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VALUE CHAIN MANAGEMENT STRATEGIES AND OPERATIONAL EFFICIENCY IN NIGERIAN LOSISTICS ORGANISATIONS

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ABSTRACT
The research investigated the correlation between strategies in managing the value chain and the efficiency of operations. A group of 115 managers and supervisors from ten logistics firms in Nigeria was purposefully selected for the study. Employing a quasi-experimental research design, a cross-sectional survey method was used to gather data. Analysis of the data was conducted using the Statistical Package for Social Sciences (SPSS) Version 25, utilizing structural equation modeling (SEM) through the AMOS package. The results revealed a positive and significant connection between value chain management and operational efficiency within Nigerian logistics firms. Specifically, the study observed positive and significant relationships between timely service delivery and indicators of operational efficiency (such as cost-minimization, sales volume, and market share). Similarly, a positive and significant correlation was identified between delivery channel stability and operational efficiency indicators. Furthermore, a positive and significant association was found between service quality and operational efficiency measures within Nigerian logistics firms. In light of these findings, the study concludes that value chain management significantly enhances the operational efficiency of logistics firms in Nigeria. Particularly, it emphasizes the roles of timely service delivery, delivery channel stability, and service quality in augmenting cost-minimization, sales volume, and market share in these firms. The study also deliberated on the theoretical and managerial implications of these findings.

Keywords: Value Chain Management, Delivery Channel Stability, Timely Delivery, Service Quality, Operational Efficiency, Cost-Minimization Efforts, Sales Volume, Market Share, Strategic Choice Theory, Transaction Cost Economy, Structural Equation Modelling, Scientific Package for Social Sciences

CONTEXT OF THE PROBLEM

In the realm of daily organizational operations, the perpetual quest for efficiency remains paramount. Operational efficiency, as defined by Beal (2016), pertains to an enterprise's capacity to maintain high-quality products and services while ensuring cost-effective delivery to customers. Burrows (2016) emphasizes that this efficiency extends beyond mere cost reduction, encompassing the preservation of service quality. Neil (2019) underscores operational efficiency as a crucial means to deliver quality offerings to clients in a cost-effective and timely manner. Its significance is evident in various facets of organizational success, including shareholder wealth, business expansion, profitability, customer satisfaction, innovation, cost reduction, flexibility, and quality enhancement (Bayo-Moriones & Merino-

Díaz de Cerio, 2002). These benefits translate into future economic prosperity for organizations and their stakeholders (Islami, 2022).

In the light of those contribution lot of empirical works have been advanced postulating and prescribing different approach and models on how to enhance or improve operational efficiency. The discourse, postulations and suggestions as evident in the different scholarships by different scholars on this subject are from different disciplinary background, context and factors. Some are the works of Filley and Aldag (1980) suggesting coordination, improved technology and organizational structure as imperative for efficiency. Garnsey, Stam and Hefferman (2006), suggests that, the manager's ability to assess the environment for threats and opportunities and also the ability to form good working partnership with employees and further offer top notch services to customers, together promotes operational efficiency. Coah (2009) postulated it as relating to organizations production activities and thus, should concentrate on its production activities. Hisatomi (1990) views it from the perspective of cost, improved reputation and market share.

In 1985, Michael Porter introduced and popularized the concept of the Value Chain, defining value as the price buyers are willing to pay for a firm's offerings. He delineated nine generic value-added activities within firm operations, which collectively deliver value to customers (Willis, 2017). Porter also established the concept of a Value System by interconnecting the value chains of different firms (Porter, 1985). Today, leveraging the value chain through innovation is recognized as a critical strategy for enhancing firms' competitiveness. This approach aligns with the broader notion that enhancing a firm's value chain by producing superior goods, enhancing operational efficiency, and venturing into more skill-intensive sectors is imperative for securing sustainable competitive advantage (Porter, 1990).

Promoting higher value-added activities and fostering innovation has become central to the strategies of numerous firms and governmental policies aimed at fostering Research and Development (Hoyt, 2013). Value chains encompass a comprehensive array of activities and services essential for bringing products or services from conception to sale, spanning local, national, international, and global markets. Producers, input suppliers, operations, processors, retailers, and buyers are all integral components of the value chain, complemented by various technical, business, and financial service providers (USAID, Briefing Paper).

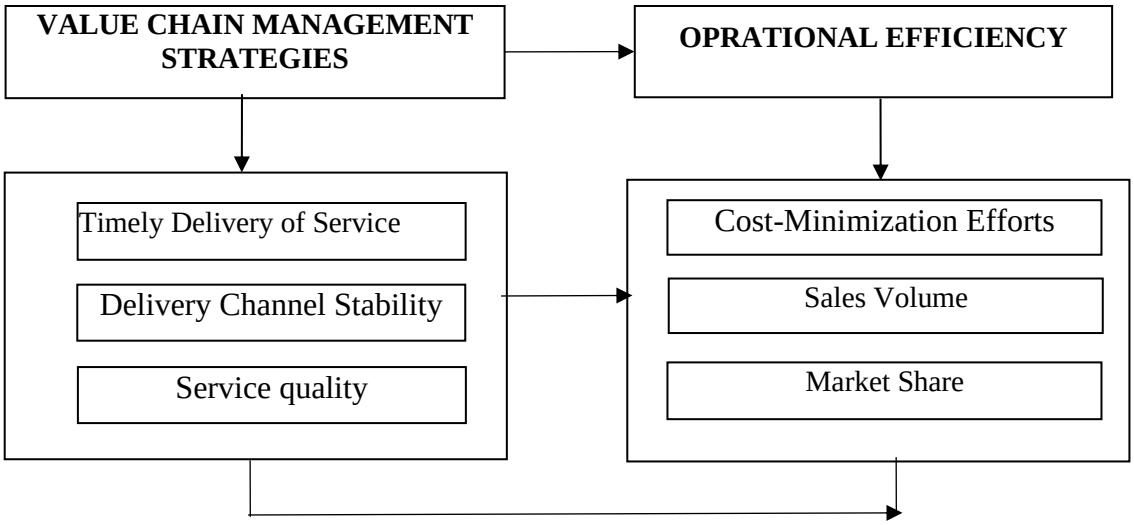
The value chain predominantly emphasizes a market-oriented collaboration strategy, underscoring the interconnections between production, marketing, and delivery activities to effectively and efficiently deliver products and services to the market.

The different extant literatures examined so far show that the direction of interest of the scholars and thus, their prescription as it relates to the subject matter were basically from different standpoints, maybe explained by their discipline and context. The least discussed as it relates to the subject of operational efficiency especially within the context of the Nigerian work setting or space was from the perspective of value chain management. This is an observed lacuna. A closer attempt was the works of Ogohi (2020) and Asaolu & Monday(2008) where the issues involved were the profitability of the organization; Akinola et al (2019) where they discussed the issues of financial performance; and Ramakrishna(2005) where the basic issues concern were minimizing material cost. Nevertheless, organization expectations and experiences, competitive factors and core competencies are changing and thus better approaches and models for recalibrating and/or sustaining efficiency. It is against this

backdrop that this study is structured to examine how value chain management can be used to recalibrate the operational efficiency of logistics firms in Nigeria

Conceptual Framework

The conceptual framework for this study is presented below.



