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Analysis of Current Supply Chain Management Practices in the Nigerian Construction Industry

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Abstract *-The construction industry in Nigeria faces persistent challenges in efficiency, cost control, and project delivery due to fragmented supply chains, infrastructure limitations, and regulatory complexities. This study analyses the evolution and current practices of supply chain management (SCM) in the Nigerian construction sector, highlighting the adaptation of global approaches such as lean construction and just-in-time delivery. It also explores the role of logistics, technological integration particularly Building Information Modelling (BIM) and specialized SCM software and stakeholder collaboration in shaping supply chain outcomes. Findings reveal that while progress has been made in adopting modern SCM frameworks, significant barriers remain, including poor integration, weak organizational structures, and adversarial stakeholder relationships. The paper concludes that adopting comprehensive SCM strategies, supported by real-time information sharing, digital tools, and collaborative frameworks, is vital for improving efficiency, reducing costs, and enhancing project performance in Nigeria's construction industry.*

Keyword*: Building Information Modelling (BIM), Lean construction, Nigerian construction industry, Project performance, Supply Chain Management*

1.0 **Introduction**

Supply Chain Management (SCM) plays a pivotal role in construction project delivery by coordinating the procurement, logistics, and integration of diverse stakeholders (Akeremale 2022). Globally, SCM has evolved from unsystematic distribution systems in the mid-20th century to sophisticated, technology-driven frameworks that emphasize efficiency, collaboration, and customer satisfaction (Benedict 2017). In the Nigerian context, SCM practices have gradually been shaped by infrastructural limitations, economic volatility, and regulatory bottlenecks, which necessitate localized adaptations of global best practices such as lean construction and just-in-time delivery (Büyüközkan et al., 2018).

Technological advancements, particularly the introduction of Building Information Modelling (BIM) and SCM software, have enhanced coordination, transparency, and decision-making in the industry (Al-Talib et al., 2024). Nonetheless, Nigerian construction supply chains remain fragmented, temporary, and highly project-specific, with adversarial relationships and weak integration across stakeholders (Ekhlasi 2024). These unique industry characteristics demand tailored approaches to supply chain logistics, involving site logistics, supply logistics, and stakeholder collaboration (Gupta et al., 2020). This paper critically analyses the historical evolution and current state of SCM practices in Nigeria's construction industry. It explores logistics processes, industry-specific challenges, and the barriers hindering effective SCM integration while identifying opportunities for improvement.

2. Materials and Methods

This study employed a qualitative exploratory design to investigate supply chain management (SCM) practices in the Nigerian construction industry, focusing on Lagos. Semi-structured interviews were conducted with 20 senior professionals, each with over three years of SCM experience. Purposive sampling ensured participants had relevant expertise in procurement, logistics, and cost control. Data were collected using structured interview protocols, audio-recorded, transcribed, and analysed with NVivo 15 software. Member checking was applied to enhance the credibility and accuracy of the findings. Participants were selected using purposive sampling to ensure that only individuals with relevant expertise contributed to the study (Falks, 2018). Inclusion criteria required participants to have at least three years of SCM experience in construction and involvement in strategies to improve efficiency and cost control. A total of 20 senior-level professionals participated, with most having over 11 years of experience reflecting deep operational and strategic knowledge within the sector (Creswell, 2013). To ensure data credibility, structured interview protocols and member checking were employed as recommended by Sailor (2020). Interviews were audio-recorded, transcribed verbatim, and analysed using NVivo 15 software, as captured in Figure 1. This

qualitative approach, involving interviews with 20 supply chain professionals, aligns with best practices in construction research by providing rich, context-specific insights.

