



Distribution Network Design and Last-Mile Logistics Performance in the Fast-Moving Consumer Goods Industry: Evidence from FARO Bottling Company, Adamawa State, Nigeria

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ARTICLE HISTORY

Received: 13 August 2026

Accepted: 18 September 2026

Published: October 2026

ARTICLE INFO



Vol. 1, No. 2 (2026), pp. 399–413

ISSN: 3141-6268 (Print)

3156-5077 (Online)

DOI: 10.67523/auijmss.v1i2.011

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HOW TO CITE

Abdullahi, G. A., Nwaejije, E. C., Sani, I., Maina, E. W., Umar, M. U., Sambo, J., Yahaya, A. Y., & Abuk, C. E. (2026). Distribution network design and last-mile logistics performance in the fast-moving consumer goods industry: Evidence from FARO Bottling Company, Adamawa State, Nigeria. *Azman Univ. Int. J. Manag. Soc. Sci.*, 1(2), 399–413. <https://doi.org/10.67523/auijmss.v1i2.011>

ABSTRACT

Distribution network design is a critical determinant of last-mile logistics performance in fast-moving consumer goods (FMCG) supply chains, particularly in developing economies where infrastructure and operational constraints affect delivery reliability. This study examined the distribution network design and last-mile logistics performance of FARO Bottling Company in Adamawa State, Nigeria. A quantitative case-study design was adopted. Structured questionnaires were administered to 260 selected distribution stakeholders, of which 212 valid responses were obtained, representing an 81.5% response rate. The respondents comprised company logistics personnel, distributors, wholesalers, and retailers. Documentary evidence from FARO dispatch and distributor records was used to triangulate reported operational outcomes. The survey indicated that outsourced/third-party logistics was the most frequently perceived transportation arrangement (58.02%), whereas company records showed a mixed fleet comprising 60.0% company-owned and 40.0% outsourced vehicles. Factory delivery performance was comparatively responsive: 69.81% of respondents reported 1-3-day lead times, while documentary records showed a mean dispatch-to-delivery time of 28.6 hours and 78.6% on-time delivery. Downstream performance was more variable, with 82.08% of respondents reporting distributor turnaround of four days or longer; documentary records nevertheless showed a mean turnaround of 31.4 hours, reflecting differences between perceived typical experience and selected documented cycles. The findings indicate that downstream coordination, visibility, and distributor performance constitute important areas for improving network-wide responsiveness. The study recommends service-level agreements, improved shipment visibility, systematic route planning, and stronger integration with outsourced transport providers.

Keywords: Distribution network design; FMCG; Last-mile logistics; Nigeria; Supply chain integration; Third-party logistics

1. Introduction

Distribution network design is an important strategic component of supply chain management because it determines how products move from manufacturing facilities through distribution centres, distributors, wholesalers and retailers to final markets. In industries characterized by high product turnover and geographically dispersed demand, the configuration of the distribution network can have substantial implications for transportation cost, delivery responsiveness, inventory availability, customer service and overall logistics performance. Distribution network decisions encompass, among other issues, the location and number of distribution points, the allocation of markets to distribution facilities, the use of direct or intermediary channels, transportation linkages and the coordination of actors involved in product movement. Thus, an effective distribution network is not simply a physical arrangement of facilities but an integrated system for coordinating product flows, information and transportation resources across multiple supply-chain stages.

The importance of distribution network configuration is particularly pronounced in the Fast-Moving Consumer Goods (FMCG) industry. FMCG products are generally characterized by frequent purchases, relatively high demand volumes, low unit margins and extensive geographical markets. These characteristics require manufacturers to maintain continuous product availability while controlling the cost and time associated with replenishment. Empirical evidence demonstrates that distribution network configuration can produce significant differences in logistics cost and service performance. For example, Okunade and Daodu (2020), using a real-life FMCG case in Southwestern Nigeria, compared direct shipment with alternative distribution arrangements involving intermediate points; their linear programming analysis showed that the most suitable intermediary-based configuration generated a 13.46% reduction in distribution cost, demonstrating the importance of intermediary location and network structure in FMCG distribution. The performance of an FMCG distribution network is closely connected to the efficiency with which transportation, warehousing, and downstream distribution activities are coordinated. Chauhan et al. (2023), based on survey evidence from 256 FMCG managers and executives, found that transportation and warehouse performance are important components of logistics distribution performance and examined how digitalization can improve these activities. Similarly, Frimpong et al. (2024), using data from 100 supply-chain actors in Ghana, found that delivery efficiency and delivery flexibility were positively associated with logistics network design and customer satisfaction, suggesting that the effectiveness of a distribution network depends not only on the physical configuration of facilities but also on the ability of the network to provide efficient and flexible delivery services.