Source: Conceptualized by the Researchers

Figure 1: Conceptual Framework Showing the Hypothesized Relationship between Value Chain Management and Operational Efficiency

As shown in Figure 1 above, the independent variable in this study is value chain management strategies. The dimensions of Value chain management adopted for this study are delivery channel stability, timely delivery and service quality while operational efficiency was measured using cost-minimization efforts, sales volume and market share.

REVIEW OF RELATED LITERATURE

Theoretical Framework: Strategic Choice Theory, and Transaction Cost Economics (TCE)

Core Competence Theory

The collective organizational learning encompasses the coordination of production skills and the integration of diverse technological streams to enhance customer satisfaction (Prahalad & Hamel, 1990). Core competence, as argued, revolves around a company's capacity to acquire expertise that is challenging to replicate in crucial areas, thus distinguishing it from competitors. Core competence is deemed significant for three main reasons: ensuring substantial contribution to customer satisfaction, fostering competitive uniqueness that is difficult to emulate, and facilitating access to various markets (Zook, 2007). Although core competencies may not directly translate into tangible products, they undeniably underpin competitiveness (Prahalad & Hamel, 1990), providing an edge throughout value delivery processes.

Given the intense competition in logistics, a distinct approach and strategy are imperative to sustain a favorable market position. Amidst competitive pressures and heightened customer expectations for reduced lead times and enhanced delivery reliability, management must prioritize identifying the firm's core competencies to achieve a competitive advantage. In a rapidly evolving business landscape, swift identification and utilization of core competencies are essential to secure improved market standings. Courier service providers must rely on internal strengths to deliver heightened customer value, particularly in terms of reliability and flexibility. Operating efficiently within the business ecosystem and adeptly responding to evolving challenges necessitate the adoption of strategic tools, unique skill sets, capabilities, and expertise to enhance delivery performance

Transaction Cost Economics (TCE)

This organizational framework is established to enhance economic efficiency by minimizing exchange costs (Williamson, 1979). Williamson's Transaction Cost Economics (TCE) is widely recognized as a seminal theory in outsourcing (Williamson, 1979). TCE remains pivotal in discussions surrounding organizational strategy, with Williamson (1979) positing that firms exist primarily to mitigate transaction costs, the expenses incurred within an economic system. By evaluating costs, firms can make informed decisions regarding their structure and sourcing strategies.

TCE theory is considered instrumental in guiding organizations through the outsourcing decision-making process, facilitating the identification of operations suitable for outsourcing and preparing for ensuing organizational adjustments. In competitive industries, selecting the appropriate outsourcing partner demands thorough analysis before a decision can be made.

Value Chain Management

Michael Porter, in his seminal work Competitive Advantage: Creating and Sustaining Superior Performance (1985), introduced the concept of the "Value Chain." Porter elucidates the notion of the Value Chain as a depiction of a company's value-enhancing activities, predicated on its pricing tactics and cost configuration. A pivotal aspect for a successful competitive strategy lies in a firm's comprehension of its capabilities vis-à-vis customer requirements. The initial step in value chain analysis involves dissecting the key activities inherent in the framework, followed by an evaluation of potential value augmentation through cost efficiency or differentiation strategies. Subsequently, strategists ascertain approaches that concentrate on activities conducive to attaining sustainable competitive advantages. The profitability of a company hinges on its adept management of various value chain activities, where the price consumers are willing to pay for its offerings surpasses the relative cost of those activities.

The concept of value chains encompasses a spectrum of activities and services indispensable for ushering a product or service from inception to its ultimate market, be it local, national, or global (USAID, Briefing Paper). These chains encompass producers, input suppliers, operations, processors, retailers, and consumers, bolstered by an array of technical, commercial, and financial service providers. Vertical alignment assumes significance as companies integrate primary and supportive activities, thereby enhancing product value at each stage. Value chains exhibit both structural and dynamic dimensions, wherein the structure influences firm behavior dynamics, ultimately impacting chain performance. Structural elements encompass end markets, the business environment, vertical

and horizontal linkages, and supporting markets, each playing a distinct role in value chain optimization.

Value Chain Management entails overseeing and directing a company's production or service delivery processes, aiming to identify avenues for enhancing efficiency and competitive edge in an increasingly globalized and competitive market landscape. This process encompasses various facets, including production, quality control, costing, and distribution, each crucial for optimizing resource utilization and determining product pricing.

Timely Delivery

Timely delivery stands as a critical dimension within the realm of value chain management, embodying the efficiency and effectiveness of logistical operations. It encapsulates the ability of an organization to meet customer demands promptly, ensuring products or services are delivered within the stipulated time frame. As highlighted by Lambert and Cooper (2000), timely delivery represents a fundamental aspect of customer satisfaction and retention, directly influencing competitive advantage in today's dynamic market environment. In their seminal work, Strategic Logistics Management, they emphasize the significance of aligning delivery schedules with customer expectations to enhance overall value creation along the supply chain. Similarly, Chopra and Meindl (2007) underscore the pivotal role of timely delivery in achieving operational excellence, stressing the need for synchronization across various stages of the value chain to minimize lead times and mitigate potential disruptions. Their insights from *Supply Chain Management: Strategy, Planning, and Operation* emphasize the interdependence between timely delivery and organizational performance, underscoring its multifaceted impact on cost efficiency, revenue generation, and brand reputation.

Furthermore, scholarly literature has elucidated the intricate interplay between timely delivery and customer loyalty, shedding light on its strategic implications for sustainable business growth. According to Christopher (2016), in *Logistics & Supply Chain Management*, timely delivery serves as a cornerstone of customer-centricity, fostering long-term relationships and fostering repeat purchases. By exceeding customer expectations through prompt order fulfillment, organizations can carve out a distinct competitive edge amidst intensifying market competition. Building on this premise, Ivanov and Rozhkov (2014) advocate for the adoption of advanced technological solutions and real-time monitoring mechanisms to enhance delivery accuracy and reliability. Their research underscores the transformative potential of digitalization in optimizing value chain performance, enabling proactive decision-making and adaptive response to evolving market dynamics.

Timely delivery extends beyond its operational implications to encompass broader strategic imperatives for organizational success. As articulated by Mentzer et al. (2001), timely delivery represents a pivotal driver of customer value proposition, shaping perceptions of service quality and responsiveness. By fostering a culture of timeliness and responsiveness across the value chain, organizations can cultivate a distinct competitive advantage predicated on agility and customer-centricity. In essence, timely delivery serves as a linchpin of value chain management, embodying the seamless orchestration of resources, processes, and technologies to deliver superior value to customers while driving sustainable business growth in an increasingly interconnected global landscape.

Timely Delivery denotes the provision of services by a business to its customers within the agreed-upon timeframe, a critical aspect encompassing all facets of service provision from initiation to follow-up, ensuring customer satisfaction and loyalty

Delivery Stability

Delivery stability represents a critical dimension within the domain of value chain management, encompassing the consistency and reliability of logistical operations. It embodies the ability of organizations to uphold dependable delivery schedules, ensuring that products or services are delivered to customers without undue variability or disruptions. As highlighted by Monczka et al. (2015), delivery stability is integral to fostering trust and confidence among customers, as it minimizes the risk of delays or inconsistencies in order fulfillment. This reliability is essential for enhancing customer satisfaction and loyalty, as emphasized by Fawcett et al. (2014). They underscore the pivotal role of delivery stability in mitigating supply chain risks and uncertainties, thereby bolstering the overall resilience and competitiveness of organizations in volatile market environments.

