International Journal of Entrepreneurship, Management and Social Sciences (IJEMSS)
Volume 3, Issue 1; ISSN: 3026-9881
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Investigating the Impact of Supply Chain Management Practices on Construction Project Delivery in Niger State, Nigeria

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Abstract

Construction project delivery depends on the co-ordinated flow of materials, information, labour, equipment, and finances among clients, contractors, subcontractors, and suppliers. Disruptions in these flows often lead to delays, cost overruns, and quality shortfalls. This study examined the influence of supply chain management (SCM) practices on construction project delivery in Niger State, Nigeria. Specifically, it aimed to explore the SCM practices utilised by building contractors and to assess the effect of those practices on project delivery. Because of the reduced population size, the research utilized a census-based method in which all population elements were involved as participants. The research primarily utilized primary data obtained via a structured questionnaire. The data were analysed using percentages, mean scores, standard deviation, and multiple regression. The results show that the three primary SCM strategies adopted—Strategic Partnership & Collaboration, Communication & Information Management, and Process Integration & Management—have average mean scores of 3.10, 3.13, and 3.37, respectively, indicating a moderate level of adoption of these SCM strategies in Niger State. Also, from the regression results, the process integration and management, communication and information management, strategic partnership and collaboration have p-values (typically less than 0.05) which indicate a strong relationship between them and project delivery. The study concludes that better collaboration, timely information sharing, and strengthened digital and logistics capability are essential for improved project delivery. It recommends structured SCM planning, wider digital adoption, and targeted professional training.

Keywords: supply chain management, construction project delivery, building contractors, Niger State, Nigeria.

1.0 Introduction

Supply chain management (SCM) in construction refers to the co-ordination of material, information, financial, and relationship flows among clients, consultants, contractors, subcontractors, and suppliers so that projects can be delivered on time, within budget, and to the required quality standard (Studer & De Brito Mello, 2021). In a fragmented project environment, SCM provides the framework for synchronising procurement, logistics, communication, and site operations across multiple organisations (Ivanov et al., 2021; Vrijhoef & Koskela, 2000).

In Nigeria, weaknesses in logistics infrastructure, policy implementation, and stakeholder co-ordination continue to constrain construction supply chains. Recent evidence from Minna, Niger State, shows that late material delivery, material shortages, inadequate site access, and poor transport infrastructure reduce labour productivity and disrupt project execution (Ajiboye et al., 2024). Related work on the Nigerian construction industry also identifies fragmented

communication, bureaucratic bottlenecks, and inconsistent procurement systems as major drivers of cost overruns and schedule slippage (Esan et al., 2025).

Although the importance of SCM is increasingly recognised, empirical evidence on how specific SCM practice dimensions influence construction project delivery in sub-national Nigerian contexts remains limited. This study therefore focuses on Niger State and examines three dimensions of SCM practice: strategic partnership and collaboration, communication and information management, and process integration and management.

By linking these practice dimensions with project delivery outcomes, the study provides evidence that is useful to contractors, clients, and professional bodies seeking to improve construction performance in the state.

Nonetheless, current studies on supply chain management (SCM) within the Nigerian construction sector primarily concentrate on major urban centers like Lagos and Abuja, resulting in a geographic neglect for semi-urban states such as Niger State. Furthermore, many studies focus on SCM practices individually or at the organisational level, providing limited empirical evidence linking specific practices—such as supplier integration, material logistics, and information sharing—directly to project delivery outcomes (cost, time, quality) in state-level public projects. This research addresses that gap by offering concrete, quantitative data from Niger State.

However, the study's objectives are as follows:

(i) Analyse the SCM practices utilised by building contractors.
(ii) Examine the effects of SCM practices on construction project delivery.

2.0 Literature Review

2.1 Concept of Supply Chain Management

Supply chain management has been described as the systematic planning and control of upstream and downstream relationships, flows, and activities required to create value for the final customer. In construction, SCM extends beyond the movement of materials to include procurement decisions, information exchange, logistics planning, and collaboration among project actors (Ivanov et al., 2021; Vrijhoef & Koskela, 2000).

In the Nigerian construction context, SCM remains unevenly developed. While firms increasingly acknowledge the importance of co-ordination and information sharing, implementation is still weakened by poor digital capability, adversarial contracting practices, and limited stakeholder alignment (Ogwueleka, 2025; Esan et al., 2025).