The distribution network is particularly significant at the last-mile stage, where products move from distribution facilities or intermediary locations to retailers and other final delivery points. Last-mile operations are often characterized by multiple delivery destinations, relatively small shipment sizes, frequent replenishment requirements, and variable travel conditions; consequently, coordination among manufacturers, distributors, wholesalers, retailers, and transport providers becomes critical to network performance. A systematic review of 85 empirical studies by Vakulenko et al. (2022) found that last-mile logistics research has increasingly focused on effectiveness and efficiency measures, while also identifying limited empirical attention to coordination among multiple actors at the system level, indicating that the performance of last-mile distribution cannot be adequately understood by examining individual logistics activities in isolation, but rather requires consideration of the relationships among the actors and stages that constitute the distribution network. The strategic importance of distribution networks is also evident in developing economies, where infrastructure and logistics constraints can significantly affect the reliability of product flows: the 2023 Logistics Performance Index emphasizes the importance of transport infrastructure, logistics service quality, tracking and tracing, shipment timeliness, and the reliability of supply-chain connections in determining logistics performance (Arvis et al., 2023). In such environments, distribution network decisions must account for the accessibility of markets, transportation distances, road conditions, vehicle availability, operating costs, and the geographical location of intermediaries; consequently, the optimal network for a manufacturing firm cannot necessarily be determined solely from theoretical cost minimization, but must reflect the actual spatial and operational conditions under which products are distributed.

Nigeria provides an important context for examining these issues. The country's large and growing consumer market has stimulated the expansion of FMCG manufacturing and the development of extensive distributor and retail networks. However, the effectiveness of these networks is influenced by persistent logistics constraints, including inadequate infrastructure, transportation costs, congestion, variable travel times, and difficulties associated with serving geographically dispersed markets. These challenges are particularly important for beverage manufacturers because beverages are relatively bulky products that require frequent replenishment and substantial transportation capacity; consequently, decisions concerning the number and location of distribution points, the use of intermediaries, market allocation, and transportation linkages can have direct implications for the cost and responsiveness of beverage distribution. Evidence from Nigeria supports the relevance of network configuration to FMCG distribution performance: Okunade and Daodu (2020) demonstrated that introducing strategically located intermediate points could substantially reduce distribution costs compared with direct shipment arrangements, and more recently, Omorinde (2024), examining packaged-food distribution in Oyo State, Nigeria, found that the producer-distributor-wholesaler-retailer-consumer channel was effective in enabling products to reach consumers on time and at relatively low cost. That study, based on 615 respondents comprising company personnel, distributors, wholesalers, and sales representatives, provides empirical evidence that the structure and coordination of distribution channels influence product availability and distribution costs.

Despite the importance of distribution networks to FMCG competitiveness, manufacturers operating in Nigeria continue to face difficulties in achieving timely, reliable, and cost-effective product distribution. The problem is particularly relevant to indigenous manufacturers that must serve geographically dispersed markets through combinations of company-owned facilities, distributors, wholesalers, retailers and transport providers. Where distribution points are poorly located, market territories are inadequately allocated, intermediary levels are excessive, or transportation links are inefficiently coordinated, the resulting network may generate unnecessary transport distances, duplicated deliveries, high vehicle operating costs, delayed replenishment, and inconsistent product availability. The problem is not simply the existence of transportation or infrastructure constraints, but the possibility that the configuration and coordination of the distribution network may amplify their effects: a distribution system that relies excessively on direct deliveries from a central facility may increase travel distances and vehicle requirements, while an excessively fragmented intermediary structure may increase handling and coordination costs; conversely, strategically located intermediate facilities may shorten delivery distances, consolidate shipments, and improve market responsiveness, as demonstrated by the empirical findings of Okunade and Daodu (2020). The choice of network configuration therefore represents an important managerial decision with implications for both distribution cost and service performance.

Although Nigerian studies have examined distribution channels, logistics management, and individual supply-chain activities, empirical evidence remains limited regarding how distribution network configuration influences delivery efficiency, transportation performance, responsiveness, and last-mile logistics performance within indigenous beverage manufacturing. Existing evidence has also been concentrated in Southern Nigeria and in broader FMCG or packaged-food contexts, leaving comparatively limited empirical evidence from Northern Nigeria; this geographical gap is important because differences in road accessibility, market dispersion, infrastructure quality, travel distances, and distribution density may produce different network requirements across regions. FARO Bottling Company in Jimeta, Adamawa State, provides an appropriate setting for addressing this gap because its market-serving operations depend on the coordinated movement of products through multiple distribution actors and transportation links; however, there is insufficient empirical evidence on whether its existing distribution arrangement provides an efficient balance between facility locations, intermediary levels, transportation linkages, and market coverage, or whether aspects of the network contribute to unnecessary distribution costs and weak delivery responsiveness. Consequently, there is a need to empirically examine the distribution network of FARO Bottling Company, Jimeta, with particular attention to its network structure, intermediary configuration, transportation linkages, market coverage, and their implications for distribution and last-mile logistics performance, since such evidence is necessary for identifying network configurations capable of improving product availability, delivery responsiveness, and cost efficiency in the Nigerian beverage industry.