Literature have discussed the strategic significance of delivery stability in driving operational efficiency and cost-effectiveness along the value chain. According to Simchi-Levi et al. (2008), stability in delivery schedules facilitates better demand forecasting and inventory management, reducing the need for costly safety stocks or expedited shipments. This, in turn, contributes to streamlined operations and optimized resource utilization, ultimately enhancing organizational profitability and performance. Building on this premise, Wilding and Harrison (2004) advocate for the adoption of lean principles and just-in-time practices to promote delivery stability and minimize wasteful activities. Their research underscores the transformative potential of lean supply chain management in enhancing delivery reliability and responsiveness to customer needs.

Furthermore, the discourse surrounding delivery stability extends beyond its operational implications to encompass broader strategic imperatives for organizational success. As articulated by Wisner et al. (2005), stable delivery performance is crucial for nurturing enduring partnerships with suppliers and customers alike. By consistently meeting delivery commitments, organizations can foster trust and collaboration across the value chain, paving the way for mutual value creation and sustained competitive advantage. In essence, delivery stability serves as a cornerstone of value chain management, underpinning the seamless coordination of activities and resources to meet customer expectations reliably while driving sustainable business growth in an increasingly dynamic and interconnected marketplace.

Service Quality

Service quality stands as a pivotal dimension within the realm of value chain management, encompassing the delivery of superior and consistent service experiences to customers throughout the value chain. It represents the extent to which organizations meet or exceed customer expectations regarding the performance and reliability of their products or services. As emphasized by Zeithaml et al. (2009), service quality plays a central role in shaping customer perceptions and fostering long-term relationships, thereby driving competitive advantage and profitability. This assertion underscores the importance of aligning service delivery processes with customer preferences and needs to enhance overall value creation and differentiation in the marketplace.

Moreover, scholarly literature underscores the multifaceted nature of service quality, which encompasses various dimensions such as reliability, responsiveness, assurance, empathy, and tangibles. Parasuraman et al. (1988) introduced the widely adopted SERVQUAL model, which delineates these dimensions and provides a framework for assessing and improving service quality across different industries. Their seminal work in the *Journal of Retailing* underscores the significance

of each dimension in shaping customer perceptions and influencing their satisfaction and loyalty. Building on this foundation, Johnston and Clark (2008) advocate for a holistic approach to managing service quality, which involves not only meeting customer expectations but also actively engaging them in co-creation and continuous improvement initiatives. Their insights highlight the strategic imperative of integrating service quality considerations into the broader value chain management framework to drive sustainable business success.

Furthermore, the discourse surrounding service quality extends beyond its operational implications to encompass broader strategic imperatives for organizational success. As articulated by Heskett et al. (1997), service quality serves as a key driver of customer loyalty and advocacy, which in turn, fuels revenue growth and shareholder value. This perspective underscores the interconnectedness between service quality, customer satisfaction, and financial performance, emphasizing the need for organizations to prioritize investments in service excellence as a means of achieving sustainable competitive advantage. In essence, service quality represents a foundational pillar of value chain management, embodying the relentless pursuit of customer-centricity and continuous improvement to drive superior value creation and organizational success in today's dynamic business landscape.

Operational Efficiency

Operational efficiency, as defined by scholars (Akinlo, 2015; Neil, 2019; Ghosh & Sanyal, 2019), refers to the effectiveness in resource allocation within business operations, quantified by the ratio of outputs to inputs. Enhancing operational efficiency entails improving this ratio, ultimately leading to higher profitability by maximizing returns relative to operating costs. This is achieved through reducing transaction costs and fees (Akinlo, 2015), and employing various methods and techniques to deliver quality products and services to customers in a cost-effective and timely manner (Neil, 2019).

Key perspectives on operational efficiency include asset utilization, production, distribution, and inventory management (Ghosh & Sanyal, 2019). Additionally, operational efficiency involves leveraging organizational capabilities to optimize assets and minimize waste while delivering quality offerings to customers (Neil, 2019). Streamlining core processes is often essential to adapt to dynamic market forces more efficiently (Vangie, 2019).

Scholars such as Kalluru & Bhat (2009) emphasize that operational efficiency is influenced by firm-specific factors like management skills, innovation, cost control, and market share, which collectively determine a firm's current performance and stability. Thus, operational efficiency encompasses the capacity of an organization to streamline operations and maximize asset utilization in providing goods and services to customers (Kalluru & Bhat, 2009).

Cost Minimization

Cost minimization serves as a fundamental measure of operational efficiency within organizations, reflecting the prudent allocation and utilization of resources to achieve optimal productivity and profitability. It entails the systematic identification and elimination of wasteful activities, redundancies, and inefficiencies across various operational processes. As elucidated by Chase et al. (2018), cost minimization is central to achieving competitiveness in today's global marketplace, as it enables organizations to offer competitive prices while safeguarding profit margins. This underscores the importance of adopting cost-effective strategies such as lean manufacturing, supply chain optimization, and process reengineering to streamline operations and reduce production costs.

In furtherance, academic beam light underscored the strategic imperative of cost minimization in driving sustainable business growth and resilience amidst economic uncertainties and market fluctuations. According to Slack et al. (2019), minimizing costs is essential for enhancing organizational agility and adaptability, allowing firms to respond effectively to changing customer demands and competitive pressures. This entails not only reducing direct production costs but also optimizing indirect expenses such as overheads, inventory carrying costs, and distribution expenses. By adopting a holistic approach to cost management, organizations can enhance their financial performance and resource allocation efficiency, thereby fortifying their competitive position in the marketplace.

The discourse surrounding cost minimization extends beyond its operational implications to encompass broader strategic imperatives for organizational success. As articulated by Drucker (2006), effective cost minimization requires a strategic focus on value creation and innovation, rather than mere cost-cutting measures. This entails fostering a culture of continuous improvement and efficiency enhancement across all levels of the organization, thereby driving sustainable cost reductions while preserving value-added activities. In essence, cost minimization represents a cornerstone of operational excellence, embodying the relentless pursuit of efficiency, competitiveness, and value creation to ensure long-term viability and success in today's dynamic business environment.

Sales Volume

Sales volume serves as a critical measure of operational efficiency within organizations, reflecting the effectiveness of production and distribution processes in meeting customer demand. It represents the quantity of products or services sold within a given period, providing insights into the organization's ability to convert resources into revenue-generating activities. As highlighted by Stevenson et al. (2018), sales volume is a key performance indicator that directly impacts revenue generation and profitability, thus serving as a vital metric for evaluating operational effectiveness. This underscores the importance of aligning production capacity with market demand and ensuring efficient inventory management to maximize sales volume while minimizing costs.

Moving forward, scholarly discourse underscores the strategic significance of sales volume in driving business growth and competitiveness. According to Hill et al. (2017), achieving high sales volume requires organizations to optimize their production processes, enhance product quality, and deliver superior customer service. This entails leveraging economies of scale, investing in technology and automation, and implementing demand forecasting and sales planning strategies to meet customer needs efficiently. By focusing on increasing sales volume while maintaining cost-effectiveness, organizations can enhance their market share, customer satisfaction, and overall competitive advantage in the marketplace.