2.2 Supply Chain Management in the Construction Industry

Construction SCM involves the planning and co-ordination of labour, materials, equipment, information, and logistics from source to site in order to support reliable project delivery. Unlike manufacturing supply chains, construction supply chains are temporary, project-based, and highly fragmented, which makes integration more difficult and increases exposure to delay, waste, and rework (Vrijhoef & Koskela, 2000).

Essential elements of construction SCM consist of procurement management, logistics and material planning, supplier selection and relationship management, inventory control, information sharing, and risk mitigation. Efficient SCM seeks to lower project expenses, lessen delays, boost quality, and improve the overall performance of project delivery by guaranteeing that the correct materials and resources are accessible at the right time and location (Studer & De Brito Mello, 2021).

Typical difficulties in construction supply chain management involve ineffective communication between stakeholders, insufficient trust, hostile relationships, fluctuations in material prices, logistical limitations, and low adoption of technology. Tackling these issues with integrated methods like just-in-time deliveries, strategic collaborations with suppliers, and digital technologies (e.g., Building Information Modeling) can greatly enhance project results (Esan et al., 2025).

2.3 SCM practices utilised by building contractors

SCM practices utilised by building contractors generally fall into relational, informational, and process-oriented categories. In practical terms, contractors must build workable partnerships with key supply-chain actors, maintain timely and accurate information exchange, and integrate procurement and logistics processes with site operations (Vignesh & Prabakaran, 2024).

Within Nigeria, the adoption of these practices is still developing. Top management support and information sharing are becoming more visible, but digital integration, formal supplier relationship management, and early involvement of partners remain comparatively weak in many firms (Ogwueleka, 2025).

2.3.1 Strategic partnerships and collaboration in construction supply chains

Strategic partnerships and collaboration promote trust, early problem-solving, shared goals, and better alignment between contractors and suppliers. Where relationships move beyond transactional exchanges, project teams are better able to reduce uncertainty, resolve disruptions quickly, and improve cost and time performance (Green, 2023).

Collaborative arrangements are especially important in construction because supply-chain decisions taken by one party often affect several others. Stronger partnerships can therefore improve responsiveness, reduce disputes, and support more reliable material flows and work sequencing (Liao et al., 2023).

2.3.2 Effective communication and information management

Effective communication and information management enable accurate ordering, timely delivery, transparent reporting, and better decision-making. In fragmented project environments, weak communication often leads to duplicated effort, late responses, material shortages, and avoidable delay (Aikor, 2025).

2.3.3 Process integration and management

Process integration and management concern the extent to which procurement, supplier management, logistics planning, finance, and site operations are linked through consistent procedures. Lean planning, standardised workflows, and simple digital tools can strengthen visibility across the supply chain; however, when integration mechanisms are weakly

implemented, they may create procedural rigidity without improving performance (Issah et al., 2025).

2.4 Empirical Review

This section offers the empirical analysis for the research. Osho et al. (2024) assess the impact of supply chain management (SCM) in the U.S. construction sector on project delivery. It emphasises the difficulties encountered and stresses the importance of Construction Supply Chain Management (CSCM) strategies in alleviating them. A questionnaire was distributed to ninety-five (95) construction stakeholders from both private and public sectors. Analysis employed Average Mean Scores (AMS) and Relative Importance Index (RII) to analyse data. Findings reveal significant obstacles, such as insufficient investment in information technology (IT), poor communication, and conflicting goals, whereas concerns like unequal risk distribution and limited understanding of SCM were ranked lower. RII varied from 0.82 for trust-oriented connections, information exchange, and robust financial flow (the highest rating) to 0.69 for the Human Resource supply chain (the lowest rating).

Additionally, research by Ogwueleka (2025) focused on the adoption of supply chain integration (SCI) and the obstacles faced in public sector construction projects within the Southern region of Nigeria, particularly in Akwa Ibom and Rivers States. Using a survey research methodology, 354 questionnaires were sent to construction experts and analysed through mean item score (MIS) and the Kruskal-Wallis H-test. Results show a moderate level of SCI implementation (MIS = 2.53), with information exchange (MIS = 3.48), client relationships (MIS = 3.46), leadership administration (MIS = 3.25), long-term partnerships (MIS = 3.14), and just-in-time logistics (MIS = 2.80) as leading practices. The main obstacles comprised low innovation (MIS = 4.02), delayed material delivery (MIS = 3.99), insufficient top management support (MIS = 3.89), negative stakeholder attitudes (MIS = 3.83), and limited resources (MIS = 3.75).

