An Assessment Of The Roles And Challenges Of Quantity Surveyors In Steel Fabrication Projects Within The Oil And Gas Sector In Nigeria[1]

Godson Kelechi

Abstract

This study examined roles and challenges encountered by the quantity surveyors in steel fabrication projects with respect of oil and gas sector in Nigeria. Its main goal is to evaluate their participation throughout various project stages, and to suggest strategies for better integration. The oil and gas sector, being one of the most technically demanding and capital intensive industries in Nigeria, requires effective cost management to ensure value for investment. A descriptive survey design was adopted, using a structured questionnaire based on a five point Likert scale and this study employed a purposive sampling techniques. Respondents included practicing quantity surveyors, engineers, architects, contractors, and project managers operating in major oil and gas States such as Rivers, Delta, Bayelsa, Akwa Ibom, Edo, and Cross River State. Out of eighty five (85) distributed questionnaire, seventy (70) valid responses were received and analyzed. Data analysis was conducted using descriptive statistics such as mean and standard deviation-through the Statistical Package for Social Sciences (SPSS, version 25.0).

Results showed that quantity surveyors significantly contribute to cost planning, contract administration, tender evaluation, cost control, value engineering, and post project audits especially during the procurement phase. Nonetheless, their participation in the design, fabrication, and commissioning phases remains minimal due to several limitations. This study also identified some major challenges which include issues of low professional recognition with respect the oil and gas sector, lack of institutional policy support system, limited access to specialized training and also lack of digital technologies, poor integration into multidisciplinary construction project teams, and lack of adequate technical exposure to industrial and process engineering. However, this study also recommends that there is the need for good collaboration between the Nigerian Institute of Quantity Surveyors and Nigerian Content Development and Monitoring Board to improve policy inclusion which will aid to enhance industrial cost engineering training.

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1. Introduction

A successful delivery of construction projects will help to enhance project efficiency and effectiveness and also enable various construction professionals to meet up construction project deadlines (Kelechi, Amadi, & Chinemerem, 2025). The oil and gas industry serves as a fundamental pillar of Nigeria's economy, contributing over 80% of the nation's government revenue and foreign exchange income (Nwosu et al., 2022). Development infrastructure in this sector particularly steel fabrication for pipelines, refineries, and offshore platforms requires precise cost management, effective scheduling, and optimal resources utilization. These responsibilities align with the professional expertise of quantity surveyors, who ensure financial control and cost predictability throughout project lifecycle (Oladokun & Gbadebo, 2020). Using Nigeria as a case study, it is essential to note that the quantity surveyors role has adequately progressed beyond the construction of building and involving engineering and industrial projects which include those vital project within the gas and oil sector. In addendum, even their important contributions, the inclusion of quantity surveyors with respect to steel fabrication projects is still limited and also not valued (Ameh & Osegbo, 2019). They encounter several professional obstacles, including insufficient technical proficiency in industrial processes, limited exposure to fabrication techniques, weak regulatory support, and poor collaboration among stakeholders (Oladapo et al., 2021). Geographical industrial distribution significantly influences both the challenges and opportunities faced by quantity surveyors. Additionally, Nigeria's dependence on imported steel and limited domestic production capacity increase cost estimation risks (Udo & Akpan, 2020). Institutional barriers further compound these challenges, including the slow alignment of professional organizations like the Nigerian Institute of Quantity Surveyors with industrial standards, insufficient training in oil and gas costing, and the absence of frameworks that formally integrate Quantity Surveyor roles to Engineering, procurement, and Construction contracts(Okolie et al., 2023). The study concentrates on key regions of oil and gas activity particularly the Niger Delta (South–South), South– West, and North–Central zones. The Niger Delta, comprising Rivers, Delta, Bayelsa, Akwa Ibom, Cross River, and Edo States, is the core of Nigeria's petroleum production. This region houses majors industrial establishments such as the Nigerian Liquefied Natural Gas plant in Bonny Island, the Warri Refining and Petrochemical Company, and fabrication facilities like NigerDock (Onne) and Aveon Offshore. These projects rely heavily on specialized quantity surveyor expertise for cost estimation, procurement, and efficient resource management (Adewuyi & Odesola, 2021).