Again, the discourse surrounding sales volume extends beyond its operational implications to encompass broader strategic imperatives for organizational success. As articulated by Kaplan and Norton (2001), sales volume serves as a leading indicator of business performance and market penetration. This underscores the importance of aligning operational activities with strategic objectives, such as market expansion, product diversification, and customer segmentation, to drive sustainable revenue growth. In essence, sales volume represents a key driver of operational efficiency and strategic alignment, embodying the organization's ability to capitalize on market opportunities and deliver value to customers while achieving its overarching business goals.

Market Share

Market share serves as a fundamental measure of operational efficiency within organizations, providing insights into their competitive position and ability to capture a portion of the market demand. It represents the percentage of total sales or revenue generated by a company within a specific industry or market segment, reflecting its ability to attract and retain customers amidst competition. As emphasized by Kotler and Armstrong (2016), market share is a key performance indicator that directly influences an organization's revenue growth, profitability, and market power. This underscores the importance of strategic marketing initiatives, product differentiation, and customer relationship management in driving market share expansion and sustaining competitive advantage in dynamic business environments.

Moreover, scholarly discourse underscores the strategic significance of market share in driving business growth and profitability. According to Porter (1980), achieving a dominant market share allows organizations to leverage economies of scale, negotiate favorable supplier contracts, and invest in innovation and product development initiatives. This, in turn, enhances their ability to offer competitive prices, attract new customers, and fend off competitive threats effectively. By focusing on increasing market share through operational efficiency and strategic differentiation, organizations can strengthen their market position and enhance their long-term viability in the marketplace.

Furthermore, the discourse surrounding market share extends beyond its operational implications to encompass broader strategic imperatives for organizational success. As articulated by Day (2011), market share serves as a key driver of shareholder value and organizational performance. This underscores the importance of aligning operational activities with strategic objectives, such as market expansion, customer acquisition, and brand positioning, to drive sustainable growth and profitability. In essence, market share represents a critical metric of operational efficiency and strategic alignment, embodying the organization's ability to capitalize on market opportunities, deliver value to customers, and achieve its overarching business objectives.

Empirical Review

Thuku (2019) conducted research on the impact of implementing value chain management practices on the performance of medium and large-scale retail establishments in Nakuru County. The findings illustrated a statistically significant and positive correlation between the adoption of value chain management practices and organizational performance. It was deduced that while internal value chain activities should remain the focal point of such practices within firms, integrating all dimensions of value chain management practices is imperative for achieving substantial enhancements in organizational performance.

Ghonar (2015) conducted a study examining the influence of value chain activities on the performance of Safaricom Limited, Kenya, concluding that organizations implementing value chain management practices typically experience enhanced performance, including increased profitability, greater market responsiveness, sustained market dominance, and long-term competitive advantages. Loko and Opusunju (2016) explored the nexus between value chain integration and performance in agro-allied small and medium-scale enterprises in Sokoto, Nigeria. They suggested that effective management of linkages often results in cost reduction or differentiation improvement. This underscores the significance of coordinated linkages in shaping a firm's cost structure or differentiation strategies, and the efforts aimed at enhancing performance in each value activity independently.

Olhager (2012) investigated the role of decoupling points in value chain management and identified a dominant customer order decoupling point (CODP) along the material flow of the value chain. The positioning of the CODP, whether within manufacturing operations, at suppliers, or downstream in the supply chain, significantly influences operational dynamics and responsiveness.

Aguko (2014) examined value chain analysis and organizational performance within beer manufacturing companies in Kenya, emphasizing the importance of integrating historical performance data and future performance expectations to develop strategic alternatives and opportunities. Thus, the value of opportunities created is intrinsically linked to past actions and should be factored into performance metrics as the risk-adjusted present value of such opportunities.

Schiebel (2005) investigated value chain analysis and competitive advantage within the telecommunications sector in the United Kingdom, revealing that it not only uncovers cost advantages but also identifies sources of differentiation relative to competitors. Moreover, it highlights activities crucial for customer satisfaction and market success, fostering above-average customer satisfaction, loyalty, increased market share, and higher profit margins.

To assess the potential impact of value chain management strategies on operational efficiency in logistics firms in Nigeria, this study aims to investigate their effectiveness. Drawing insights from existing literature on the measurement and dimensions of relevant variables, this study formulates hypotheses to guide its inquiry.

The null hypotheses for this study are as follows:

1. Timely delivery s no statistical correlation with cost minimize of logistics companies in Nigeria.
2. Timely delivery has no correlation with sales volume of logistics companies in Nigeria.
3. Timely delivery has no statistical connection with market share of logistics companies in Nigeria.
4. Stability of delivery channels has no statistical relevance on minimization of costs of logistics firms in Nigeria
5. Stability of delivery channels has no significant statistical association with sales volume of logistics companies in Nigeria.
6. There is no statistical link between stability of delivery channels and market share of logistics companies in Nigeria.
7. There is no statistically prove showing the correlation between the quality of service and cost minimization of logistics companies in Nigeria.
8. Statistically there is no significant dependence between the quality of service and sales volume of logistics companies in Nigeria.
9. Significantly, there is no statistics showing the correlation between the quality of service and market share of logistics companies in Nigeria.

RESEARCH METHODS

This study employed a descriptive research design coupled with a cross-sectional survey to examine the dynamics within the logistics sector of Nigeria, focusing on the operations of 61 logistics firms as listed on www.f6s.com. From this pool, a subset of 10 firms was selected based on their prominence in terms of workload and market share, as documented on www.glassdoor.com. Recognizing the pivotal role of logistics firms in facilitating the distribution of goods and services to end consumers, thereby bolstering the production and GDP growth of the Nigerian economy, this research hones in on the organizational level, specifically targeting management personnel.

Within the scope of this investigation, the independent variable is Value Chain Management, while operational efficiency serves as the dependent variable. Value Chain Management is assessed through indicators such as delivery channel stability, timeliness, and quality, whereas operational efficiency is gauged by metrics including cost, sales volume, and market share.

To test the formulated hypotheses, Structural Equation Modeling (SEM) was employed, encompassing both a measurement model and a structural model. The measurement model adheres to the common factor model, drawing on Thurstone's framework (as cited in Dimitris, George, Malvina, & Demosthenes, 2017), with validation and significance testing conducted at a confidence level of 95%. Descriptive Statistics, employing mean and standard deviation, were computed using Statistical Package for Social Sciences (SPSS) software version 25 to encapsulate the characteristics of the variables under scrutiny.

Ordinal data were evaluated using a Likert-scaling approach, a method conducive to normality, particularly with large sample sizes (Hoyle, 2012), thus rendering it compatible with SEM analysis, as substantiated by Altman and Bland (1995). The study utilized AMOS (Analysis of Moment Structure) software, renowned for its user-friendly interface, model visualization capabilities, and robust bootstrapping features (Byrne, 2001; 2010; 2012; Tabachnick & Fidell, 2007; Bagozzi & Yi, 2012), to execute the SEM analysis.

Further elucidation on the sub-sectors and the firms under examination is provided below.

Table 1: Names of Firms and number of copies of the Questionnaires Distributed to the Selected logistics firms in Nigeria.

S/N	Name of Company	Number of Respondents
1	UPS	13
2	GIG	15
3	DHL	12
4	FedEx	14
5	Courier Plus	10
6	GLOVO	11
7	Zenith Corex	12
8	Maersk	13
9	AB Logistics	12
10	Fortune Global Limited	14
	Total	126

Fieldwork (2023)

Table 2: Number and percentage of questionnaires administered and used

	No of Copies	**Percentage (%)**
Distributed	126	100
Retrieved and Utilized	115	91.26%
Unused	11	8.74%

Source: Research Data, 2023

Table 2 above, is an analysis of the number of copies that were distributed, number retrieved/returned, as well as the number voided because they were either returned blank, wrongly filled, or were not returned.