The study therefore aims to examine the distribution network design of FARO Bottling Company and its implications for last-mile logistics performance in Jimeta, Adamawa State. Specifically, the study sought to identify the transport and fleet configuration used in distributing FARO products, examine the structure and role of distribution intermediaries, assess factory delivery lead time and distributor turnaround time, and interpret the observed distribution practices using Supply Chain Integration Theory, the Resource-Based View, and Dynamic Capabilities Theory.

2. Literature Review

Distribution network design refers to the strategic configuration of facilities, transportation links, inventory locations, and distribution channels through which products move from manufacturers to final consumers. Its central objective is to balance logistics costs with customer service requirements, with decisions concerning warehouse location, distributor allocation, transport modes, fleet deployment, and routing directly influencing supply chain responsiveness and operational performance. This is particularly important in FMCG supply chains, where rapid replenishment and extensive market coverage are essential. Evidence from Nigeria supports this relationship: using a linear programming model based on real operational data from a Nigerian beverage manufacturer, Okunade and Daodu (2020) found that strategically located intermediate distribution points reduced overall distribution costs by approximately 13.46% compared with direct shipment. Logistics performance, in turn, reflects the effectiveness with which logistics resources are deployed to satisfy customer demand at minimum cost and is commonly assessed through indicators such as delivery timeliness, transportation cost, lead time, inventory availability, order fulfilment, fleet utilization, and customer satisfaction. For FMCG firms, these outcomes depend not only on physical transport resources but also on coordination and information exchange among manufacturers, distributors, wholesalers, retailers, and logistics providers; integrated logistics systems can improve inventory visibility, reduce delivery uncertainty, and strengthen supply-chain responsiveness (Ogunlela, 2018; Flynn et al., 2010; Chauhan et al., 2023).

The study is anchored on three complementary theoretical perspectives: Supply Chain Integration (SCI), the Resource-Based View (RBV), and Dynamic Capabilities Theory, which together provide a multidimensional explanation of how the configuration and management of a firm's distribution network can influence logistics performance. Supply Chain Integration explains the importance of coordination and information exchange among supply-chain actors. Rather than being attributed to a single originating scholar, SCI has developed from the broader supply-chain management literature concerned with the integration of internal functions and external supply-chain partners; an important empirical foundation is provided by Frohlich and Westbrook (2001), who examined supplier and customer integration among 322 manufacturers across different countries and demonstrated that different patterns of integration with upstream and downstream partners have implications for operational performance, while Flynn et al. (2010) subsequently conceptualized supply chain integration in terms of internal integration, supplier integration, and customer integration and empirically demonstrated that the configuration and extent of integration are associated with organizational performance. Sulaiman and Ganiyu (2024), examining selected manufacturing and food-and-beverage firms in Lagos State, found that internal, supplier, and customer integration significantly influenced dimensions of operational performance, including productivity, quick delivery, and customer satisfaction; similarly, Babatunde et al. (2023), using a survey of 384 consumers of Nigeria Bottling Company products in Ibadan, reported a significant positive association between supply-chain integration and product performance, with information sharing, partner coordination and customer integration as the dimensions examined. These findings reinforce the relevance of supply-chain integration to the coordination of FMCG distribution activities, and for this study SCI provides the basis for examining how information sharing, coordination among distribution partners, internal integration and customer/supplier integration may influence the effectiveness of the distribution network and, ultimately, last-mile logistics performance.

The second theoretical foundation is the Resource-Based View (RBV) of the firm, which explains how firm-specific resources can provide the foundation for superior logistics capabilities. The RBV was formally articulated by Wernerfelt (1984), who proposed analysing firms in terms of the resources they control and the strategic advantages that can arise from distinctive resource positions, and Barney (1991) subsequently developed

the resource-based explanation of sustained competitive advantage, arguing that resources capable of generating sustained advantage possess characteristics relating to value, rarity, inimitability and non-substitutability. For the present study, RBV is particularly relevant because the distribution network of an FMCG manufacturer represents an aggregation of physical, technological, relational and organizational resources; the location and capacity of distribution facilities, transportation resources, information systems, distributor relationships, and logistics-management capabilities can influence the firm's ability to move products efficiently to downstream markets, and a firm that combines these resources effectively may achieve shorter replenishment times, improved vehicle and facility utilization, lower distribution costs, and more reliable product availability than competitors with less effectively organized resources. It also complements the SCI perspective: while SCI explains how supply-chain actors coordinate their activities, RBV explains why the resources available to the focal firm and its ability to organize those resources can create differences in network performance.