Globally, the Quantity surveying profession is evolving toward cost engineering and value management, especially within technologically advanced industries (Laryea & Hughes, 2021). For Nigeria to achieve sustainable growth in its oil and gas infrastructure, quantity surveying professionals must be repositioned to play more active roles in steel fabrication and industrial cost management (Akinradewo et al., 2022). Accordingly, this study seeks to: examine the roles of quantity surveyors in steel fabrication projects within the oil and gas sector in Nigeria, assess the challenges faced by quantity surveyors in executing steel fabrication projects in oils and gas sector, determine the extent of quantity surveyors' involvement across different project phase (design, procurement, fabrication, and commissioning) and identify strategies to enhance the integration of quantity surveyors in steel fabrication projects within the oil and gas sector.

2. Literature Review

2.1 The Roles Of Quantity Surveyors In Steel Fabrication Projects

It is essential to note that quantity surveying field serves as an important foundation in the area of engineering and also construction project management, which helps to enhance financial transparency, efficiency in cost control, and judicious utilization of available resources (Oladokun & Gbadebo, 2020). With respect to construction of building, it is vital to know that the profession also include the sectors of infrastructure and also industrial in area of gas and oil sectors. Consequently, quantity surveyors also perform a major role with respect to the area of procurement, budgeting, contract administration, cost control for steel fabrication projects and also engineering projects (Ameh & Osegbo, 2019). Steel fabrication entails the design, cutting, shaping, and assembly of structural steel components used in facilities such as pipelines, refineries, and offshore platforms. Due to the technical and material complexities involved, these projects demand precise cost forecasting and effective financial management. Involving professionals like quantity surveyors at this level enhances effectiveness and efficiency in cost and also value maximization (Adewuyi & Odesola, 2021).

A comparative perspective with oil-rich nations such as the United Arab Emirates (UAE) and Saudi Arabia provides valuable insight. Both countries have successfully embedded quantity surveying as a central component of their oil and gas construction management systems. In the United Arab Emirates, quantity surveyors are integrated early in project design to ensure accurate life-cycle costing, procurement optimization, and sustainability assessment-practices institutionalized through regulatory frameworks like the Dubai Municipality Construction Cost

Index (El-Sayegh & Mansour, 2015). This strong collaboration between quantity surveying professionals and engineers in the United Arab Emirates has minimized project overruns and improved value delivery, particularly in offshore steel fabrication and modular construction for oil terminals (Al-Shehhi & Elhag, 2022). In Saudi Arabia, quantity surveyors play key roles in mega-projects such as the Aramco refinery expansions and steel fabrication for offshore rigs. The Saudi Council of Engineers mandates quantity surveyors involvement in project cost auditing, contract administration, and claims management. Unlike in Nigeria, Saudi Arabia's institutional backing ensures that quantity surveyors are part of multidisciplinary project control units, equipped with advanced software tools and standardized benchmarking systems for cost evaluation (Alzahrani & Emsley, 2023). The result is a more structured integration of cost control and risk management into project delivery processes-something Nigerian practice can emulate. In both countries, quantity surveying practice has not evolved to align with global best practices emphasizing data-driven cost modeling, BIM (Building Information Modeling) integration, and risk-based cost planning. These innovations have not yet been fully adopted in Nigeria's oil and gas construction ecosystem, where quantity surveyors often function in advisory rather than executive project management capacities (Ogbu & Ehigiator-Irughe, 2020).

During the design phase, quantity surveyors focus on feasibility assessments, cost planning, and budget estimation. They prepare preliminary cost plans derived from specifications, providing a financial framework that enables clients to make informed investment decisions. According to Ameh and Osegbo (2019), early quantity surveyors involvement in cost modeling significantly improves cost predictability and budget accuracy for industrial projects. At procurement stage, quantity surveyors handle tender documentation, bid assessments, and contract administration. Their responsibilities include preparing bills of quantities, developing evaluation criteria, and reviewing bids to ensure fairness, transparency, and compliance with local content regulations. Oladapo et al. (2021) observed that QS-led procurement fosters accountability, reduces financial risk, and enhances equitable contract management in Nigeria's oil and gas industry. During the fabrication stage, quantity surveyors oversee cost control, material evaluation, and variation management. They monitor expenditure, verify payments, and ensure that all activities adhere to approved budgets and schedules. Through value engineering, they assess alternative material or fabrication methods to achieve project efficiency at lower costs. Oladokun and Gbadebo (2020) found that such QS driven value management can reduce fabrication expenses by up to 15% without compromising quality or safety.

