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Digital Transformation and Customer Satisfaction in Nigerian Commercial Banking: Unpacking the Mediating Mechanism of competitive intensity

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ABSTRACT: This study examines the mediating role of competitive intensity between digital transformation dimensions and customer satisfaction, among selected Tier-1 Commercial Banks in North Central Nigeria. Grounded in the Technology Acceptance Model and Resource-Based View theory, the study deployed a quantitative, cross-sectional survey design utilizing structured questionnaires administered to 400 active digital banking customers across four states (FCT, Nasarawa, Plateau, and Benue) via stratified quota sampling technique, with Partial Least Squares Structural Equation Modeling (PLS-SEM) for the empirical analysis. Findings reveal that the structural model accounted for 46.9% of the variance in CES (R^2=0.469). Directly, Digital Communication and Support and Omnichannel Integration both exhibited positive and significant effect on reducing customer effort [(β=0.218,p<0.001) and (β=0.134,p=0.005) respectively whereas Technology Adoption (β=0.095,p=0.058) had negative and significant effect on reducing customer effort. Furthermore, mediation analysis demonstrated that Competitive Intensity significantly mediated all indirect paths, with Technology Adoption achieving full mediation (β=0.049,p=0.001), indicating that raw technological infrastructure reduces customer effort only when catalyzed by market rivalry. Theoretically, this study extends TAM and RBV by positioning competitive intensity as a crucial environmental catalyst, while practically signaling that bank executives must prioritize real-time support mechanisms and channel synchronization over mere technological expansion to minimize customer effort.

Jel Code Classification: M10; M31; D4; G21.

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INTRODUCTION

The global financial services industry is in the midst of a structural digital transformation (DT), fundamentally shifting commercial banking away from traditional, branch-centric operations toward agile, technology-driven ecosystems (PwC, 2022; Teece, 2021). Driven by rapid technological advancements and evolving consumer expectations, banks are increasingly compelled to integrate digital solutions across all touchpoints to enhance operational efficiency, innovate products, and elevate customer engagement (Wen, 2025). In emerging African markets, particularly Nigeria, this paradigm shift has gained significant momentum due to widespread mobile phone penetration, expanding internet connectivity, and aggressive regulatory pushes toward financial inclusion (Akinyemi & Ojo, 2024; Elsevier, 2025). Commercial banks in North Central Nigeria a vital economic and administrative hub, face immense pressure to innovate to serve a growing population of digitally literate consumers who demand seamless, personalized, and rapid financial services (CBN, 2023).

Despite substantial financial investments in digital capabilities by commercial banks, a persistent disconnect remains between technology deployment and actual customer satisfaction. While institutions have introduced a wide array of digital platforms, customer complaints regarding complex user interfaces, system downtime, slow response times, and fragmented support channels continue to proliferate across the region (CBN, 2023; Khan et al., 2023). This disconnect demonstrates that technology adoption alone is not a sufficient condition for achieving positive customer outcomes. Rather, the impact of digital initiatives on service performance depends heavily on the strategic execution and contextual dynamics of the market environment (Berman, 2022).

To address this empirical gap, this study examines the relationship between digital transformation and customer satisfaction among selected commercial banks in North Central Nigeria. Grounded in the Technology Acceptance Model (TAM) (Davis, 1989) and the Resource-Based View (RBV) (Barney, 1991), digital transformation is operationalized through three primary dimensions: technology adoption, omnichannel integration, and digital communication and support (Adebayo et al., 2022; Eze et al., 2024; Afolabi et al., 2023). Rather than using broad or abstract perceptual metrics, customer satisfaction is measured using the Customer Effort Score (CES) as its core proxy. CES quantifies the ease with which customers navigate digital interfaces, execute transactions, and resolve inquiries, reflecting the principle that frictionless experiences are the primary driver of modern customer loyalty and retention (Wirtz et al., 2023).

Furthermore, this research examines the key mediating role of competitive intensity within this dynamic. In a highly competitive banking landscape, intense market rivalry forces financial institutions to deploy digital tools strategically, ensuring front-end user experience and operational support are continually optimized to differentiate the bank and capture market share (Berman, 2022; Ogunleye & Salihu, 2021). Conversely, in environments with low competitive pressure, banks may lack the impetus to optimize their digital infrastructure beyond superficial levels, leading to suboptimal tools that fail to minimize customer effort (Okafor & Bello, 2022).