Vignesh and Prabakaran (2024) carried out a comparable research on enhancing supply chain management processes in construction: a comprehensive analysis of SCM trends, challenges, and innovations. The study covers various subjects, including contract termination administration, claims procedures, sustainable supply chain management, and the incorporation of Industry 4.0 technologies. The research investigates challenges, best practices, and emerging trends in SCM through systematic literature reviews, analytical studies, and empirical investigations. The creation of reference models, the evaluation of key performance metrics, and confirmation through expert interviews enhance a comprehensive grasp of SCM in construction.

Overall, following a comprehensive examination of these studies and other relevant research, it was determined that no study of this kind has been carried out in Niger State, Nigeria. Additionally, numerous studies carried out utilised descriptive statistics analysis, which restricted their generalizability.

2.5 Construction project delivery: time, cost, and quality

Construction project delivery is commonly assessed in terms of time, cost, and quality performance. A project is considered successfully delivered when it is completed within the planned duration, within the approved budget, and in conformity with specified quality

requirements. Because delays in procurement, information flow, and logistics quickly affect site operations, SCM practices have a direct bearing on these three delivery criteria.

2.6 Theoretical Underpinning

The foundation of the research is the resource-based theory. The resource-based theory (RBT) posits that a firm's competitive advantage arises from its distinctive, valuable, and hard-to-replicate internal resources and capabilities (Barney, 1991). In the context of supply chain management within construction project delivery, RBT indicates that a contractor's success in achieving excellent project results relies not only on having access to common materials or subcontractors, but also on developing unique relational and operational resources. These comprise enduring collaborations with dependable suppliers, unique logistics frameworks, specialized expertise in handling intricate supply chains, and trust-driven coordination methods that rivals find difficult to duplicate (Rahmani et al., 2025). Utilizing these resources enables construction firms to attain reduced costs, quicker project delivery, and enhanced quality—establishing a sustainable advantage in a fiercely competitive sector (Abdullahi & Tembo, 2023). RBT therefore shifts its emphasis from merely optimizing transactions to strategically enhancing and safeguarding the supply chain strengths that set a company apart in the market.

3.0 Methodology

The research utilized a quantitative, cross-sectional survey approach. The design was deemed suitable as the research aimed to evaluate the degree of SCM practice implementation and to analyze the statistical impact of those practices on project delivery through data gathered from a specific group of construction stakeholders at one time.

The target population included 110 construction participants associated with significant SCM stakeholder organizations in Niger State, Nigeria. The information was obtained from the files of the construction firms in Niger State. These stakeholders were selected from construction experts, contracting companies, and suppliers since they symbolize the parties most closely engaged in procurement, logistics, information sharing, and project implementation.

Due to the reduced population size, the research utilized a census-based method in which all population elements were involved as participants. The research primarily utilized primary data obtained via a structured questionnaire. The tool included closed-ended questions primarily measured on a five-point Likert scale, allowing the research to gauge the degree of practice adoption and participants' evaluation of project delivery results.

Descriptive statistics, such as frequency, percentage, mean score, and standard deviation, were employed to assess the extent of SCM practice adoption. Subsequently, multiple regression analysis was utilized to assess the impact of strategic partnerships and collaboration, management of communication and information, and integration and management of processes on the delivery of construction projects.

4.0 Results and Discussion

4.1 Results of the Supply Chain Management Practices Adopted

To ascertain the supply chain management (SCM) practices implemented in Niger State, a literature review reveals three primary SCMs utilised: Strategic Partnership & Collaboration, Communication & Information Management, and Process Integration & Management.

Participants were requested to evaluate, using a 5-point Likert scale (5 = Very effective, 4 = Effective, 3 = Moderate, 2 = Somewhat Effective, and 1 = Not at all Effective), the degree to which they agree with the statement regarding the implementation of SCM practices. The findings related to the adopted supply chain management practices adopted are shown in Table 1.

