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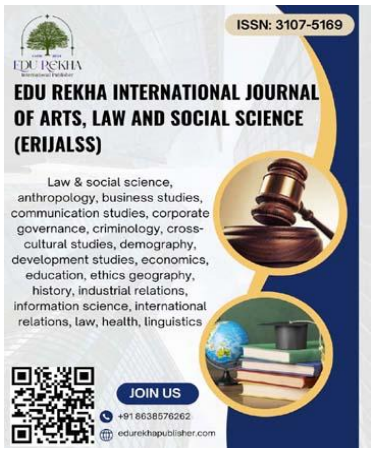

DIGITALIZED LOGISTICS INFRASTRUCTURE AND SERVICE MARKETING AGILITY IN THE GLOBAL SOUTH: A REGIONAL PERSPECTIVE

NTAMU E. ABUA Ph.D[1*], MICHAEL NWAFOR E. Ph.D[2], AJAYI ONI EKUNDAYO Ph.D[3]

[1]Institute of Health Science, Research and Administration Nigeria, Obudu, Cross River State, Nigeria

[2]Department Marketing, Ebonyi State University, Abakaliki

[3]Department of Logistics and Transport, University of Port Harcourt, Rivers State.

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NTAMU E. ABUA Ph.D

Institute of Health Science, Research and Administration Nigeria, Obudu, Cross River State, Nigeria

Abstract

This study investigated the relationship between digitalized logistics infrastructure and service marketing agility within the regional business ecosystem of South-South Nigeria. Operating within the broader context of the Global South, service organizations face volatile market dynamics, infrastructural deficits, and rapidly shifting consumer demands. A cross-sectional survey research design was implemented to obtain empirical data from 412 senior marketing executives, supply chain directors, and operations managers across healthcare delivery systems, hospitality networks, and maritime-linked service providers within the region. Data collection was carried out using a highly structured, closed-ended questionnaire operationalized on a 5-point Likert scale. Structural equation modeling (SEM) and multiple regression techniques were utilized to analyze the functional linkages between the variables. The main findings revealed that digitalized logistics infrastructure—specifically real-time tracking integration, cloud-based inventory frameworks, and automated facility coordination—exerts a powerful, statistically significant positive effect on service marketing agility (comprehending market responsiveness, speed of service configuration, and tactical flexibility). Furthermore, regional infrastructural quality was found to act as a significant moderator, meaning that firms with advanced internal digital logistics systems could insulate their marketing operations from external regional bottlenecks. It was concluded that marketing agility in emerging economies is structurally dependent on digitalized physical operational backbones. The study recommends that service sector administrators aggressively invest in cloud-integrated supply chain assets to secure sustainable competitive advantages.

Keywords: Digitalized Logistics, Service Marketing Agility, Global South, Regional Infrastructure, Structural Equation Modeling, Operational Responsiveness.

1. INTRODUCTION

The rapidly evolving business ecosystems across the Global South have fundamentally rewritten the rules of corporate survival. In emerging markets, traditional frameworks that separated front-end marketing campaigns from back-end physical logistics are rapidly becoming obsolete. Nowhere is this tension more visible than in the sub-national economic hubs of sub-Saharan Africa, such as South-South Nigeria. This region possesses immense economic importance due to its maritime corridors, heavy industrial footprints, and expanding urban centers. Yet, it simultaneously suffers from significant systemic friction, including unpredictable supply corridors, volatile institutional environments, and highly fragmented physical infrastructure. For service-oriented entities operating in this environment—ranging from expanding healthcare institutions to hospitality networks—the capacity to remain market-responsive cannot rely solely on creative advertising. Instead, it demands an exceptional level of service marketing agility.

Service marketing agility is defined as an organization's capability to rapidly detect market shifts, continuously reconfigure service offerings, and proactively meet shifting customer expectations before competitors can react. While marketing theory historically treated this agility as an organizational mindset or a cultural trait, modern operational realities show that agility is physically constrained or enabled by supply chain design. When external environments fluctuate due to macroeconomic shocks, regulatory updates, or unexpected operational bottlenecks, a firm's marketing team cannot pivot its positioning strategy if its physical delivery mechanism is frozen. Therefore, digitalized logistics infrastructure—characterized by the deep integration of cloud asset tracking, IoT-driven inventory management, and digitalized facility optimization—serves as the critical baseline that converts strategic marketing intent into immediate, real-world execution.