IV. DATA ANALYSIS

Table 3: Measurement Model Analysis of Delivery Channel Stability

Model	Chi-Square (df), Significance	NFI	TLI	CFI	RMSEA	Variable	Standardized Factor Loading Estimates	Error VAR
Delivery channel stability	(2df) = 4.56, p > 0.000	0.94	0.97	0.98	0.69	DCS 1	0.77	0.40
						DCS 2	0.70	0.30
						DCS 3	0.72	0.22
						DCS 4	0.67	0.23
						DCS 5	0.81	0.37

Source: Research data, 2023

All indicators of delivery channel stability loaded significantly as they were all above 0.5(50%). This shows that all the indicators can be employed for subsequent analysis.

Table 4: Measurement Model Analysis of Timely Delivery

Model	Chi-Square (df), Significance	NFI	TLI	CFI	RMSEA	Variable	Standardized Factor Loading Estimates	Error VAR
Timely delivery	(35df) =242, p > 0.000	1.0	0.54	1.0	0.16	TDV 1	0.64	0.36
						TDV 2	0.86	0.43
						TDV 3	0.84	0.54
						TDV 4	0.74	0.46
						TDV 5	0.91	0.28

Source: Research data, 2023

All indicators of timely delivery loaded significantly as they were all above 0.5(50%). This shows that all the indicators can be employed for subsequent analysis.

Table 5: Measurement Model Analysis of Service quality

Model	Chi-Square (df), Significance	NFI	TLI	CFI	RMSEA	Variable	Standardized Factor Loading Estimates	Error VAR
Service quality	(33df) =241, p>0.000	0.82	0.75	0.84	0.16	Q1	0.80	0.36
						Q2	0.84	0.22
						Q3	0.74	0.34
						Q4	0.82	0.24
						Q 5	0.75	0.14

Source: Research data, 2023

All indicators of quality loaded significantly as they were all above 0.5(50%). This shows that all the indicators can be employed for subsequent analysis.

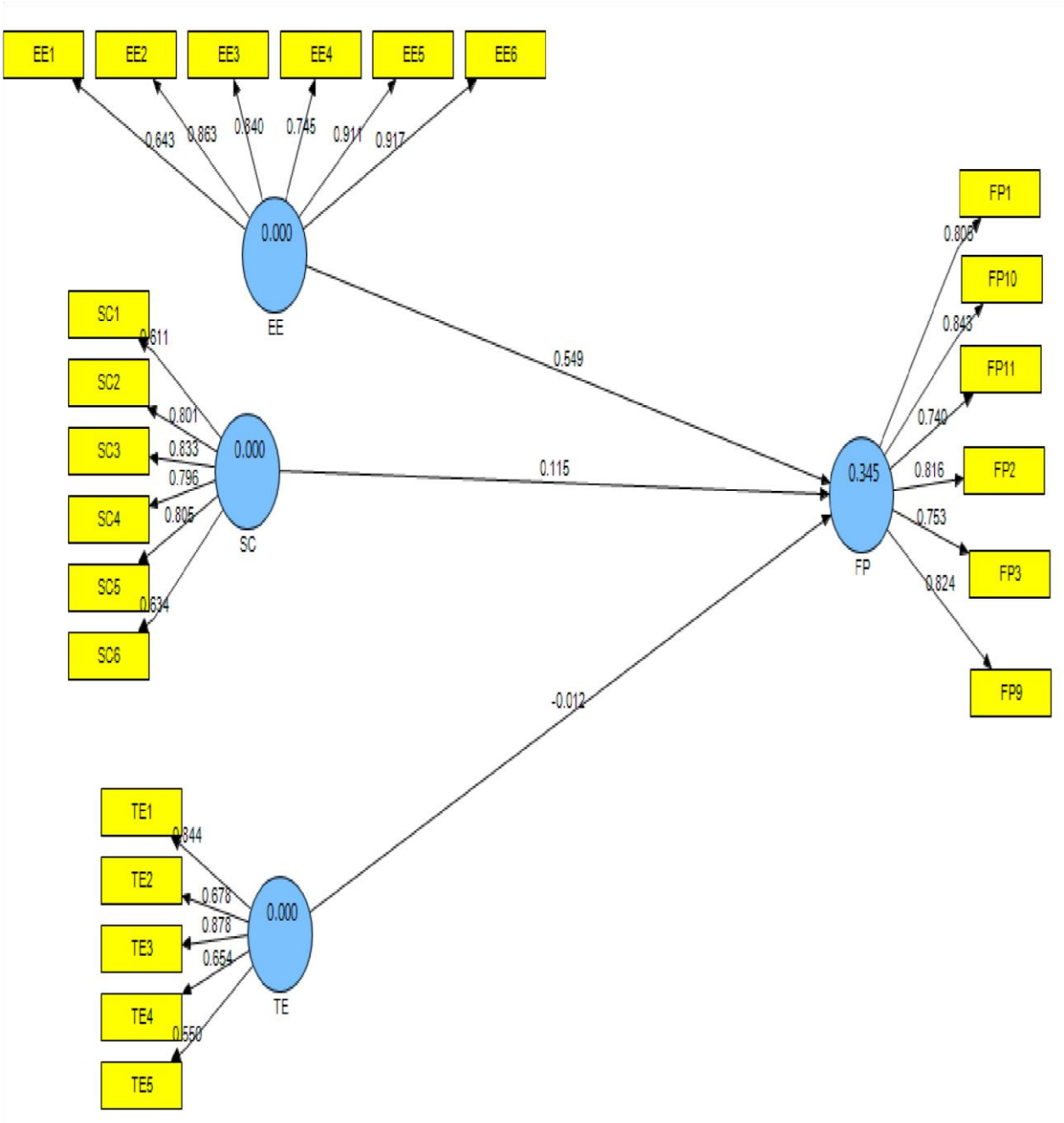


Figure 2: **Measurement Model**

Figure 2 above shows how the model fit the study with individual indicators showing the reliability and the validity of the variables. Table 6 below further explains the figure.

Table 6: Construct Reliability and Validity

Variable	Items	Loadings	AVE	CR	CA
Delivery channel stability	DCS1	0.81	0.64	0.91	0.845
	DCS2	0.82			
	DCS3	0.75			
	DCS9	0.82			
	DCS10	0.84			
	DCS11	0.74			
Timely delivery	TDV1	0.64	0.68	0.93	0.715
	TDV 2	0.86			
	TDV 3	0.84			
	TDV 4	0.74			
	TDV 5	0.91			
	TDV 6	0.92			
Quality	Q1	0.84	0.53	0.85	0.643
	Q2	0.68			
	Q3	0.88			
	Q4	0.65			
	Q5	0.55			

Table 7: Discriminant Validity using Fornell-larcker criterion

	Construct	1	2	3	4
1	Service quality	**0.83**			
2	Delivery channel stability	0.58	**0.80**		
3	Timely delivery	0.25	0.25	**0.75**	

Source: Field Survey, (2023).