Table 1: Supply Chain Management Practices Adopted

S/N	SCM Practices	VE (5)	E (4)	M (3)	SE (2)	Not at All (1)	Mean	Std. Dev.
C1: Strategic Partnership & Collaboration								
1	Long-term strategic partnering	16 (14.5)	28 (25.5)	44 (40.0)	14 (12.7)	8 (7.3)	3.27	1.05
2	Early appointment of key partners	11 (10.0)	21 (19.1)	38 (34.5)	24 (21.8)	16 (14.5)	2.88	1.19
3	Dedication to common goals	21 (19.1)	33 (30.0)	33 (30.0)	14 (12.7)	9 (8.2)	3.39	1.18
4	Incentive-based contracting	5 (4.5)	11 (10.0)	28 (25.5)	38 (34.5)	28 (25.5)	2.34	1.07
5	Joint problem-solving	27 (24.5)	38 (34.5)	28 (25.5)	11 (10.0)	6 (5.5)	3.63	1.15
	Average mean scores						**3.10**	
C2: Communication & Information Management								
6	Transparent information sharing	32 (29.1)	44 (40.0)	21 (19.1)	9 (8.2)	4 (3.6)	3.83	1.03
7	Use of IT for SCM	16 (14.5)	21 (19.1)	33 (30.0)	19 (17.3)	21 (19.1)	2.92	1.35
8	Appropriate info deployment	21 (19.1)	38 (34.5)	33 (30.0)	11 (10.0)	7 (6.4)	3.50	1.15
9	Use of BIM for coordination	9 (8.2)	12 (10.9)	21 (19.1)	27 (24.5)	41 (37.3)	2.28	1.30
	Average mean scores						**3.13**	
C3: Process Integration & Management								
10	Supply chain integration (JIT)	11 (10.0)	16 (14.5)	44 (40.0)	24 (21.8)	15 (13.6)	2.85	1.12
11	Transparency in financial management	38 (34.5)	33 (30.0)	21 (19.1)	11 (10.0)	7 (6.4)	3.76	1.22
12	Standardized processes	27 (24.5)	33 (30.0)	27 (24.5)	14 (12.7)	9 (8.2)	3.50	1.18
13	Formal supplier (SRM) programs	11 (10.0)	16 (14.5)	33 (30.0)	33 (30.0)	17 (15.5)	2.73	1.24
14	Top management support	44 (40.0)	38 (34.5)	16 (14.5)	7 (6.4)	5 (4.5)	3.99	1.08
	Average mean scores						**3.37**	

Field Survey, 2025

According to Table 2, the three primary Supply Chain Management (SCM) strategies adopted—Strategic Partnership & Collaboration, Communication & Information Management, and Process Integration & Management—have average mean scores of 3.10, 3.13, and 3.37, respectively. These scores suggest a moderate level of adoption of these SCM strategies in Niger State. This observation aligns with previous research by Ogwueleka (2025) and Esan et al. (2025), which indicates that SCM is still unevenly developed within the Nigerian

construction sector. Although companies are increasingly recognising the significance of coordination and information sharing, their implementation efforts continue to be hindered by inadequate digital capabilities, adversarial contracting approaches, and a lack of alignment among stakeholders.

4.2 Results of the Impact of Supply Chain Management on Project Delivery

The result for the impact of supply chain management on project delivery is presented in Table 2, 3 and 4 respectively.

Table 2: Model Summary of the impact of supply chain management on project delivery

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.692[a]	.479	.465	.953

a. Predictors: (Constant), Process Integration and Management, Communication and Information Management, Strategic Partnership and Collaboration

Field Survey, 2025

This table provides the R and R^2 values. The R value represents the simple correlation and is 0.692, which indicates a high degree of correlation. This implies that the total variation in the dependent variable, project delivery, is of 69.2% explained by the independent variables, Process Integration and Management, Communication and Information Management, Strategic Partnership and Collaboration. In this case, 69.2% can be explained, which is very large.