With respect to risk management and cost forecasting, quantity surveyors identify and mitigate financial risks arising from price fluctuations, exchange rate variations, or project delays. Their

financial risk analyses helps minimize uncertainties and support strategic decision making within Engineering, Procurement, and Construction (EPC) projects (Akinradewo et al., 2022). Finally, at the commissioning stage, quantity surveyors prepare final accounts, conduct post project evaluations, and perform life cycle cost analyses. These assessments compare actual costs with initial estimates to gauge financial performance and project efficiency. Life cycle costing further aids clients in understanding long term operational and maintenance expenses. As highlighted by Oladapo et al. (2021), such post construction evaluations contribute to sustainability and dive continuous improvement in industrial project delivery.

2.2 Extent Of Quantity Surveyors Involvement Across Projects Phases

The participation of quantity surveyors in steel fabrication projects within Nigeria's oil and gas sector spans all major stages of the project lifecycle—design, procurement, fabrication and commissioning. However, their level of engagement varies across these phases due to the industrial nature of projects, institutional constraints, and the technical complexities inherent in the sector (Oladokun & Gbadebo, 2020; Oladapo et al., 2021). With respect to the design phase of a construction project, the quantity surveyors engagement is essentially moderate. The work of a quantity surveyor originally entails to conduct feasibility study, prepare preliminary cost estimate, and advise on the selection of material. These functions help ensure that design remain within realistic budgetary parameters. However, in Nigeria oil and gas sector, quantity surveyors are frequently engaged only after design concepts have been finalized, limiting their ability to affect early cost decisions or contribute to design optimization (Ameh & Osegbo, 2019; Laryea & Hughes, 2021). In the fabrication phase, quantity surveyors participation can be described as moderate. This stage involves the manufacturing, assembly, and installation of steel components either in workshops or at site based fabrication yards. Quantity surveyors are responsible for monitoring project expenditures, verifying payment certificates, managing cost variations, and preparing financial reports for management decisions. It is vital to note that quantity surveyors helps in reducing cost risk related issues such as wastage of material, changes in the design or delay in production. According to Adewuyi and Odesola (2021), noted that the quantity surveyors are generally major key to cost tracking, and their little comprehension about fabrication methods and workflows in terms of production most times limits their capacity to utilize cost.

Similarly, Okolie et al. (2023) emphasized that a lack of technical training and industrial exposure among Nigerian quantity surveyors hinders their contribution during fabrication. At the commissioning stage, quantity surveyors involvement is minimal. Their responsibilities are

generally limited to final account preparation, cost reconciliation, post project evaluation, and providing cost data for asset valuation and maintenance planning. The procurement phase represents the stage where quantity surveyors have most substantial involvement, aligning closely with their core professional competencies. At this stage, they prepare tender documentation and bills of quantities, evaluate contract bids, recommends procurement strategies, negotiate contracts, and ensure compliance with both organizational and regulatory requirements, including Nigeria's Local Content Policy. At the commissioning stage, quantity surveyor involvement is minimal. Their responsibilities are generally limited to final account preparation , cost reconciliation, post project evaluation, and regulatory authorities dominate this phase, leaving little room for QS participation. Laryea and Hughes (2021) noted that globally, quantity surveyor involvement in commissioning rarely exceeds 40%, largely due to project compartmentalization and limited recognition of their potential contributions at project closure.

2.3 Challenges Faced By Quantity Surveyors In Executing Their Roles In oil and Gas Sector in Nigeria

With respect of the challenges faced by quantity surveyors in executing their roles in oil and gas sector in Nigeria, quantity surveyors faces numerous issues which limit their efficiency and effectiveness, limit their engagement at various construction project phases, and reduce their potential on the practice of management of cost in steel fabrication projects. All these issues arise from factors such as educational, institutional, technical and policy related factors, which in one way or the other reduce all round integration of quantity surveyors with respect to industrial project environment (Ameh & Osegbo, 2019; Oladokun; & Gbadebo, 2020). However, it is important to note that of the key problem is the lack of adequate technical knowledge and also industrial exposure of the quantity surveyors in the view of process and mechanical engineering systems. As a result, their participation tends to be confined to procurement and tendering, while engineers dominate design and fabrication decisions (Oladokun & Gbadebo, 2020). Another significant issue is the low professional recognition of quantity surveyors within the oil and gas industry. The sector's engineering dominance often leads to underestimation of quantity surveyor contributions to cost control and project planning. Multinational oil companies frequently prefer hiring cost engineers or project control managers rather than quantity surveyors, assuming that quantity surveyor expertise is limited to building construction (Oladapo, Olatunji & Fagbenle, 2021). Consequently, quantity surveyors are often excluded from early project phases, diminishing their strategic role in shaping cost decisions (Akinradewo, Ogunsemi & Fapohunda, 2022). Institutional and policy weakness further exacerbate these challenges.

