing new opportunities for Quantity Surveyors to contribute to sustainable development. With the advancement in building information modeling (BIM) systems, the use of object orientated CAD may be able to contain information such as Green Assessment points, intelligent advice on usage, LCA with carbon, specifications and real time costing as well. The other key advancement to note is the automatic generation of bills of quantities from BIM. The apparent advantage of utilizing such systems would be a fundamental shift in the role of QSs to focus on higher value added cost estimating activities. Therefore, it is pertinent that the QS has to come to grasp with the advancement in information technology to stay relevant. By leveraging these tools, Quantity Surveyors can optimize design and construction processes, identify potential cost and environmental savings, and make more informed decisions about the materials and methods used in a project.
- **Focus on Circular Economy Concepts:** The concept of the circular economy encourages the reuse, repair, and recycling of materials to minimize waste and resource consumption. Quantity Surveyors can play a crucial role in promoting circular economy principles within the construction industry by identifying opportunities to incorporate these concepts into their projects. This may include implementing waste reduction strategies, promoting the use of recycled materials, and encouraging the adoption of modular construction techniques.
- **Promoting Social Sustainability:** Social sustainability is an essential aspect of sustainable development, and Quantity Surveyors can contribute to this by promoting projects that prioritize the well-being of the local community and its residents. This may include ensuring that projects provide affordable housing, accessible public spaces, and promote economic opportunities for local businesses. By incorporating these social considerations into their decision-making process, Quantity Surveyors can help create more sustainable and resilient communities.
- **Green Costing:** Cost models have to be updated to cater to Clients' needs in regards to the extra over costs for achieving the different levels of green building certification. The cost model for green buildings may vary from country to country due to the use of

different green building rating system, maturity of the construction industry and the availability of materials and technology. The strength of the QS will be to adjust high level cost models at the feasibility stage to fit the budget and inform the design consultants on the parameters of efficiencies, design factors, concepts and controlled quantities factors and rates. This will be underlined with value management ethos as well as risk management concepts.

- Carbon Footprint: Carbon footprint, that is, the current level of carbon emissions is essential for building owners to set benchmarks to measure carbon performance and to compare amongst other properties. The carbon footprint for buildings includes embodied carbon and operational carbon. The embodied carbon of a building are from the CO<sub>2</sub> produced during the manufacture of materials, their transport and assembly on site, maintenance and replacement, disassembly and decomposition. Operational carbon is carbon emissions due to the operations of the building. The QS may add value via executing the role of a cost and carbon management consultant through the integration of cost and carbon footprint. With an established methodology, the QS will be equipped to measure the carbon footprint as well as to create various carbon models for different developments. Costing benchmarks such as \$/m<sup>2</sup> GFA may be compared against carbon benchmarks such as kg/m<sup>2</sup> of CO<sub>2</sub> with carbon offset factors for green cover and carbon credits.
- Property Performance Reporting: Property performance reporting serves as a tool for measuring and evaluating the sustainability performance of buildings and portfolios. It allows property owners, investors, tenants, and other stakeholders to understand the environmental impact, resource consumption, and social aspects associated with a property or portfolio. By tracking key performance indicators (KPIs) and benchmarks, property performance reporting enables the identification of areas for improvement and the establishment of targets to enhance sustainability outcomes.
- Green Building Rating Assessment: The prevalent use of green building rating systems such as LEED and Green Mark in international projects has created new inroads for the QS to exploit. Courses such as the LEED Accredited Professional and the Green Mark Manager certification have been created to enhance the understanding of the relevant Green Building rating system and environmentally sustainable designs. With a greater understanding of the green building rating systems, the QS would be able to in a better position to advise the Client both on the costing and sustainable designs.

Howard (2015) states that the quantity surveyor has traditionally been the professional accounting for financial cost, benefits and value and into the future, we might expect the quantity surveyor to also be best placed to account for Greenhouse Gas costs, benefits and value.



#### 4. QUANTITY SURVEYORS AND SUSTAINABLE DEVELOPMENT

The contribution of the construction industry to sustainable development is vast and has many benefits though not all are being utilized (Cartlidge, 2017). Construction activities have evolved because of technological advances, and all construction professionals have an essential role in such substantial changes (Chamikara et al., 2020). In the context of sustainable development, quantity surveyors have a unique opportunity to influence decision-making processes by integrating sustainability considerations into cost management strategies.