Table 3: ANOVA of the Impact of Supply Chain Management on Project Delivery

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	88.571	3	29.524	32.534	.000[b]
Residual	96.193	106	.907		
Total	184.764	109			

a. Dependent Variable: Project Delivery
b. Predictors: (Constant), Process Integration and Management, Communication and Information Management, Strategic Partnership and Collaboration
Field Survey, 2025

The ANOVA results in Table 3 indicate that the overall model was significant. The overall model was significant as shown by a calculated F statistic of 32.534 (p value 0.000). The findings indicated that the variables: Process Integration and Management, Communication and Information Management, Strategic Partnership and Collaboration are good predictors of project delivery.

Table 4: Coefficients of the Impact of Supply Chain Management on Project Delivery

		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	.555	.227		2.443	.016

Strategic Partnership and Collaboration	.435	.074	.465	5.911	.000
Communication and Information Management	.285	.058	.380	4.889	.000
Process Integration and Management	-.207	.077	-.195	-2.697	.008

a. Dependent Variable: Project Delivery

Field Survey, 2025

The Coefficients table in Table 4 provides the necessary information to predict project delivery from Process Integration and Management, Communication and Information Management, Strategic Partnership and Collaboration, as well as determine whether explanatory variables contributes statistically significantly to the model. There are low p-values (typically less than 0.05) which indicate a strong relationship between the independent (Process Integration and Management, Communication and Information Management, Strategic Partnership and Collaboration) and dependent variables (project delivery).

In these results, the estimated regression equation is:

PD = 0.555 + 0.435 (SPC) + 0.285 (CIM) + (-0.207) (PIM)

4.3 Discussion of Results

This section discusses the results of the major findings of the study, these major findings were compared with earlier studies.

4.3.1 Supply chain management's practices adopted by building Contactors

Many supply chain management's practices were adopted by building contractors. The research question asking, what are the supply chain managements practices adopted by building contactors? That there are three basic supply chain management adopted which strengthens successful project delivery. The findings from the study may be validated based on the fact the adoption of these supply chain management practices enhances effective collaborations and communication within the construction firms which facilitate proper coordination and fast track project delivery.

The most extensively adopted practices Top Management Support and Transparent Information Sharing are consistently identified in literature as critical enablers. For instance, the high adoption of transparent communication echoes the work of Ogwueleka (2025), who highlighted information exchange as the bedrock of inter-organizational collaboration in construction.

4.3.2 Impact of Supply Chain Management on Construction Project Delivery

From the results, it was found that effective SCM in construction projects has a significant positive effect on project time, project cost, and project quality as hypothesised. By examining beta scores, it was concluded that effective SCM practices of Process Integration and Management, Communication and Information Management, Strategic Partnership and Collaboration had positive effect on project delivery.

These findings are in line with the earlier findings in the context of Nigerian construction projects which identified supply chain as one of the major success factors for construction projects (Esan et al., 2025).

5.0 Conclusion and Recommendations

5.1 Conclusion

This study employed a survey with a questionnaire distributed to construction experts connected to major Supply Chain Management (SCM) stakeholder entities in Niger State, Nigeria. This study investigates the SCM practices used by construction contractors and evaluates the impact of SCM on the delivery of construction projects. The results showed that the three SCM practices employed by construction contractors were either occasionally or moderately implemented, with average scores of 3.13 for strategic partnership & collaboration, 3.17 for communication & information management, and 3.41 for process integration & management. Furthermore, the results indicated that these three supply chain management practices have a beneficial effect on project delivery, as shown by p-values of 0.000, 0.000, and 0.037, respectively. This research has clearly demonstrated that there remains potential for enhancement regarding Construction SCM activities within the Niger state construction sector, which is part of the broader Nigerian construction industry. According to this research report, the significance index of the aforementioned CSCM practices, if acknowledged by construction professionals or stakeholders, will significantly enhance the efficient implementation of SCM within the construction sector.

5.2 Recommendations

Based on the findings of the study, the following recommendations are made:

i. Public and private clients should require basic SCM plans at tender stage so that contractors demonstrate how materials, logistics, information, and supplier interfaces will be managed before work begins.
ii. Construction firms should invest progressively in digital tools such as BIM, cloud-based communication platforms, and simple material-tracking systems to improve co-ordination, transparency, and delivery reliability.
iii. Professional bodies and tertiary institutions should strengthen training in SCM, construction logistics, and collaborative procurement through workshops, continuous professional development programmes, and curriculum review.

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