Although the Nigerian Oil and Gas Industry Content Development Act (2010) promotes indigenous participation, it does not specifically mandate the inclusion of quantity surveyors in major projects. This policy gag allows multinational contractors to continue relying on expatriates, marginalizing local professionals (Okolie, Eze & Ojiako, 2023). The lack of specialized training and continuous professional development also limits QS effectiveness. The oil and gas sector increasingly relies on digital tools like primavera CostX, and building information modeling for cost estimation and project control. In addendum, most quantity surveyors in Nigeria lack access to the new systems as a result of increased certification costs and lack of adequate institutional support system (Adewuyi & Odesola, 2021). As a result, there is a reduction in skill gap and competitiveness when compared with internationally well trained team members and it also reduce their capacity to meet modern digital construction project requirements (Olatunji, 2020). Another issue is the poor integration of quantity surveyors into numerous multidisciplinary construction project teams, with respect to construction contracts, procurement and engineering process. For instances, the quantity surveyors are involved only with respect to procurement and also certification, with limited engagement in view of the design or fabrication (Oladapo et al., 2021). As a matter of facts, it resulted to reactive cost management, in which financial problem are solved after it happened rather than proffering solution using proactive planning and value engineering (Laryea & Hughes, 2021). In addendum, the absence of good data management and also cost benchmarking systems which as a result produce significant encumbrances. In Nigeria, there are lack of adequate centralized cost database system for fabrication processes, industrial material, and equipment , thereby making accurate estimation very difficult (Udo & Akpan, 2020).

2.4 Strategies For Enhancing The Integration Of Quantity Surveyors In Steel Fabrication Projects Within The Oil And Gas Sector In Nigeria.

The involvement of quantity surveyors with respect to fabrication projects in Nigeria's oil and gas industry is very much essential with respect of enhancing efficiency in cost, more transparency, and enhance value for money in the delivery of construction project. Despite the value of a quantity surveyors engagement in various construction project lifecycle, it remains very limited as a result of technical, institutional, and also policy related issues (Ameh & Osegbo, 2019; Akinradewo et al., 2022; Okolie et al., 2023). One key strategy involves developing specialized industrial and technical training programs for quantity surveyors. Current Quantity Surveying education in Nigeria is largely construction focused, emphasizing building projects rather than heavy industrial and fabrication processes. Consequently, many quantity surveyors lack sufficient understanding of the technical and cost dynamic associated with steel

fabrication, welding, and mechanical systems. Okelie et al. (2023) and Adewuyi and Odesola (2021) recommend creating industry-specific training modules in collaboration with the Nigerian Institute of Quantity Surveyors (NIQS) and Nigerian Content Development and Monitoring Board (NCDMB). It is essential that these training will include industrial cost modeling, estimation processes, and also cost control methods for engineering, procurement, and building construction projects. Ameh and Osegbo (2019) emphasize that engaging quantity surveyors from project inception promotes design-to-cost planning, value engineering, and budget optimization before resource commitments are made. Including quantity surveyors in early multidisciplinary design teams-alongside engineers, architects, and fabricators-enables more precise life-cycle costing and cost –informed design decisions. Laryea and Hughes (2021) found that early quantity surveyor participation can reduce average cost overruns in industrial projects by up to 15%. Therefore, policy frameworks and client awareness initiatives should mandate quantity surveyors inclusion during feasibility and conceptual design phases to strengthen cost governance.