The third perspective, Dynamic Capabilities Theory, explains how firms adapt and reconfigure these resources in response to changing operating environments. It originates principally from the work of Teece, Pisano and Shuen (1997), who conceptualized dynamic capabilities as the firm's capacity to integrate, build, and reconfigure internal and external competences in response to rapidly changing environments; Teece (2007) subsequently elaborated the concept by emphasizing the organizational and managerial processes through which firms sense opportunities and threats, seize opportunities, and reconfigure their resource base to maintain performance under changing conditions. Dynamic Capabilities Theory provides the basis for examining the ability of the focal firm to adapt, reconfigure, and continuously improve its distribution network: whereas RBV explains the strategic importance of resources such as distribution facilities, transport assets, information systems, and distributor relationships, Dynamic Capabilities Theory explains how those resources can be recombined and redeployed when market and operational conditions change. The three perspectives are complementary rather than competing explanations of distribution network performance: SCI explains the relational and coordination dimension by emphasizing information sharing, joint planning, and coordination among supply-chain partners; RBV explains the resource dimension by proposing that distribution infrastructure, transportation assets, information systems, human resources, and established distributor relationships can constitute strategically important resources; and Dynamic Capabilities Theory adds the adaptive dimension by explaining how firms can reconfigure these resources and relationships in response to environmental and market changes. The combined framework is therefore appropriate for the present study because distribution network performance is unlikely to be determined by network structure alone; an effective network requires appropriate resources, coordination among the actors operating within the network, and the organizational capability to adapt the network as market and operating conditions change, so the framework supports the proposition that distribution network configuration and coordination influence last-mile logistics performance through the effective deployment of resources and the capacity of the firm to adapt its distribution arrangements.

Empirical evidence generally confirms that distribution network configuration and logistics practices are important determinants of distribution efficiency and service performance, although Nigerian research remains fragmented. Okunade and Daodu (2020), in one of the few Nigerian studies explicitly examining distribution network design, compared direct shipment with intermediary-based distribution using a linear programming model and real distribution data, finding that intermediate distribution centres reduced distribution costs by 13.46% and demonstrating that facility configuration and intermediary location can improve transportation efficiency and customer service while controlling logistics expenditure. More recent evidence has emphasized last-mile coordination: Akinmolayan and Opatola (2026), examining micro-retail FMCG outlets in Alimosho Local Government Area, Lagos State, found that replenishment frequency, supplier coordination, delivery flexibility, and procurement strategies significantly influenced retail service performance, suggesting that effective last-mile distribution requires flexible arrangements capable of responding to heterogeneous retail conditions; similarly, Ateke et al. (2025), using survey evidence from logistics and operations managers of twelve FMCG distribution firms in Rivers State, reported that logistics optimization significantly improved resource utilization, waste reduction, and distribution cost efficiency. Other Nigerian studies reinforce the importance of coordinated physical distribution practices: Etuk et al. (2024), using data from 247 sales representatives of selected FMCG firms in South-South Nigeria, found through multiple regression that transportation management, warehouse management,

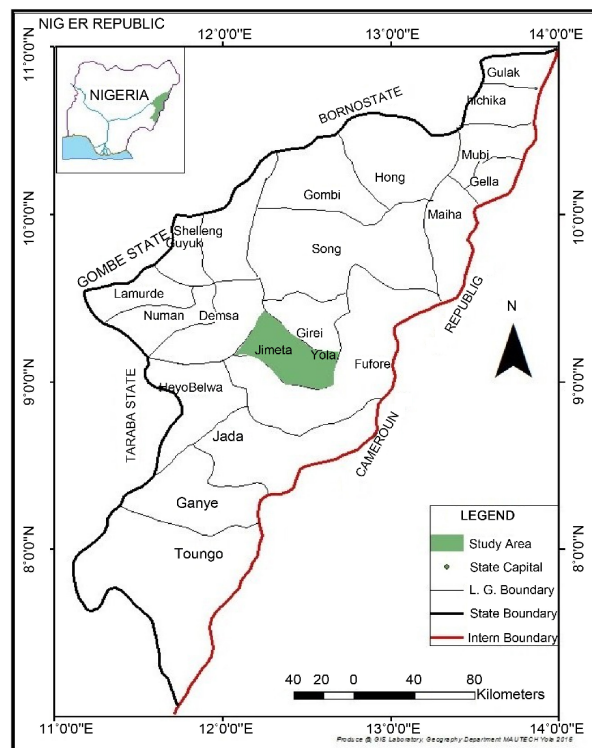
communication systems, and order processing significantly influenced marketing performance, with transportation management emerging as the strongest predictor; although the dependent variable was marketing rather than logistics performance, the findings demonstrate that coordinated distribution practices constitute important operational capabilities. Zego and Mohamad Husny (2023), through a systematic review of cold-chain logistics service providers in Nigeria's FMCG industry, similarly identified inadequate logistics technology, weak regulatory frameworks, limited skilled personnel, and poor infrastructure as major constraints on logistics performance, while international evidence further indicates that digitally enabled transportation management, warehouse automation, intelligent route optimization, and real-time information sharing can improve delivery responsiveness and reduce transportation costs by facilitating inventory synchronization, fleet monitoring, and rapid responses to changing demand.