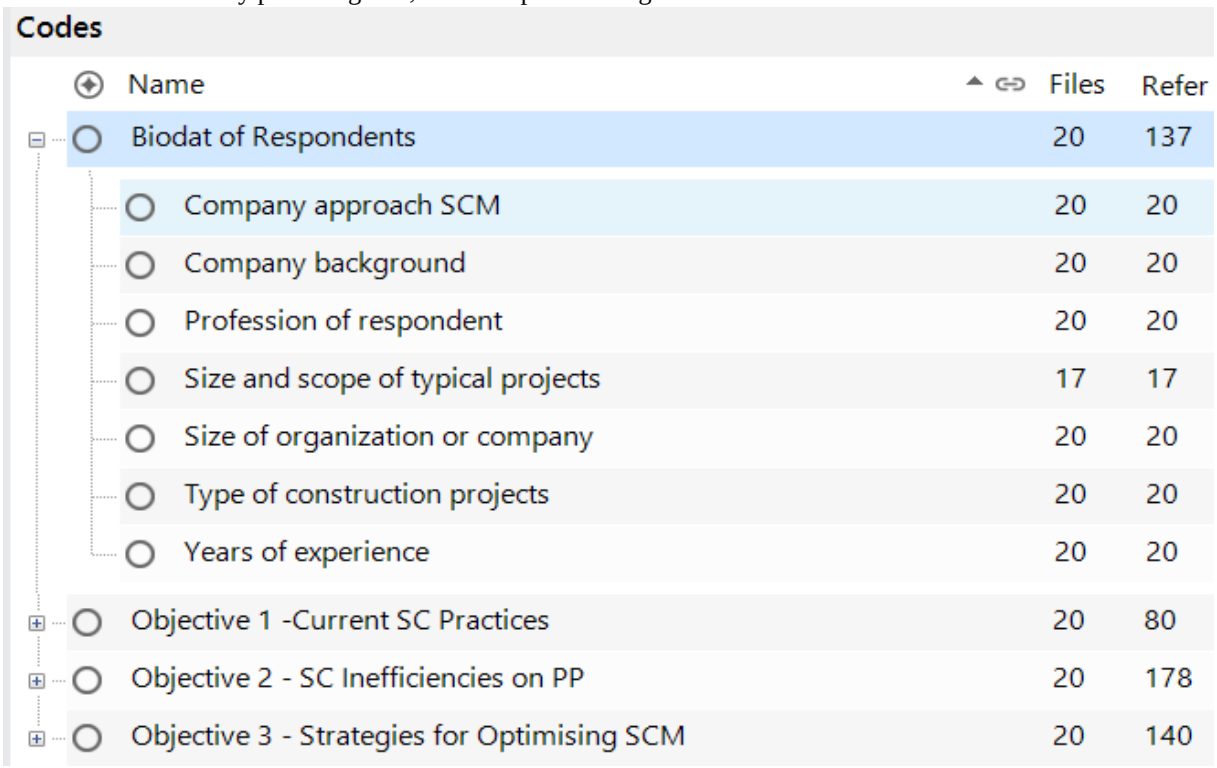

Figure 1: Thematic coding of Interview respondents and analyzed using NVivo 15 software.

The analysis followed inductive and deductive content analysis techniques recommended by Lichtman (2023), Kabesa & Berkovich (2023) for qualitative explorations. Inductive coding allowed themes to emerge from the data, while deductive coding applied theoretical constructs such as experience levels and project scale. All themes were structured around the objective which is current SCM practices in Nigeria. Visual tools like coding frameworks helped synthesize findings and highlight recurring patterns, ensuring analytical rigour and actionable insights.

3. Results and Discussions

3.1 Experiences with Supply Chain Management

The interview responses on supply chain management (SCM) in Nigerian construction projects highlight significant challenges and key aspects, as shown in Table 1. Terms such as "management," "procurement," and "supply" emphasise the importance of strategic oversight, resource acquisition, and the smooth flow of materials in project execution. These findings align with Yosef et al. (2023), who stress the role of integrated SCM practices in improving operational efficiency and sustainability in the construction sector. The recurring mention of "materials," "construction," and "logistics" reflects the complexities of sourcing and managing construction materials in Nigeria, a point supported by Abdulkadir (2023), who identifies procurement delays and logistical inefficiencies as major challenges in emerging markets. References to "cost," "timely," and "project" underline financial constraints and the need for timely project delivery, as noted by Ekhlasi (2024), who highlights the importance of cost control and adhering to project timelines. Issues of "quality," "supplier," and "delivery" suggest that strong supplier relationships and maintaining high standards are crucial for success. Kaushik (2018) discusses how improving supply chain resilience can enhance responsiveness to material shortages and supplier delays.

Table 1: Interview Responses on Experiences with Supply Chain Management

Word	Count	Similar Words
Management	20	Handle, managed, management, managers, supervision
Operating .	13	Control, engaging, operating, performance. procedure, process, processes, work, worked
Supply	13	Issues, supply
Project	11	Planning, project, projects, tasking
Chain	10	Chain, chains
Material	10	Material, materials
Effective	9	Effect, effective, effectively, effectiveness, efficient, issues, outcomes
Procurement	9	Procurement, securing
Construction	8	Building, construction, making, structured
Logistics	8	Logistics
Process	7	Process, processes, progress, work, worked

3.2 Handling Procurement and Logistics Materials

The interview responses to the question on how procurement and logistics are typically handled in Nigerian construction projects, as presented in Table 2, highlight the emphasis on structured procurement practices, quality control, and efficient logistics management. A common theme was the strategic sourcing of materials, involving detailed processes such as requests for quotations, vendor selection, and ensuring cost efficiency. These practices are consistent with Ogunsanya et al. (2022), who noted that procurement in Nigerian construction prioritises factors like price, delivery terms, and material quality.