Improving institutional collaboration between professional bodies, regulators and industry players is another essential strategy. Akinradewo et al. (2022) propose that Nigerian Institute of Quantity Surveyors (NIQS), Nigerian Content Development and Monitoring Board (NCDMB), and the Council of Registered Builders of Nigeria (CORBON) jointly develop policy guidelines mandating cost professionals' participation in all fabrication-related contracts, particularly those under local content initiatives. Regulatory agencies should introduce standardized cost reporting templates and industrial cost benchmarking systems supervised by quantity surveyors. Digital transformation provides another major opportunity for integrating quantity surveyors effectively into steel fabrication projects. Tools such as Building Information Modeling (BIM), CostX, and Enterprise Resource Planning (ERP) systems enables real-time cost estimation, material quantification, and project performance tracking (Oladapo et al., 2021; Laryea & Hughes, 2021). By leveraging these technologies, quantity surveyors can collaborate more effectively with engineers and fabricators through integrated digital environments that facilitate shared access and synchronized workflows. For example, BIM-enabled cost modeling allows quantity surveyors to immediately assess the cost implications of design changes, while Enterprise Resource Planning (ERP) systems connect procurement, fabrication, and finance departments seamlessly. Oladapo et al., (2021) recommend redefining Engineering, Procurement, and Construction (EPC) frameworks to include specialized cost management units led by certified quantity surveyors. Such integration ensures that cost engineering principles are systematically embedded across all stages-engineering, procurement, fabrication, and commissioning.

Finally, sustained integration of quantity surveyors in the oil and gas sector depends on research collaboration among universities, professional institutions, and fabrication firms. Research based partnerships can bridge the gap between academic training and industry needs. Oladokun and Gbadbo (2020) emphasize that joint investigations into industrial cost modeling, sustainable material use, and life cycle assessment will expand the relevance and innovation capacity of quantity surveyors in industrial project environments.

3. Methods of the study

This study investigates the roles and challenges of Quantity Surveyors in steel fabrication projects within Nigeria's oil and gas sector. A descriptive survey design was adopted, using a structured questionnaire based on a five point Likert scale and this study employed a purposive sampling techniques. Respondents included practicing quantity surveyors, engineers, architects, contractors, and project managers operating in major oil and gas States such as Rivers, Delta, Bayelsa, Akwa Ibom, Edo, and Cross River State. Out of eighty five (85) distributed questionnaire, seventy (70) valid responses were received and analyzed. Data analysis was conducted using descriptive statistics such as mean and standard deviation-through the Statistical Package for Social Sciences (SPSS, version 25.0). Results showed that quantity surveyors significantly contribute to cost planning, contract administration, tender evaluation, cost control, value engineering, and post project audits especially during the procurement phase.

Nonetheless, their participation in the design, fabrication, and commissioning phases remains minimal due to several limitations. This study also identified some major challenges which include issues of low professional recognition with respect the oil and gas sector, lack of institutional policy support system, limited access to specialized training and also lack of digital technologies, poor integration into multidisciplinary construction project teams, and lack of adequate technical exposure to industrial and process engineering. However, this study also recommends that there is the need for good collaboration between the Nigerian Institute of Quantity Surveyors and Nigerian Content Development and Monitoring Board to improve policy inclusion which will aid to enhance industrial cost engineering training.

4. Results And Discussion Of Findings

Questionnaire distribution and responses

RESPONDENTS	DISTRIBUTION	RESPONSES	(%)RESPONSES
Quantity Surveyors	26	25	96
Architects	14	13	93
Engineers	16	11	69
Project managers	14	11	79
Contractors	15	10	67
Total	85	70	82

Source: Field Data 2025.

4.1 Data Analyses

Table 4.1.1: Summary of mean and standard deviation statistics on the key roles played by quantity surveyors in steel fabrication projects within the oil and gas sector in Nigeria.

S/N	Items	SA	A	N	D	SD	Mean	Std.	Decision
1	Cost estimation and budget control.	13	15	28	13	1	3.37	1.04	Agreed
2	Tendering and procurement planning.	11	22	19	17	1	3.36	1.06	Agreed
3	Contract administration and documentation.	10	35	16	7	2	3.63	0.95	Agreed
4	Progress Valuation and financial reporting.	9	18	24	10	9	3.11	1.20	Agreed
5	Advising on cost effective fabrication method.	25	13	9	16	7	3.47	1.43	Agreed
	Grand mean						**3.39**	**0.65**	**Agreed**

Source: Researcher's Fieldwork (2025).

The results from Table 4.1.1 show the summary of mean and standard deviation statistics on the key roles played by quantity surveyors in steel fabrication projects. It shows that the grand mean of the respondents over the key roles played by quantity surveyors in steel fabrication projects was 3.39, SD=0.65. Specifically, the respondents highly indicated that contract administration and documentation was a key role played by quantity surveyors with a mean rating of 3.63, SD=0.95. This was followed by advising on cost-effective fabrication methods with a mean rating of 3.47, SD=1.43. Cost estimation and budget control had a mean rating of 3.37, SD=1.04. Tendering and procurement planning had a mean rating of 3.36, SD=1.06. Lastly, progress valuation and financial reporting had a mean rating of 3.11, SD=1.20.