Table 7 displays the findings concerning discriminant validity, a critical aspect in research. This validity is established when the square root of the Average Variance Extracted (AVE) for each construct surpasses the correlations with other constructs. For efficiency, the AVE is notably high at 0.83, exceeding all inter-construct correlations. Similarly, the AVE for cost stands at 0.80, with correlations falling below this threshold. Sales volume exhibits an AVE of 0.75, again surpassing all relevant correlations. Likewise, market share demonstrates an AVE of 0.73, with correlations remaining lower. By adhering to the Fornell-Larcker discriminant validity criterion, it's evident from the data that discriminant validity is achieved, as indicated by the higher square root of AVE compared to inter-construct correlations (Garson, 2016).

Bootstrapping Analysis

A bootstrapping analysis was carried out to determine the direct effect of the independent variables on the dependent variables of the study. Based on the result, figure 3 is presented, which shows the structural model of the direct impact of Delivery channel stability, Timely Delivery and Service quality on Operational Efficiency of Logistics firms in Nigeria.

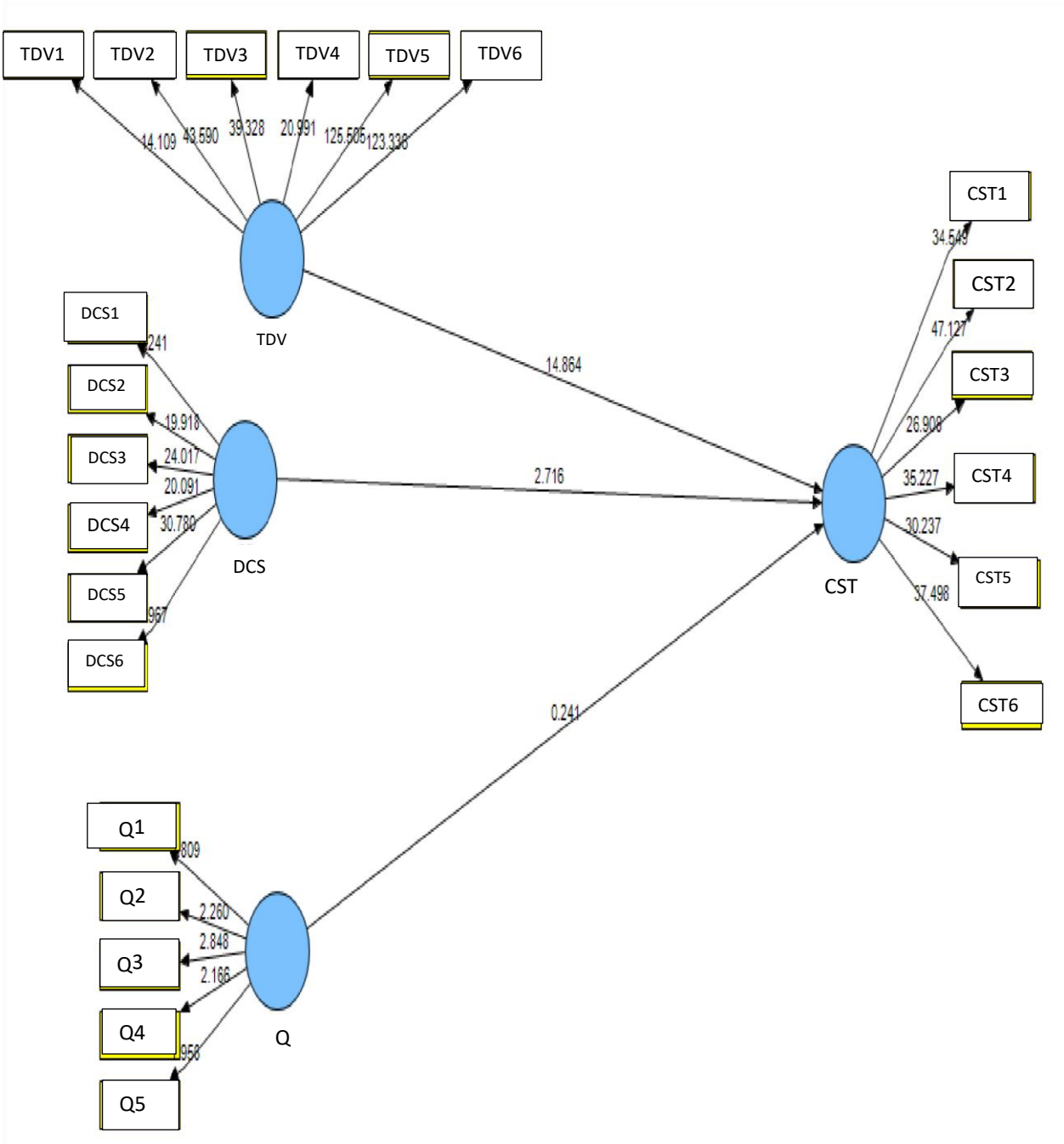


Figure 3: Structural Model

Figure 3 above was used to estimate the path model to view the sampling distribution in order to determine the standard error and the standard deviation of the estimated coefficients distribution in the population

Table 8: Result of standardized and unstandardized regression estimate of the model.

S/N	Mediation Stage	Relationship	Std. Beta	Actual Beta	S.E.	C.R.	P	Remark
1.	X →Y (Hypothesis 1)	Timely Delivery and Cost-Minimization Efforts	0.69	0.87	0.13	2.51	0.000	Not Supported
2.	X →Y (Hypothesis 2)	Timely Delivery and Sales Volume	0.76	0.83	0.22	3.40	0.000	Not Supported
3.	X →Y (Hypothesis 3)	Timely Delivery and Market Share	0.58	0.82	0.18	4.32	0.000	Not Supported
4.	X →Y (Hypothesis 4)	Delivery Channel Stability and Cost-Minimization Efforts	0.74	0.87	0.13	2.51	0.000	Not Supported
5.	X →Y (Hypothesis 5)	Delivery Channel Stability and Sales Volume	0.78	0.83	0.22	3.40	0.000	Not Supported
6.	X →Y (Hypothesis 6)	Delivery Channel Stability and Market Share	0.60	0.82	0.18	4.32	0.000	Not Supported
7.	X →Y (Hypothesis 7)	Service quality and Cost-Minimization Efforts	0.71	0.87	0.13	2.51	0.000	Not Supported
8.	X →Y (Hypothesis 8)	Service quality and Sales Volume	0.79	0.83	0.22	3.40	0.000	Not Supported
9.	X →Y (Hypothesis 3)	Service quality and Market Share	0.61	0.82	0.18	4.32	0.000	Not Supported

Hypotheses Testing

Hypothesis One

H_{O1}: *There is no significant relationship between Timely Delivery and the cost-minimization efforts of logistics firms in Nigeria.*

S/N	Mediation Stage	Relationship	Std. Beta	Actual Beta	S.E.	C.R.	P	Remark
1.	X →Y (Hypothesis 1)	Timely Delivery and Cost-Minimization Efforts	0.69	0.87	0.13	2.51	0.000	Not Supported

The initial hypothesis (H01) aimed to explore the link between punctual delivery and the cost reduction endeavors of logistics companies operating in Nigeria. Analysis results presented in Table 8 demonstrate that β=0.87, r=0.69, and p = 0.000. Following the decision protocol where the null hypothesis is embraced if β<0.3, r<0.7, and p > 0.05; or rejected if β>0.3, r>0.7, and p < 0.05), the null hypothesis is rejected, favoring the alternative stance. This outcome suggests a robust positive and

statistically significant correlation between timely delivery and the cost reduction initiatives of logistics firms in Nigeria (β=0.87 >0.3, r=0.69 >0.7, and p = 0.000 < 0.05). Consequently, H01 lacks support. Based on this discovery, the research concludes that punctual delivery significantly contributes to enhancing the cost reduction endeavors of logistics companies in Nigeria.