Taken together, the literature indicates that logistics performance is shaped by an integrated distribution network rather than by isolated transportation decisions: facility location, distributor coordination, transportation optimization, information sharing, and adaptive last-mile delivery jointly influence delivery reliability, customer responsiveness, and operational efficiency. Nevertheless, important gaps remain in the Nigerian literature. Existing studies have largely examined distribution cost optimization, transportation management, marketing performance, or individual logistics practices rather than treating distribution network design as a multidimensional strategic capability encompassing network configuration, transportation infrastructure, distributor coordination, information flows, and last-mile performance. Geographically, available evidence is concentrated largely in Lagos, Rivers, and South-Western Nigeria, leaving limited empirical evidence from indigenous FMCG manufacturers in Northern Nigeria, where longer travel distances, infrastructure limitations, and weaker distribution connectivity may create distinctive logistics challenges. Furthermore, although contemporary international research increasingly emphasizes digitally integrated distribution networks and intelligent routing, evidence concerning the adoption and operational implications of these capabilities among indigenous Nigerian FMCG manufacturers remains limited; international empirical evidence indicates that digital technologies, intelligent routing, real-time information systems, and digitally enabled logistics coordination can improve transportation and distribution efficiency by enhancing visibility, fleet utilization, delivery responsiveness, and the coordination of logistics activities (Chauhan et al., 2023; Queiroz et al., 2022). Finally, previous Nigerian studies have insufficiently integrated Supply Chain Integration Theory, the Resource-Based View, and Dynamic Capabilities Theory to explain how distribution network capabilities translate into superior logistics performance. This study therefore addresses these gaps by examining the influence of distribution network design on last-mile logistics performance using empirical evidence from FARO Bottling Company, Adamawa State, thereby extending understanding of strategic logistics capability within an emerging-economy FMCG supply chain.

3. Methodology

The study was conducted in Jimeta, Yola North Local Government Area, Adamawa State, Nigeria. Jimeta is the administrative headquarters of Yola North and an important commercial centre within the Yola urban area. It lies between latitude 9°13'30" and 9°18'30" N and longitude 12°24' and 12°29' E, on the southern bank of the River Benue (Barde et al., 2019). The FARO/Adama Beverages facility is located in the Kofare industrial area of Jimeta; its strategic location has historically established Jimeta as an important commercial gateway linking northeastern Nigeria with neighbouring states and the Republic of Cameroon through an extensive road transport network.

Figure 1: Map of Jimeta, Adamawa State (modified after Ministry of Land and Survey, Adamawa State, 2025)



A quantitative case-study design was adopted to examine the distribution network of FARO Bottling Company and its implications for last-mile logistics performance. The case-study approach was appropriate because the investigation focused on a single indigenous beverage manufacturer operating within a specific regional logistics environment, while the quantitative component enabled systematic description of stakeholder perceptions and selected operational indicators. The target population comprised four stakeholder groups directly involved in FARO's distribution network: company logistics personnel (40), distributors (12), wholesalers (90), and retailers (422), yielding a total population of 564. Because the groups differed substantially in size and network position, proportionate stratified sampling was employed to preserve the underlying population structure in the sample. Using Yamane's (1967) formula, $n = N / (1 + N(e^2))$, with $N = 564$ and $e = 0.05$, a minimum sample size of 234 was calculated. To allow for non-response, 260 questionnaires were distributed (Table 1); of these, 212 were returned and judged sufficiently complete for analysis, producing a response rate of 81.5%. Although the achieved sample fell 22 respondents short of the calculated minimum, it represented approximately 90.6% of the target sample size; the 81.5% response rate compares favourably with the 52.7% mean reported for individual-level surveys in Baruch and Holtom's (2008) review of organizational research. However, response rate alone cannot establish the absence of nonresponse bias (Groves, 2006), so the shortfall is acknowledged as a limitation, and the findings are interpreted as descriptive evidence from the achieved sample rather than as estimates free from possible nonresponse error. Purposive sampling within strata was used to select respondents who possessed direct operational knowledge of the distribution network; the four groups remained distinct analytical categories throughout the study because they occupy different informational positions, as company personnel and distributors are better placed to observe upstream (factory-to-hub) movements, while wholesalers and retailers have greater exposure to downstream fulfilment.

Table 1: Questionnaire Administration Process

Questionnaire status	Number	Percentage (%)
Questionnaires distributed	260	100.0
Questionnaires returned/received	212	81.5
Valid questionnaires used for analysis	212	81.5
Questionnaires not returned/available for analysis	48	18.5
Total	260	100.0

Source: Authors' compilation (2026).

Primary data were collected using a structured questionnaire. Section A captured respondent category, years of experience, and business relationship with FARO. Section B contained seven Likert-scale items covering transportation practices, with responses measured on a five-point scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree); the items were adapted from established logistics and supply-chain literature and contextualised to the FARO distribution network. Documentary evidence was obtained from FARO dispatch logs and selected distributor records and was used to assess factory delivery lead time, on-time delivery, and distributor turnaround. Content validity was established through expert review by five specialists in transportation/logistics management, supply-chain management, and research methodology; ambiguous or redundant items were revised or removed, and the instrument was then pilot-tested with respondents similar to the study population (but excluded from the final sample) to assess clarity, response format, and completion time. The internal consistency of the multi-item scale was evaluated using Cronbach's alpha (α) coefficients derived from the pilot dataset (Table 2); the transportation-practices construct returned an alpha coefficient of 0.78, indicating acceptable internal consistency for the instrument used in this study.