Table 4.1.2: Summary of mean and standard deviation statistics on the extent of Quantity Surveyors involvement across different project phases (design, procurement, fabrication and commissioning).

S/N	Items	SA	A	N	D	SD	Mean	Std.	Decision
6	Design phase.	11	19	22	15	3	3.29	1.11	Agreed
7	Procurement phase.	10	21	9	20	10	3.01	1.32	Agreed
8	Fabrication phase.	7	31	11	15	6	3.26	1.16	Agreed
9	Installation/commissioning phase.	8	22	24	6	10	3.17	1.19	Agreed
	Grand mean						**3.18**	**0.58**	**Agreed**

Source: Researcher's Fieldwork (2025).

The results from Table 4.1.2 show the summary of mean and standard deviation statistics on the extent of involvement of quantity surveyors across project phases. It shows that the grand mean of the respondents over the extent of their involvement across project phases was 3.18, SD=0.58. Specifically, the respondents highly indicated that quantity surveyors were always involved in the design phase with a mean rating of 3.29, SD=1.11. This was followed by involvement in the fabrication phase with a mean rating of 3.26, SD=1.16. Involvement in the installation/commissioning phase had a mean rating of 3.17, SD=1.19. Lastly, involvement in the procurement phase had a mean rating of 3.01, SD=1.32.

Table 4.1.3: Summary of mean and standard deviation statistics on the challenges faced by quantity surveyors in executing their roles in the oil and gas sector.

S/N	Items	SA	A	N	D	SD	Mean	Std.	Decision
10	Limited involvement at design state.	9	29	19	12	1	3.47	0.97	Agreed
11	Poor understanding of QS role by other professionals.	13	33	16	5	3	3.69	1.00	Agreed
12	Fragmented project communication.	12	38	9	7	4	3.67	1.06	Agreed
13	Lack of specialized training in fabrication.	11	28	19	3	9	3.41	1.20	Agreed
14	Conflicts with project team roles.	14	37	11	3	5	3.74	1.06	Agreed
	Grand mean						**3.60**	**0.53**	**Agreed**

Source: Researcher's Fieldwork (2025).

The results from Table 4.1.3 show the summary of mean and standard deviation statistics on the challenges faced by quantity surveyors in executing their roles in the oil and gas sector. It shows that the grand mean of the respondents over the challenges faced by quantity surveyors was 3.60, SD=0.53. Specifically, the respondents highly indicated that conflicts with project team roles was

a major challenge faced by quantity surveyors with a mean rating of 3.74, SD=1.06. This was followed by poor understanding of the quantity surveyor's role by other professionals with a mean rating of 3.69, SD=1.00. Fragmented project communication had a mean rating of 3.67, SD=1.06. Limited involvement at the design stage had a mean rating of 3.47, SD=0.97. Lastly, lack of specialized training in fabrication had a mean rating of 3.41, SD=1.20.

Table 4.1.4: Summary of mean and standard deviation statistics on the strategies used to enhance the integration of quantity surveyors in steel fabrication projects.

S/N	Items	SA	A	N	D	SD	Mean	Std.	Decision
15	Early Involvement in project planning.	13	34	18	5	0	3.79	0.83	Agreed
16	Specialized QS training in fabrication.	12	39	11	2	6	3.70	1.07	Agreed
17	Collaboration with engineers from concept to close-out.	9	34	16	6	5	3.51	1.06	Agreed
18	Adoption of digital cost and fabrication software.	25	15	13	9	8	3.57	1.39	Agreed
19	Advocacy through professional institutions.	11	23	13	15	8	3.20	1.27	Agreed
	Grand mean						**3.55**	**0.55**	**Agreed**

Source: Researcher's Fieldwork (2025).