Table 2: Interview Responses on Handling Procurement and Logistics Materials

Word	Count	Similar Words
procurement	19	obtains, procurement, secure
material	16	material, materials
direct	14	conduct, direct, engineers, head, manager, send, sends, takes
department	11	department, departments
operation	11	controlling, engaging, operating, operation, process, works
logistics	10	logistic, logistics
quality	9	quality, select, selection
supplier	9	supplier, suppliers

cost	8	cost, costs, prices
vendors	8	market, vendor, vendors
project	7	planning, project, projects
quotations	7	credit, quotation, quotations, quotes
request	7	Request
require	7	involves, requires, requirements, requisition, takes
selection	7	options, select, selection, takes

The responses also stressed the importance of coordination between procurement and logistics teams to ensure timely delivery, quality inspection, and compliance with project specifications. This aligns with Tristan et al. (2022), who emphasised the need for close collaboration to reduce delays and maintain material flow. Various procurement strategies were mentioned, including direct purchasing and outsourcing tasks, which reflect recent findings on the importance of sourcing from both local and international suppliers to optimise costs and minimise delays (Ogunsanya et al., 2022). Additionally, respondents highlighted the use of formal contracts to avoid misunderstandings and ensure materials meet project requirements. The need for proactive coordination to mitigate material shortages was also stressed, a critical factor in the dynamic Nigerian construction environment (Temowo, 2024).

3.3 Technological Influence on Supply Chain Management

Table 3 illustrates how technology impacts supply chain management (SCM) in construction projects, focusing on the integration of digital tools to streamline processes, enhance productivity, and improve overall supply chain efficiency. Key terms like "technology," "software," "ERP," "apps," and "tracking" highlight the increasing reliance on digital systems to optimise supply chain operations. Software solutions, such as Microsoft Navision and ERP systems, play a crucial role in automating tasks, improving accuracy, and providing real-time tracking of materials and deliveries, which helps reduce errors and delays. The emphasis on "visibility" and "responsiveness" underscores the importance of technology in ensuring stakeholders have up-to-date information on procurement, inventory, and logistics (Dutta et al., 2020).

Table 3: How Technology Influences Supply Chain Management

Word	Count	Similar Words
helps	14	aided, aids, help, helped, helps
technology	12	Technology
materials	9	material, materials
use	8	practices, role, use, utilise
order	6	order, ordering, rates
positively	6	positively, profitability
process	6	process, processes, processing
chain	5	Chain
delivery	5	deliveries, delivery
supply	5	Supply

The adoption of mobile apps, cloud-based platforms, and automated processes also enhances communication among team members and suppliers, facilitating better collaboration and decision-making. Terms like "efficiency" and "productivity" suggest that technology streamlines operations, resulting in time and cost savings. Digital tools, such as Microsoft Excel and CAD systems, simplify complex procurement processes and manage large data volumes, enabling quicker, informed decisions (Adeyemo, 2016). These technological advancements align with recent

studies on digital transformation, which highlight its role in enhancing supply chain resilience and gaining a competitive advantage (Lopez-Morales et al., 2023).

3.4 Emerging Trends in Technological Optimization of SCM

The interview responses on emerging trends and technologies to optimise supply chain management in the construction industry, presented in Table 4, highlight a growing focus on automation, digital tools, and advanced technologies like Artificial Intelligence (AI), drones, and the Internet of Things (IoT). A notable trend is the increasing use of Enterprise Resource Planning (ERP) systems and software to streamline operations and integrate various processes in construction projects. ERP systems are crucial in improving supply chain efficiency by facilitating real-time tracking, inventory management, and data-driven decision-making (Kamakia, 2015). The responses also highlight an interest in GPS tracking and modular construction technologies, which help reduce delivery delays, minimise waste, and improve logistics.

Drones and AI were also mentioned as key technological trends in the construction supply chain. Drones are revolutionising the industry by providing precise site surveys and monitoring, as well as enhancing material and equipment tracking (Liang et al., 2023). AI, with its predictive analytics capabilities, enables demand forecasting and optimises delivery routes, which is essential for cost reduction and operational efficiency (Abaku et al., 2024). Additionally, digital technologies such as augmented reality (AR) and virtual reality (VR) are being explored to improve planning and training, making complex processes more manageable and reducing the likelihood of errors (Swallow, 2024).