Table 2: Cronbach's Alpha Reliability Results

Construct	Items	α	Decision
Transportation practices	7	0.78	Acceptable

Source: Author's survey (2026).

Participation was voluntary. Respondents were informed of the academic purpose of the study, assured of confidentiality and anonymity, and informed that no personally identifiable information would be disclosed. Data were analysed primarily using descriptive statistics, including frequencies, percentages and cross-tabulations. Factory delivery lead time and distributor turnaround time obtained from the questionnaire were treated as ordinal categorical measures, while documentary records supplied continuous operational measures, including mean, median, minimum, maximum and on-time delivery percentages. The two data sources were triangulated but were not treated as identical measures: survey responses describe respondents' reported or perceived typical experience, whereas documentary records represent observed performance for the available recorded cycles.

4. Results and Discussion

Of the 260 questionnaires distributed, 212 were returned and usable (response rate 81.5%). Table 3 shows the composition of the valid sample by stakeholder category. Retailers constituted the largest group (66.04%), followed by wholesalers (21.23%), company logistics personnel (7.08%), and distributors (5.66%); this distribution mirrors the underlying population structure and supports retaining the four groups as distinct analytical categories rather than collapsing them into a single stakeholder pool.

Table 3: Respondent Categories

Respondent category	Target population	Valid respondents	Percentage of valid sample
Company logistics personnel	40	15	7.08
Distributors	12	12	5.66
Wholesalers	90	45	21.23
Retailers	422	140	66.04
Total	564	212	100.00

Source: Authors' compilation (2026).

The majority of respondents (78.30%) reported five or more years of experience in distribution or trading activities (Table 4), indicating substantial practical exposure to the network under study. Business-relationship classification (Table 5) confirmed that each respondent answered from a clear positional identity within the network, which is important for interpreting upstream versus downstream perceptions.

Table 4: Years of Experience by Respondent Category

Respondent category	<5 years	5-9 years	10-14 years	≥15 years	Total
Company logistics personnel	2	5	5	3	15
Distributors	1	3	4	4	12
Wholesalers	7	14	15	9	45
Retailers	36	49	35	20	140
Total	46	71	59	36	212
Percentage	21.70	33.49	27.83	16.98	100.00

Source: Authors' compilation (2026).

Table 5: Business Relationship with the Distribution Network

Respondent category	Company employee	Distributor	Wholesaler	Retailer	Total
Company logistics personnel	15	–	–	–	15
Distributors	–	12	–	–	12
Wholesalers	–	–	45	–	45
Retailers	–	–	–	140	140
Total	15	12	45	140	212

Source: Authors' compilation (2026).

Respondents most frequently identified outsourced/third-party logistics (3PL) as the dominant transportation arrangement (58.02%), followed by company-owned fleets (27.83%) and hybrid arrangements (14.15%) (Table 6). Documentary evidence from FARO's records presented a more mixed picture: company-owned vehicles accounted for 60% of available dispatch capacity and 56.7% of examined dispatches, while outsourced vehicles provided 40% of capacity and 43.3% of dispatches (Table 7).

Table 6: Respondents' Perception of Dominant Transportation Arrangement

Transportation arrangement	Frequency (n)	Percentage (%)
Outsourced/third-party logistics	123	58.02
Company-owned fleet	59	27.83
Hybrid arrangement	30	14.15
Total	212	100.00

Source: Authors' survey (2026).

Table 7: Documentary Summary on Transportation/Fleet Arrangement

Indicator	Documentary evidence
Company-owned delivery vehicles	12
Regularly contracted/outsourced vehicles	8
Vehicles available for routine dispatch	20
Company-owned share	60.0%
Outsourced share	40.0%
Dispatches using company-owned vehicles	68 (56.7%)
Dispatches using outsourced vehicles	52 (43.3%)
Total dispatches examined	120

Source: FARO records (2023).

The divergence between perceptual and documentary data should be interpreted as a difference in observation point rather than as contradictory evidence. Retailers and wholesalers primarily encounter the downstream leg, whereas the company record captures factory-level capacity and dispatches; this distinction is consistent with the empirical review, since Etuk et al. (2024) found that transportation management, communication systems, and order processing were associated with FMCG marketing performance, while Chauhan et al. (2023) identified transport and warehouse processes as central elements of logistics-distribution performance. In the present case, the mixed fleet provides a resource base; its contribution to performance depends on how FARO coordinates and monitors both owned and contracted capacity. This is the RBV interpretation of Table 7 and the SCI interpretation of Table 6: the relevant capability is orchestration, information sharing and joint performance management, rather than vehicle ownership alone.