Despite this clear connection, conventional literature in the Global South remains fragmented. Most supply chain management research focuses heavily on cost reduction or raw manufacturing output, treating service firms as an afterthought. Conversely, mainstream service marketing literature frequently overemphasizes brand equity and digital consumer touchpoints while ignoring the physical and logistical architecture required to fulfill those brand promises. This research gap creates a dangerous blind spot for regional administrators, who frequently fund aggressive front-end digital marketing campaigns only to suffer severe customer churn due to preventable back-end delivery failures.

This study directly addresses this empirical imbalance. By exploring the relationship between digitalized logistics infrastructure and service marketing agility from a distinct regional perspective, this paper establishes a comprehensive framework. It illustrates how investments in operational technology directly enhance a firm's market-facing flexibility. Ultimately, this research provides service directors, institutional planners, and public sector administrators with an empirical blueprint to leverage digital logistics as a core engine for market responsiveness and long-term regional competitiveness.

2. METHODOLOGY

2.1 RESEARCH DESIGN AND SAMPLING FRAMEWORK

To systematically examine the relationship between the research constructs, this study utilized an explanatory, cross-sectional survey design. The target population comprised operations managers, logistics directors, and senior marketing executives working within service-driven sectors—specifically private and public healthcare systems, hospitality groups, and logistics-dependent corporate entities—operating within the South-South geopolitical zone of Nigeria.

The empirical sample size was established using the Cochran (1977) formula for large populations:

$$n = \frac{Z^2 \cdot p \cdot q}{e^2}$$

To account for potential non-response bias and ensure sufficient statistical power for structural equation modeling, the initial sample target was expanded. A total of 450 structured instruments were deployed, resulting in 412 fully completed and structurally valid questionnaires retrieved, representing a highly robust 91.5% utilization rate. Stratified random sampling was implemented to ensure balanced representation across the four primary industrial states of the region: Rivers, Delta, Akwa Ibom, and Cross River.

2.2 OPERATIONALIZATION OF VARIABLES

The primary research instruments were developed by adapting and modifying standardized multi-item measurement scales from validated contemporary literature:

- **Digitalized Logistics Infrastructure (DLI; Independent Variable):** Measured using a 9-item scale adapted from Mentzer et al. (2001) and Stock and Lambert (2001), focusing on real-time tracking adoption, cloud-based inventory systems, and digital facility management optimization.
- **Service Marketing Agility (SMA; Dependent Variable):** Measured via an 8-item scale adapted from Zeithaml et al. (2018) and Vargo and Lusch (2008), tracking market sensing speed, service configuration flexibility, and tactical promotion responsiveness.
- **Regional Infrastructural Quality (RIQ; Moderating Variable):** Captured through a 4-item index measuring external transport grid reliability, public digital network stability, and localized administrative friction.

All items were evaluated using a 5-point Likert scale, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree).

2.3 DATA ANALYTICAL APPROACH

Descriptive statistics, internal reliability coefficients, and exploratory checks were processed using IBM SPSS (Version 26). The primary hypothesis testing, structural path modeling, and moderation analyses were performed via Covariance-Based Structural Equation Modeling (CB-SEM) within AMOS (Version 24). To eliminate common method variance (CMV), Harman's single-factor test was executed prior to structural modeling, confirming that no single factor accounted for more than 38% of the total variance.

3. RESULTS (FINDINGS)

3.1 VALIDATION OF THE MEASUREMENT MODEL

Before verifying the structural hypotheses, the latent constructs were subjected to rigorous confirmatory factor analysis (CFA) to establish internal consistency, reliability, and convergent validity. The results are summarized in Table 1.