Table 4: Emerging Trends or Technologies to Optimise Supply Chain Management

Code	Count	Similar Words
organisation	8	organisation, system, systems
tracking	8	Tracking
construction	6	Construction
ERP	6	ERP
software	4	Software
artificial	3	Artificial
delivery	3	Delivery
drone	3	drone, drones
intelligence	3	Intelligence
introduce	3	Introduce
inventory	3	Inventory
materials	3	Materials
movement	3	Movement
online	3	Online

4 Discussion of Results and Findings

The analysis of interview responses regarding supply chain management in Nigerian construction projects, as summarized in Table 4, reveals key insights into the sector's challenges and strategies. Respondents consistently highlighted the complexity of managing supply chains, particularly in procurement and logistics. One respondent observed, "It has not been as expected, as the Nigerian economy is not making it easy for supply chain managers. Material prices fluctuate almost every week, affecting most projects' progress." This highlights the unpredictable nature of material costs, which significantly impact project timelines and budgets.

A major issue identified was the reliance on manual systems, with a fragmented procurement process and challenges in securing quality materials at competitive prices. Respondents noted that "delays in payment from accounts, availability of material requested, and human delays affect the progress of work on-site, and we spend more to cover up for the loss of time by practising overtime to workers." This reflects the inefficiencies in logistics and

procurement that contribute to delays and additional costs. The lack of integration across different stages of the construction process, combined with limited supplier networks, further complicates the supply chain.

Technology adoption has emerged as a critical factor for improving operational efficiency. Respondents highlighted the increasing use of Enterprise Resource Planning (ERP) systems, AI, and drones to streamline logistics and monitor project progress. One respondent recommended, "ERP software like Microsoft Navision, Sage, and other systems for Digital Procurement and GPS Tracking." Another respondent emphasised the importance of "tracking systems whereby all parties will be seen the movement of the materials from request to delivery." These tools are seen as essential in reducing manual errors, improving decision-making, and enhancing coordination between stakeholders. Emerging technologies like Building Information Modelling (BIM) and Augmented Reality (AR) were also identified as promising solutions, with one respondent noting that these tools could improve the precision of material sourcing and optimise project planning. However, it was also pointed out that "organizations should introduce tracking systems" to ensure greater transparency and efficiency in material movement.

5. Conclusion

The findings from the interview analysis underscore the complexity and inefficiencies within supply chain management (SCM) practices in the Nigerian construction industry. Challenges such as fluctuating material prices, delayed payments, reliance on manual procurement systems, fragmented supplier networks, and limited transparency in material movement continue to undermine project delivery. These constraints not only prolong project timelines but also increase costs, often requiring corrective measures such as overtime work to meet deadlines.

At the same time, the study highlights an increasing awareness of the potential of technology to address these inefficiencies. Tools such as Enterprise Resource Planning (ERP) systems, GPS tracking, drones, Building Information Modelling (BIM), and Augmented Reality (AR) are gradually being adopted to streamline procurement, enhance transparency, and support better decision-making. However, their adoption remains inconsistent across firms, and without stronger organizational support, policy backing, and process integration, their full benefits are yet to be realized.

Overall, the Nigerian construction industry's supply chain remains largely fragmented, temporary, and reactive compared to more integrated and standardized systems in other sectors such as manufacturing. Yet, with greater collaboration, technological adoption, and policy support, the sector has significant potential to develop more resilient, efficient, and cost-effective supply chains.

Recommendations

1. **Adopt Integrated Digital Platforms** – Promote the use of ERP systems, BIM, and digital procurement tools that enable real-time tracking and information sharing, thereby improving transparency and reducing manual inefficiencies.

2. **Strengthen Stakeholder Collaboration** – Encourage early supplier and subcontractor involvement to foster trust, reduce adversarial relationships, and improve material flow throughout the project lifecycle.

3. **Capacity Building and Professional Training** – Provide targeted training on SCM principles, digital tools, and lean practices to enhance professionals' ability to manage supply chains strategically.

4. **Government and Policy Intervention** – Develop supportive policies and invest in infrastructure that facilitate efficient logistics, reduce bureaucratic bottlenecks, and promote supply chain integration.

5. **Standardize Processes and Apply Lean Construction** – Implement just-in-time delivery, lean construction methods, and standardized procurement frameworks to minimize waste, reduce costs, and improve efficiency.

6. **Promote Collaborative Procurement Models** – Expand the use of partnering contracts, alliancing, and public-private partnerships (PPPs) to create more integrated and long-term supply chain relationships.

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