Self-reported factory delivery lead times were relatively favourable: 69.81% of respondents placed typical lead times in the 1-3-day category, 22.17% in the 4-6-day category, and only 8.02% reported seven days or longer or variable delivery (Table 9). Documentary analysis of 120 dispatch records corroborated this pattern: mean factory dispatch-to-delivery time was 28.6 hours (median 24.0 hours), with an overall on-time performance of 78.6% (Table 8 and Table 13). Performance varied by destination: Jimeta/Yola and Girei achieved the highest on-time rates (91.7% and 88.9%), while more distant destinations such as Jalingo and "other" locations recorded lower rates (66.7% and 61.1%). These results indicate that the primary (factory-to-distributor) stage operates with comparatively good responsiveness in the recorded sample, though the destination pattern shows that longer and more dispersed routes had lower on-time performance. This is consistent with the broader logistics-performance dimensions identified by Arvis et al. (2023), particularly infrastructure, timeliness, and the reliability of supply-chain connections, and it also accords with Okunade and Daodu's (2020) Nigerian FMCG case, in which location and routing choices materially altered distribution cost. The present result does not establish road condition as a causal variable, because that variable was not measured; it instead identifies a route-level performance pattern that FARO should investigate through distance, loading, departure-time, and delay records.

Table 8: Factory-to-Distributor Delivery Lead Time by Distribution Destination

Destination/market zone	Dispatches reviewed	Mean lead time (hours)	Median (hours)	On-time (%)
Jimeta/Yola (10-15 minutes)	24	10.8	10.0	91.7
Mubi (3-3.5 hours)	18	25.6	24.0	83.3
Jalingo (2 hours 15 minutes)	14	30.4	28.0	78.6
Numan (1 hour)	16	21.8	20.0	81.3
Girei (20-25 minutes)	18	13.6	12.0	88.9
Gombi (3 hours 30 minutes)	12	39.5	36.0	66.7
Other destinations	18	48.2	42.0	61.1
Overall (112 of 120 with complete timestamps)	112	28.6	24.0	78.6

Source: FARO records (2023). The Overall row reflects the 112 of 120 reviewed dispatches with complete dispatch-and-delivery timestamps (see Table 13); it is not a direct aggregation of the seven destination rows above, which are based on all 120 dispatches reviewed.

Table 9: Self-Reported Factory Delivery Lead Time

Factory delivery lead time	Frequency (n)	Percentage (%)
1-3 days	148	69.81
4-6 days	47	22.17
7+ days/variable	17	8.02
Total	212	100.00

Source: Authors' survey (2026).

Downstream performance presented a markedly different picture. Only 17.92% of respondents reported distributor turnaround times of 1-3 days; the majority (58.96%) reported 4-6 days, and 23.12% reported seven days or longer or variable turnaround (Table 10). Collectively, 82.08% of respondents experienced turnaround of four days or more. Documentary records from 56 complete distributor cycles showed an average turnaround of 31.4 hours (median 28.0 hours), with 80.4% of cycles completed within 48 hours but a non-negligible tail of longer cycles (Table 11). The contrast with factory lead-time perceptions is substantial (Table 12): the proportion of respondents placing performance in the shortest (1-3 day) category was 51.89 percentage points higher for factory delivery than for distributor turnaround.

Table 10: Self-Reported Distributor Turnaround Time

Distributor turnaround time	Frequency (n)	Percentage (%)
1-3 days	38	17.92
4-6 days	125	58.96
7+ days/variable	49	23.12
Total	212	100.00

Source: Authors' survey (2026).

Table 11: Distributor Turnaround-Time Records

Indicator	Result
Distributor records reviewed	60
Complete observations	56
Average turnaround time	31.4 hours
Median turnaround time	28.0 hours
Minimum	8.0 hours
Maximum	96.0 hours
Turnarounds ≤ 24 hours	23 (41.1%)
Turnarounds 25-48 hours	22 (39.3%)
Turnarounds 49-72 hours	8 (14.3%)
Turnarounds > 72 hours	3 (5.4%)

Source: Factory records.

Table 12: Comparison of Self-Reported Factory Delivery Lead Time and Distributor Turnaround

Time category	Factory delivery lead time (%)	Distributor turnaround (%)	Difference (pp)
1-3 days	148 (69.81)	38 (17.92)	51.89
4-6 days	47 (22.17)	125 (58.96)	36.79
7+ days/variable	17 (8.02)	49 (23.12)	15.10
Total	212 (100.00)	212 (100.00)	—

Source: Authors' survey (2026).

Table 13: Summary of Factory Delivery Records

Indicator	Result
Orders/dispatches reviewed	120 dispatch-log observations
Orders dispatched	120 completed dispatches
Orders delivered	116 delivery records matched to dispatches
Orders with complete dispatch and delivery timestamps	112 usable observations
Average factory dispatch-to-delivery time	28.6 h
Median delivery time	24.0 h
Minimum delivery time	8.0 h
Maximum delivery time	72.0 h
On-time deliveries	78.6%
Delayed deliveries	21.4%

Source: Factory records.