Hypothesis Two

Ho2: *There is no significant relationship between Timely Delivery and the sales volume of logistics firms in Nigeria.*

S/N	Mediation Stage	Relationship	Std. Beta	Actual Beta	S.E.	C.R.	P	Remark
2.	X →Y (Hypothesis 2)	Timely Delivery and Sales Volume	0.76	0.83	0.22	3.40	0.000	Not Supported

The analysis of the second hypothesis (H02) aimed to explore the correlation between punctual delivery and the sales volume of logistics companies in Nigeria. According to the findings presented in Table 8, the data analysis yielded values of β=0.83, r=0.76, and p=0.000. Following the established decision criteria, which dictate acceptance of the null hypothesis if β<0.3, r<0.7, and p>0.05, or rejection of the null hypothesis if β>0.3, r>0.7, and p<0.05, the null hypothesis is rejected, favoring the alternative hypothesis. This outcome underscores a robust positive and statistically significant connection between timely delivery and the sales volume of logistics firms in Nigeria (β=0.83 >0.3, r=0.76 >0.7, and p=0.000 <0.05). Consequently, H02 lacks support. The study concludes that timely delivery significantly contributes to bolstering the sales volume of logistics firms in Nigeria.

Hypothesis Three

Ho3: *There is no significant relationship between Timely Delivery and Market Share of logistics firms in Nigeria.*

S/N	Mediation Stage	Relationship	Std. Beta	Actual Beta	S.E.	C.R.	P	Remark
3.	X →Y (Hypothesis 3)	Timely Delivery and Market Share	0.58	0.82	0.18	4.32	0.000	Not Supported

In exploring the nexus between punctual delivery and the market share of logistics companies in Nigeria, the third hypothesis (H03) was investigated. Analysis of the data, as depicted in Table 8, unveiled the following statistical values: β=0.82, r=0.58, and p = 0.000. Following the established criteria for decision-making, which dictate acceptance of the null hypothesis if β<0.3, r<0.7, and p > 0.05; or rejection if β>0.3, r>0.7, and p < 0.05), the null hypothesis is rejected, favoring the alternative hypothesis. This outcome underscores a substantial and positive correlation between timely delivery and the market share of logistics firms in Nigeria (β=0.82 >0.3, r=0.58 >0.7, and p = 0.000 < 0.05). Consequently, H03 lacks empirical support. In light of this discovery, the study asserts the pivotal role of timely delivery in bolstering the market share of logistics firms in Nigeria.

Hypothesis Four

Ho4: *There is no significant relationship between delivery channel stability and the cost-minimization efforts of logistics firms in Nigeria.*

S/N	Mediation Stage	Relationship	Std. Beta	Actual Beta	S.E.	C.R.	P	Remark
4.	X →Y (Hypothesis 4)	Delivery Channel Stability and Cost-Minimization Efforts	0.74	0.87	0.13	2.51	0.000	Not Supported

Table 8 presents an analysis of the correlation between delivery channel stability and logistics firms' costs in Rivers State, revealing significant findings with β=0.87, r=0.74, and p = 0.000. The results indicate a robust positive association meeting the established criteria for significance (β>0.3, r>0.7, and p < 0.05). Consequently, rejecting the null hypothesis aligns with the observed positive significant relationship between delivery channel stability and logistics costs in Nigeria, thereby not supporting H04.

This hypothesis aimed to explore the link between delivery channel stability and logistics firms' cost-minimization efforts. The analysis demonstrates a strong positive relationship with β=0.87, r=0.74, and p = 0.000, leading to the rejection of the null hypothesis in favor of the alternate form. These results affirm the pivotal role of delivery channel stability in enhancing cost-minimization efforts among logistics firms in Nigeria, leading to the non-support of H04 and concluding that delivery channel stability significantly contributes to cost-minimization endeavors in the Nigerian logistics sector.

Hypothesis Five

Ho5: *There is no significant relationship between delivery channel stability and the sales volume of logistics firms in Nigeria.*

S/N	Mediation Stage	Relationship	Std. Beta	Actual Beta	S.E.	C.R.	P	Remark
5.	X →Y (Hypothesis 5)	Delivery Channel Stability and Sales Volume	0.78	0.83	0.22	3.40	0.000	Not Supported

In analyzing the fifth hypothesis (H05), the study explored the correlation between delivery channel stability and sales volume within Nigeria's logistics firms. The findings, detailed in Table 8, demonstrated significant parameters: β=0.83, r=0.78, and p = 0.000. Following predetermined criteria - accepting the null hypothesis if β<0.3, r<0.7, and p > 0.05, or rejecting it if β>0.3, r>0.7, and p < 0.05 - the null hypothesis was rejected, affirming the alternate hypothesis. Consequently, a robust positive relationship was established between delivery channel stability and sales volume in Nigerian logistics firms (β=0.83 >0.3, r=0.78 >0.7, and p = 0.000 < 0.05), rendering support to H05. Hence, the study concludes that the stability of delivery channels significantly augments sales volume within Nigeria's logistics industry.

Hypothesis Six

Ho6: *There is no significant relationship between delivery channel stability and the market share of logistics firms in Nigeria.*

S/N	Mediation Stage	Relationship	Std. Beta	Actual Beta	S.E.	C.R.	P	Remark
6.	X →Y (Hypothesis 6)	Delivery Channel Stability and Market Share	0.60	0.82	0.18	4.32	0.000	Not Supported

The sixth hypothesis (H06) aimed to investigate the correlation between delivery channel stability and the market share of logistics companies in Nigeria. The analysis, as presented in Table 8, yielded results indicating β=0.82, r=0.60, and p = 0.000. Following the prescribed decision criteria, which advises accepting the null hypothesis if β<0.3, r<0.7, and p > 0.05; or rejecting it if β>0.3, r>0.7, and p < 0.05, we reject the null hypothesis and accept the alternative. This outcome demonstrates a significant positive relationship between delivery channel stability and the market share of logistics firms in Nigeria (β=0.82 >0.3, r=0.60 >0.7, and p = 0.000 < 0.05). Consequently, H06 is not upheld. Consequently, this study concludes that delivery channel stability significantly contributes to augmenting the market share of logistics firms in Nigeria.

Hypothesis Seven

Ho7: *There is no significant relationship between service quality and the cost-minimization efforts of logistics firms in Nigeria.*

S/N	Mediation Stage	Relationship	Std. Beta	Actual Beta	S.E.	C.R.	P	Remark
7.	X →Y (Hypothesis 7)	Service quality and Cost-Minimization Efforts	0.71	0.87	0.13	2.51	0.000	Not Supported

The analysis in Table 8 shows that the data analysis for hypothesis H07, which investigates the relationship between service quality and cost-minimization efforts in Nigerian logistics firms, resulted in β=0.87, r=0.71, and p=0.000. According to the decision criteria, which suggests accepting the null hypothesis if β<0.3, r<0.7, and p>0.05, or rejecting it if β>0.3, r>0.7, and p<0.05, the null hypothesis is rejected in favor of the alternative hypothesis. This indicates a significant positive relationship between service quality and cost-minimization efforts in Nigerian logistics firms (β=0.87>0.3, r=0.71>0.7, and p=0.000<0.05). Therefore, H07 is not supported, leading to the conclusion that service quality plays a significant role in enhancing cost-minimization efforts in Nigerian logistics firms.