Quantity Surveyors who adopt innovative new technologies like Building Information Model (BIM) would be more effective in dispensing their duties in addition to their vital experience and knowledge surrounding cost. The QS main role in sustainable development will be to evaluate the economic side of the sustainability model. This role has been adapted to modern times to become more diverse than advising about cost and cost management. Cartlidge (2017) argued that Quantity Surveyors could add value to a project by advising on the best value of a construction process or procedure by utilizing their procurement and contractual/legal experience to add value in terms of social and environmental rather than minimizing cost. (Chamikara et al., 2020). Another area of contribution to the role of the QS in sustainable development is the area of waste management. The construction industry accounts for 25-30% of all EU waste, with many of this waste currently containing different materials that can be recycled and reused (The European Commission, 2016). The barrier to recycling this material is cost, or more directly, the cost to the project sometimes, and clients do not have a budget for the extra cost (Cartlidge, 2017). However, with specification change, Quantity Surveyors can include waste recycling, reusing, or repurposing in the tender documentation, allowing disposal cost to be reduced while reducing the overall construction waste (Seidu et al., 2019). Quantity Surveyors' main goal is to assist with delivering a project on time and within budget. However, the government has placed emphasis on turning the industry greener with a new strategy in place such as; Construction 2025 and more comprehensive legislation like EU Directive 2002/91/EU for EPCs and DEC's in support of greener development (Cartlidge, 2017). Enhancing the built environment includes eliminating inefficiencies for all phases and aspects of construction works by accurately reporting the advantages and disadvantages of different construction methods, materials, and costs to better understand efficiency (Ekundayo et al., 2011). Comparing usage against output and cost provides a definite answer for the best option during the pre and post-construction phase (Cartlidge, 2017). Decision making is a crucial skill for Quantity Surveyors. Failure to act in the best interest of the construction industry due to professional interest leaves the built environment unprotected. Hence exceeding the industry's disciplinary boundaries for self-gain is detrimental to the protection of the built environment (Olatunji et al., 2010). The RICS (2015) and Seidu et al. (2020) conclude that innovative technology like Building Information Modeling, Common Big Data, E-Procurement can complement the evolving roles of Quantity Surveyors in improving sustainable development to help achieve sustainable goals.

## 5. CONCLUSION AND RECOMMENDATION

This study reviewed literature on the role of the Quantity surveyor towards achieving sustainable construction and it was clearly established that the Quantity Surveyor has a significant role to play in ensuring the advancement and benefits of sustainable construction for it to be delivered successfully. Sustainability, or sustainable development as it is known in the construction industry, is the current buzzword for our modern society. However, implementing green building is not without its challenges. This challenge calls for transformation in the way Quantity Surveyor/s function. Although the participation of the Quantity Surveyor towards achieving sustainable construction in developing economies is somewhat low due to lack of knowledge and skills of green materials and products, lack of sufficient database for cost comparison and estimation.

It is recommended that the Quantity Surveyor should rigorously embrace these duties through continuous development and participation of these sustainable construction duties.

Ma (2013) also suggested that Quantity Surveyors should:

- Upgrade themselves with relevant skills and knowledge in sustainable development via research
- Attend seminars on green building
- Building up cost database by collecting costs from suppliers on green building services and products.

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## **BIOGRAPHICAL NOTES**

Priscilla Oluchi Akabudike is a professional in the field of Quantity Surveying and Project Management in the Oil and Gas Fabrication sector and currently works as a Subcontract administrator for EPC projects at Aveon Offshore Limited. She received a Higher National Diploma in Quantity Surveying from Federal Polytechnic Nekede Imo State in the year 2000. Her job responsibilities empowered her to earn a postgraduate diploma in Professional Practice in Contract Management from the College of Contract Management, United Kingdom. Due to her quest to learn, unlearn, and relearn, she enrolled and earned a bachelor's degree in Quantity Surveying (Top-up) from Gregory University Uturu, Abia State, and is currently undergoing her master's degree in Quantity Surveying from Gregory University Uturu Abia State, Nigeria. She is a Fellow of the Nigerian Institute of Quantity Surveyors (NIQS), a registered member of the Quantity Surveyors Registration Board of Nigeria (QSRBN), and a member of the Women Association of Quantity Surveyors in Nigeria (WAQSN). She also holds a PMP certification and is a member of the Project Management Institute (PMI). She has served in various capacities for NIQS and WAQSN, in which she is the immediate past WAQSN Chairperson for the year 2021-2023. She has delivered seminar papers at webinars with the themes "The Professional Woman and Work-life Balance" and

"Soft Skills Required by a Quantity Surveyor". She is passionate about career growth in her field of endeavor.

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