This downstream responsiveness gap constitutes the central empirical finding of the study. It is consistent with the proposition that a network can perform relatively well in primary transport yet experience constraints at intermediary and last-mile nodes, extending Okunade and Daodu's (2020) Nigerian evidence that intermediary

location and configuration affect network efficiency, and corresponding with Akinmolayan and Opatola's (2026) observation that FMCG micro-retail replenishment uses varied procurement and delivery arrangements, and with Frimpong et al.'s (2024) evidence that delivery efficiency and flexibility are linked to logistics-network design and customer satisfaction. The apparent inconsistency between the perception data and the 56 documented distributor cycles is substantively important: the documentary mean of 31.4 hours describes recorded complete cycles, whereas the questionnaire captures respondents' typical experience across a broader downstream relationship, so the two measures should not be treated as estimates of the same quantity. A plausible operational interpretation is that the recorded cycles represent a more controlled subset, while downstream actors also experience ordering, allocation, consolidation, and hand-off delays that are not represented in a completed-cycle timestamp; this interpretation requires further transaction-level data and is not a causal conclusion from the current descriptive design.

The results connect directly to the three theoretical perspectives reviewed above. SCI predicts that physical movement alone will not ensure network-wide responsiveness without information sharing, order visibility, coordinated scheduling, and joint performance management, a reading supported by the Nigerian integration studies of Babatunde et al. (2023) and Sulaiman and Ganiyu (2024). RBV frames the mixed fleet, distributor relationships, and information resources as a potentially valuable logistics bundle, while Dynamic Capabilities Theory frames the observed route and turnaround variability as a trigger for sensing, reconfiguring capacity and inventory positioning, and revising routing. The discussion consequently treats the downstream gap as an empirical priority for coordinated network improvement, not as proof that outsourcing or any single intermediary is ineffective.

5. Conclusion and Recommendations

Taken together, the perception and record evidence portray a multi-tier distribution network whose recorded factory-to-distributor stage is comparatively responsive but whose downstream stage warrants closer operational diagnosis. The findings complement the empirical review: network configuration and intermediary location matter for cost (Okunade & Daodu, 2020), while coordination, information flow and delivery flexibility matter for operational and customer outcomes (Babatunde et al., 2023; Frimpong et al., 2024; Sulaiman & Ganiyu, 2024). The evidence supports viewing distribution network design as a strategic logistics capability that depends on the integrated deployment of physical, relational and informational resources and on the ability to adapt those resources as conditions change.

This study examined the distribution network design of FARO Bottling Company and its implications for last-mile logistics performance in Adamawa State, Nigeria. The evidence indicates that FARO operates a multi-tier, intermediary-based network that relies on a mixed fleet of company-owned and outsourced transport capacity. Factory-to-primary-hub delivery is perceived and recorded as relatively responsive (69.81% of respondents reporting 1-3-day lead times; mean documentary lead time 28.6 hours; 78.6% on-time). In contrast, distributor turnaround is substantially slower and more variable (only 17.92% reporting 1-3 days; 82.08% reporting four days or longer; average documentary turnaround 31.4 hours with a long tail). The central insight is therefore the existence of a downstream responsiveness gap: products move comparatively efficiently from the factory to primary distribution points, but fulfilment slows once goods reach intermediate nodes. This pattern demonstrates that network performance cannot be inferred from primary transportation metrics alone; it depends on coordination, visibility, and capability across the entire chain of actors. The findings are consistent with Supply Chain Integration Theory (emphasising information sharing and joint planning), the Resource-Based View (highlighting the strategic value of organised distribution resources), and Dynamic Capabilities Theory (underscoring the need to reconfigure resources under changing conditions), and they extend the limited empirical literature on indigenous FMCG distribution networks in Northern Nigeria.

Based on the evidence, four managerial priorities are recommended. First, FARO should establish clear service-level agreements, routine performance reviews, and joint planning mechanisms with distributors to reduce turnaround variability and improve last-mile reliability. Second, the company should invest in systems that provide real-time or near-real-time visibility of orders and shipments across factory, carrier, distributor, and retail nodes, thereby enabling proactive exception management. Third, systematic route planning and load consolidation should be applied, particularly for longer and more variable destinations, to reduce travel times and vehicle

under-utilisation. Finally, 3PL partners should be treated as strategic rather than transactional resources by embedding them in planning processes, sharing demand forecasts, and aligning performance metrics.

6. Limitations and Direction for Future Research

This study is subject to several limitations. First, factory delivery lead time and distributor turnaround time rely substantially on respondents' perceptions of typical performance bands; although documentary dispatch and distributor data were used for triangulation, perceptual measures remain central to the descriptive analysis. Second, the study focuses on a single indigenous beverage manufacturer in one Nigerian state, limiting generalizability to other firms, product categories, and regions. Third, the achieved sample of 212 was below the calculated Yamane minimum of 234, although the 81.5% response rate was strong and all four stakeholder strata were represented. Finally, the analysis is descriptive rather than inferential; therefore, observed patterns should not be interpreted as statistically tested relationships or causal effects. Future studies should employ inferential methods, such as regression or structural equation modelling, to formally test relationships between network configuration and logistics performance. Research covering multiple FMCG manufacturers and Nigerian regions would establish whether the identified downstream responsiveness gap is firm-specific or more widespread, and longer-term analysis of company dispatch and distributor records would also reduce reliance on self-reported estimates.

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