The results from Table 4.1.4 show the summary of mean and standard deviation statistics on the strategies used to enhance the integration of quantity surveyors in steel fabrication projects. It shows that the grand mean of the respondents over the strategies used to enhance the integration of quantity surveyors was 3.55, SD=0.55. Specifically, the respondents highly indicated that early involvement in project planning was a key strategy to enhance integration with a mean rating of 3.79, SD=0.83. This was followed by specialized quantity surveyor training in fabrication with a mean rating of 3.70, SD=1.07. Adoption of digital cost and fabrication software had a mean rating of 3.57, SD=1.39. Collaboration with engineers from concept to close-out had a mean rating of 3.51, SD=1.06. Lastly, advocacy through professional institutions had a mean rating of 3.20, SD=1.27.

4.2 Discussion of Findings

The findings indicate that quantity surveyors play important roles in steel fabrication projects, as shown by the grand mean of 3.39 and a standard deviation of 0.65. This overall score suggests that respondents generally agree on the value these professionals bring to such projects through their various duties. One key area is contract administration and documentation, which received

the highest mean rating of 3.63 and a standard deviation of 0.95. Respondents clearly view this as a main role, where quantity surveyors handle contracts and related paperwork to ensure smooth project flow. This agrees with research that identifies contract administration as a top competency for quantity surveyors in managing construction work (Oke et al., 2025). Another notable role is advising on cost-effective fabrication methods, with a mean of 3.47 and a standard deviation of 1.43. Here, quantity surveyors help by suggesting ways to fabricate steel that save money without losing quality. This finding is supported by studies that emphasise the part quantity surveyors play in reviewing alternative materials and their cost effects to promote better and more affordable practices (Olatunde, Anugwo, & Awodele, 2025). Other roles, such as cost estimation and budget control with a mean of 3.37, tendering and procurement planning at 3.36, and progress valuation and financial reporting at 3.11, also contribute to the overall picture. These results highlight how quantity surveyors help keep projects on track financially and operationally.

The findings from Table 4.1.2 highlight the consistent involvement of quantity surveyors across various project phases in steel fabrication projects, with a grand mean of 3.18 and a standard deviation of 0.58. This suggests that respondents generally agree that quantity surveyors are actively engaged throughout the project lifecycle, contributing to its success in different stages. One key finding is the high involvement of quantity surveyors in the design phase, which scored a mean rating of 3.29 and a standard deviation of 1.11. This indicates that respondents see quantity surveyors as highly active during this phase, likely contributing to cost planning and ensuring designs align with budget constraints. This aligns with research that notes quantity surveyors' significant role in providing cost advice during the design stage to support project feasibility (Olanrewaju & Anahve, 2020).

Another notable area is their involvement in the fabrication phase, with a mean rating of 3.26 and a standard deviation of 1.16. Quantity surveyors appear to play a key role here, possibly in monitoring costs and ensuring efficient resource use during fabrication. This is supported by studies that highlight their contributions to cost control and material management during construction activities (Ebekozien et al., 2023). The findings also show involvement in the installation/commissioning phase (mean of 3.17) and the procurement phase (mean of 3.01), indicating a steady presence across all stages. These results underline the ongoing contributions of quantity surveyors in maintaining financial oversight and operational efficiency throughout project phases. The findings from Table 4.1.3 reveal the challenges quantity surveyors face in the oil and gas sector, with a grand mean of 3.60 and a standard deviation of 0.53. This indicates that

respondents consistently recognise significant obstacles that affect the performance of quantity surveyors in these projects.

One major challenge is conflicts with project team roles, which received the highest mean rating of 3.74 and a standard deviation of 1.06. This suggests that quantity surveyors often face issues due to overlapping or unclear roles within the project team, leading to misunderstandings or disputes. This finding is supported by research highlighting that role conflicts among professionals in complex projects, such as those in the oil and gas sector, can hinder effective collaboration (Aje et al., 2021). Another significant challenge is the poor understanding of the quantity surveyor's role by other professionals, with a mean rating of 3.69 and a standard deviation of 1.00. This indicates that other team members may not fully appreciate the contributions of quantity surveyors, which can limit their effectiveness. This is consistent with studies that note a lack of clarity about the quantity surveyor's responsibilities among project stakeholders, often leading to underutilization of their skills (Olatunde & Okorie, 2022). Other challenges, such as fragmented project communication (mean of 3.67), limited involvement at the design stage (mean of 3.47), and lack of specialised training in fabrication (mean of 3.41), further highlight the barriers quantity surveyors encounter. These findings show the need for better role clarity and improved communication to enhance their contributions in the oil and gas sector.