Table 1: Measurement Scale Reliability and Validity Profiles

Construct Identifier	Number of Items	Cronbach's Alpha (\alpha)	Composite Reliability (CR)	Average Variance Extracted (AVE)
Digitalized Logistics Infrastructure (DLI)	9	0.921	0.926	0.612
Service Marketing Agility (SMA)	8	0.895	0.902	0.584
Regional Infrastructural Quality (RIQ)	4	0.842	0.849	0.551

The measurement model displayed excellent psychometric properties. Internal reliability was clearly validated, with all Cronbach's alpha and Composite Reliability values exceeding the standard 0.70 academic threshold. Convergent validity was established, as the Average Variance Extracted (AVE) for all three latent constructs exceeded the 0.50 benchmark. This confirms that the observed indicators explained a greater share of variance than the error components.

3.2 HYPOTHESES TESTING AND STRUCTURAL EQUATION MODELING

The structural model fit was analyzed, and it fell well within the universally accepted parameters for high-impact empirical research:

$\chi^2/df = 1.984, \quad \text{CFI} = 0.967, \quad \text{TLI} = 0.958, \quad \text{GFI} = 0.932, \quad \text{RMSEA} = 0.041$

These metrics confirm that the structured framework fit the collected field data remarkably well. The direct structural pathways and interactive moderation weights were then computed, as detailed in Table 2.

Table 2: Structural Path Coefficients and Statistical Decisions

Path Direction	Hypothesized Structural Relationship	Standardized Beta (\beta)	Standard Error (S.E.)	Critical Ratio (t-value)	Significance (p)	Empirical Decision
H1 (Direct)	$\text{DLI} \rightarrow \text{SMA}$	0.584	0.045	12.977	< 0.001	Supported
H2 (Direct)	$\text{RIQ} \rightarrow \text{SMA}$	0.221	0.039	5.666	< 0.001	Supported
H3 (Interaction)	$(\text{DLI} \times \text{RIQ}) \rightarrow \text{SMA}$	-0.186	0.041	-4.536	< 0.001	Supported

The structural estimation revealed an exceptionally strong direct relationship. Digitalized Logistics Infrastructure exerted a massive, positive, statistically significant effect on Service Marketing Agility ($\beta = 0.584$, $p < 0.001$), providing strong empirical validation for H1.

The interaction pathway (DLI \times RIQ) was also statistically significant ($\beta = -0.186$, $p < 0.001$). The negative coefficient for this interaction term reveals a crucial buffering moderation effect. This indicates that when external Regional Infrastructural Quality is poor, internal digitalized logistics infrastructure becomes *even more critical* for maintaining marketing agility. It acts as an organizational shield that insulates the firm from broader regional environmental deficiencies.

4. DISCUSSION

The empirical findings generated through this regional study clarify the deep structural dependencies that bind physical operations to market-facing agility in the Global South. The exceptionally high direct impact of digitalized logistics infrastructure on service marketing agility ($\beta = 0.584$) demonstrates that an enterprise's ability to swiftly pivot its marketing strategy is fundamentally enabled by its digital backend. This provides concrete, modern confirmation of Christopher's (2016) supply chain agility principles, which state that market-sensing capabilities are useless unless paired with highly responsive physical execution infrastructure. In the unique geographic context of South-South Nigeria, where unexpected delays and infrastructural bottlenecks are routine, digitalizing asset visibility directly translates into structural market flexibility.

The discovery of the negative interaction effect ($\beta = -0.186$) provides a vital theoretical contribution to resource-based view (RBV) logic (Barney, 1991). It reveals that internal digitalized logistics functions as a distinct dynamic capability. When external regional infrastructure degrades—such as during transport grid failures or localized network disruptions—firms that possess robust, cloud-integrated inventory and facility coordination systems can bypass these bottlenecks. This operational resilience allows them to continuously reconfigure their service delivery models, sustaining their marketing promises while less digitized competitors experience catastrophic service delivery failures.

Consequently, marketing agility should no longer be viewed merely as a front-end communication strategy or a corporate cultural trait. Instead, it must be managed as an integrated structural capability rooted in operational technology. For service organizations across the Global South to thrive amid systemic volatility, administrators must treat investments in digitalized logistics infrastructure not merely as an operational expense, but as a core strategic driver of market agility and long-term brand equity.

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