Hypothesis Eight

Ho8: *There is no significant relationship between quality and sales volume of logistics firms in Nigeria.*

S/N	Mediation Stage	Relationship	Std. Beta	Actual Beta	S.E.	C.R.	P	Remark
8.	X →Y (Hypothesis 8)	Service quality and Sales Volume	0.79	0.83	0.22	3.40	0.000	Not Supported

The eighth hypothesis (H08) aimed to investigate the correlation between service quality and the sales volume of logistics companies in Nigeria. As evidenced in Table 8, the data analysis outcome displayed β=0.83, r=0.79, and p = 0.000. Following the decision criteria which necessitates acceptance of the null hypothesis if β<0.3, r<0.7, and p > 0.05; or rejection of the null hypothesis if β>0.3, r>0.7, and p < 0.05), the null hypothesis is rejected, favoring the alternative. This outcome underscores a robust positive and significant association between service quality and the sales volume of logistics firms in Nigeria (β=0.83 >0.3, r=0.79>0.7, and p = 0.000 < 0.05). Consequently, H08 is unsupported. This discovery leads to the conclusion that service quality substantially impacts the sales volume of logistics firms in Nigeria.

Hypothesis Nine

Ho9: *There is no significant relationship between service quality and the market share of logistics firms in Nigeria*

S/N	Mediation Stage	Relationship	Std. Beta	Actual Beta	S.E.	C.R.	P	Remark
9.	X →Y (Hypothesis 3)	Service quality and market Share	0.61	0.82	0.18	4.32	0.000	Not Supported

The ninth hypothesis (H09) was investigated to explore the correlation between service quality and the market share of logistics companies in Nigeria. Analysis of the data, as presented in Table 8, yielded β=0.82, r=0.61, and p=0.000. Following the decision criteria stipulating acceptance of the null hypothesis if β<0.3, r<0.7, and p>0.05; or rejection if β>0.3, r>0.7, and p<0.05, we reject the null hypothesis and affirm the alternate hypothesis. This outcome underscores a robust positive correlation between service quality and the market share of logistics firms in Nigeria (β=0.82>0.3, r=0.61>0.7, and p=0.000<0.05). Consequently, H09 is not substantiated. From this discovery, it can be concluded that service quality significantly influences the market share of logistics firms in Nigeria.

Table 9: Summary of the Results/Findings and Decisions

S/N	Hypotheses	Outcome	Extent of Relationship	Remark
Ho_1:	*There is no significant relationship between timely delivery and the cost-minimization efforts of logistics firms in Nigeria.*	β = 0.87 r = 0.69 p = 0.000	Strong and Positive Relationship	Not Supported
Ho_2:	*There is no significant relationship between timely delivery and the sales volume of logistics firms in Nigeria.*	β = 0.83 r = 0.76 p = 0.000	Strong and Positive Relationship	Not Supported
Ho_3:	*There is no significant relationship between timely delivery and the market share of logistics firms in Nigeria.*	β = 0.82 r = 0.58 p = 0.000	Strong and Positive Relationship	Not Supported
Ho_4:	*There is no significant relationship between delivery channel stability and the cost-minimization efforts of logistics firms in Nigeria.*	β = 0.87 r = 0.74 p = 0.000	Strong and Positive Relationship	Not Supported
Ho_5:	*There is no significant relationship between delivery channel stability and the sales volume of logistics firms in Nigeria.*	β = 0.83 r = 0.78 p = 0.000	Strong and Positive Relationship	Not Supported
Ho_6:	*There is no significant relationship between delivery channel stability and the market share of logistics firms in Nigeria.*	β = 0.82 r = 0.60 p = 0.000	Strong and Positive Relationship	Not Supported
Ho_7:	*There is no significant relationship between service quality and the cost-minimization efforts of logistics firms in Nigeria.*	β = 0.87 r = 0.71 p = 0.000	Strong and Positive Relationship	Not Supported
Ho_8:	*There is no significant relationship between service quality and Sales Volume of logistics firms in Nigeria.*	β = 0.83 r = 0.79 p = 0.000	Strong and Positive Relationship	Not Supported
Ho_9:	*There is no significant relationship between service quality and the Market Share of logistics firms in Nigeria*	β = 0.82 r = 0.61 p = 0.000	Strong and Positive Relationship	Not Supported

DISCUSSION OF FINDINGS, CONCLUSION, AND RECOMMENDATIONS

The present research aimed to investigate the connection between strategies in managing value chains and the efficiency of operations. The analysis of data indicated a noteworthy and positive correlation between the two aspects within logistics companies in Nigeria. Consequently, the study asserts that value chain management significantly contributes to the enhancement of operational efficiency within logistics firms in Nigeria.

Furthermore, the study delved into the associations among various dimensions of value chain management strategies—specifically, timely service delivery, stability of delivery channels, and service quality—and indicators of operational efficiency, namely, efforts in cost minimization, sales volume, and market share. The findings revealed a positive and significant relationship between timely service delivery and the indicators of operational efficiency within Nigerian logistics firms. This underscores the pivotal role of timely service delivery in augmenting cost minimization efforts, sales volume, and market share within such firms. This can be attributed to the potential reduction in customer wait times or inventory levels, thereby facilitating a lean and efficient supply chain.

Similarly, the study uncovered a positive and significant correlation between the stability of delivery channels and the indicators of operational efficiency within logistics firms in Nigeria. This emphasizes

the importance of delivery channel stability in enhancing cost minimization efforts, sales volume, and market share within these firms. Stable delivery channels not only foster customer loyalty but also provide a strategic advantage, enabling firms to command premium prices for their services.

Moreover, the analysis demonstrated a positive and significant association between service quality and operational efficiency indicators within Nigerian logistics firms. This highlights the role of service quality in improving cost minimization efforts, sales volume, and market share within such firms. Emphasizing quality management practices can lead to enhanced service quality, consequently contributing to operational efficiency and overall corporate performance.

The results of this investigation indicate that the incorporation of all three dimensions of value chain management, as studied, is imperative for optimizing the operational efficiency of logistics companies in Nigeria. Drawing from the aforementioned findings and conclusions, the following suggestions are put forward:

i. Logistics firm executives must prioritize the stability of their delivery channels, not only to cut costs but also to maintain a competitive edge. ii. Managers should implement strategies to minimize delivery times, which will not only bolster customer confidence and competitiveness but also increase patronage. iii. Emphasis should be placed on enhancing the quality and value of operational endeavors to improve the corporate reputation of logistics firms. iv. Continuous enhancement of customer experience through real-time updates, accurate ETA, and convenient time windows is crucial for logistics firms. v. It's imperative for logistics companies to hire experienced drivers, address their training needs, prioritize their well-being, and leverage their local knowledge. vi. Regular maintenance of vehicles is essential to prevent breakdowns that could lead to delays and tarnish the company's reputation. Throughout their operations, logistics managers should consistently strive to elevate the quality of service delivery to maintain a competitive advantage.

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