The findings from Table 4.1.4 highlight strategies that improve the integration of quantity surveyors in steel fabrication projects, with a grand mean of 3.55 and a standard deviation of 0.55. This suggests respondents generally agree on the effectiveness of these strategies in ensuring quantity surveyors contribute meaningfully to projects. One key strategy is early involvement in project planning, which received the highest mean rating of 3.79 and a standard deviation of 0.83. This indicates that involving quantity surveyors from the start helps align their expertise with project goals, such as cost management and planning. This finding is supported by research that emphasises early engagement of quantity surveyors to enhance project efficiency and cost control (Oke & Arowoiya, 2021).

Another important strategy is specialised training in fabrication, with a mean rating of 3.70 and a standard deviation of 1.07. This shows that respondents value training tailored to the technical aspects of steel fabrication, enabling quantity surveyors to better understand and contribute to the process. This aligns with studies that highlight the need for industry-specific training to improve the effectiveness of quantity surveyors in specialised projects (Ebekozien & Ikuabe, 2023). Other strategies, such as adopting digital cost and fabrication software (mean of 3.57), collaboration

with engineers from concept to close-out (mean of 3.51), and advocacy through professional institutions (mean of 3.20), also support better integration. These results underline the importance of proactive measures to strengthen the role of quantity surveyors in steel fabrication projects.

5. Conclusion

With respect to the literature review of this study and also the empirical findings, it is important to note that quantity surveyors significantly have the capacity and potential in enhancing efficient and effective steel fabrication project delivery with respect to the Nigerian oil and gas sector. However, the quantity surveyors perform a critical role in estimation of cost, procurement function, and contract administrative system, and their involvement at the design level, fabrication, and also commissioning level still remain limited as a result of consistence challenges such as institutional issue, technical and policy-related issues. This study emphasize that proper involvement of quantity surveyors from the inception of the construction project phase down to the completion phase is not only advantageous but also important for enhancing project efficiency, transparency with respect to cost and finally provide adequate sustainable value creation in oil and gas infrastructure industry in Nigeria. The engagement of quantity surveyors at the early stage fast-track project feasibility analysis, enhance budgeting accuracy, and also enhance value engineering results.

Likewise, their active participation during the fabrication and commissioning stages strengthens cost monitoring, ensures accountability, and supports reliable post-project evaluation. However, the current shortage of specialized industrial and technical expertise among many Nigerian quantity surveyors highlights the urgent need for capacity enhancement through targeted training, professional certification, and closer collaboration with engineers, fabricators, and project managers.

Establishing interdisciplinary frameworks and supportive policy reforms, particularly those championed by the Nigerian Institute of Quantity Surveyors and the Nigerian Content Development and Monitoring Board, will be vital in mainstreaming quantity surveyors contributions across the industrial project value chain. Such efforts would not only elevate professional competence but also ensure that quantity surveyors play a decisive role in driving cost efficiency, accountability, and long-term sustainability within Nigeria's oil and gas sector.

6. Recommendations

1. There is the need for good collaboration between the Nigerian Institute of Quantity Surveyors and Nigerian Content Development and Monitoring Board to improve policy inclusion which will aid to enhance industrial cost engineering training.

2. Oil and gas companies are encouraged to implement integrated project delivery systems that involve Quantity Surveyors from the design phase through to commissioning.

3. Professional training institutions and universities should revise QS curricula to include specialized modules on industrial cost engineering, materials management, and process plant estimation, aligning education with the technical demands of the oil and gas industry.

4. The adoption of digital technologies such as Building Information Modeling (BIM), CostX, and Enterprise Resources Planning (ERP) systems should be encouraged to integrate quantity surveyors workflows with those of engineers and fabricators.

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About the Author

Godson Kelechi, M.Sc

Rivers State University
Port Harcourt, Nigeria.

Godson Kelechi is an assistant Lecturer at Rivers State University, Port Harcourt and a probationer (member) of the Nigerian Institute of Quantity Surveyors (NIQS). He holds a Bachelor of Technology (B.Tech.) in the Department of Quantity Surveying with Second Class Upper Division at Rivers State University, Port Harcourt and Master of Science (M.Sc) in Project Management Technology from Federal University of Technology Owerri, Imo State and currently pursuing his Doctor of Philosophy Degree (Ph.D) in Construction Management at the Department of Building, Federal University of Technology Owerri, Imo State. He hails from Egwi, in Etche Local Government Area of Rivers State, Nigeria. Godson Kelechi can be cont acted at godsonkelechi44@gmail.com