By isolating and quantifying the mediating effect of competitive intensity between digital transformation proxies and CES, this study bridges a major void in African management literature. Practically, the findings offer actionable strategies for bank managers navigating the Central Bank of Nigeria's (CBN) 2025 recapitalization directives and cybersecurity regulations, helping institutions optimize capital allocation toward high-impact, low-effort digital touchpoints.

LITERATURE REVIEW

Digital transformation (DT) is fundamentally a strategic and leadership-driven endeavor rather than a mere IT-centric initiative. It entails the comprehensive reimagining of business models and customer value propositions within the contemporary digital economy. Vial (2021) conceptualizes DT as a systemic process aimed at improving an organizational entity by triggering structural changes through combinations of information, computing, communication, and connectivity technologies. Building on strategic management theory, Warner and Wäger (2019) establish that building dynamic capabilities, specifically sensing, seizing, and reconfiguring serves as the linchpin for successfully executing digital initiatives. In the commercial banking domain, this strategic imperative requires visionary leadership capable of articulating digital ambitions, cultivating organizational agility, and breaking down functional silos (Kane et al., 2021).

The technological foundations of DT have converged significantly, forming a synergistic stack comprising cloud computing, artificial intelligence (AI), big data analytics, and advanced connectivity solutions (Verhoef et al., 2021). The rapid emergence

of generative AI has further accelerated this shift, reshaping customer touchpoints and operational workflows (Davenport & Mittal, 2023). Crucially, the ultimate realization of DT is reflected in a tripartite reconfiguration: elevating customer experience, driving operational agility, and evolving traditional linear delivery models into dynamic, platform-based ecosystems (Trabucchi et al., 2024). Modern banking literature increasingly measures DT through concrete operational proxies, specifically Technology Adoption, Omnichannel Integration, and Digital Communication and Support.

Technology Adoption represents the structural uptake and core integration of advanced digital tools such as mobile banking applications, AI algorithms, and cloud infrastructure to drive long term organizational value (Liu et al., 2021; Hoque, 2024). In emerging financial markets like Nigeria, technology adoption serves as a primary barometer of DT maturity. High adoption rates enable commercial banks to streamline core operational processes, reducing processing times from days to minutes while generating substantial improvements in operational efficiency and return on equity (Samuel-Ogbu, 2022; Pratiningsih, 2025; IBM, 2024). Furthermore, deep technological integration bridges front-, mid-, and back-office functions, reducing error rates and facilitating real-time automated service delivery (Anichebe, 2019; Prosci, 2025).

Omnichannel Integration (OI) is defined as the strategic and operational capability of a bank to deliver a seamless, consistent, and synchronized customer experience across physical and digital touchpoints (Parameswaran et al., 2022; Saman et al., 2025). Distinct from fragmented multi-channel or cross-channel frameworks, OI relies on system-wide data unification such as a Unified Customer View (UCV) and process coherence supported by application programming interfaces (APIs) (Deng et al., 2021; Mustafa et al., 2022; Lopes et al., 2023). By establishing channel coverage, deep functionality, and proactive personalization, banks eliminate operational friction and manual data re-entry (Sony & Naik, 2020; Tang, 2021; Bhaird et al., 2024).

Digital Communication and Support encompass the suite of technological tools including online portals, mobile applications, AI-driven chatbots, and real-time automated support that facilitate continuous interaction between banks and their clientele (Abdullahi & Mohammed, 2025; Bachir, 2021). In highly competitive environments, effective digital support mechanisms enable 24/7 accessibility and swift problem resolution, directly minimizing customer effort and improving overall service perceptions (Osuma & Nzimande, 2024; Kondybayeva et al., 2024).

In contemporary digital service evaluation, customer satisfaction is increasingly operationalized using the Customer Effort Score (CES). CES quantifies the ease with which customers execute transactions, navigate digital touchpoints, and resolve issues. Within digital banking, service quality, system reliability, operational speed, and data-driven personalization directly reduce the friction and effort required by end users (Anichebe, 2019; IBM, 2024; Chu & Zhan, 2024). When banks deploy integrated digital technologies, automated communication platforms, and predictive service tools, they significantly lower the cognitive and physical effort demanded of customers, thereby driving satisfaction, engagement, and retention (Adeniran et al., 2024; Abiodun & Oniku, 2025).

Conceptual Framework

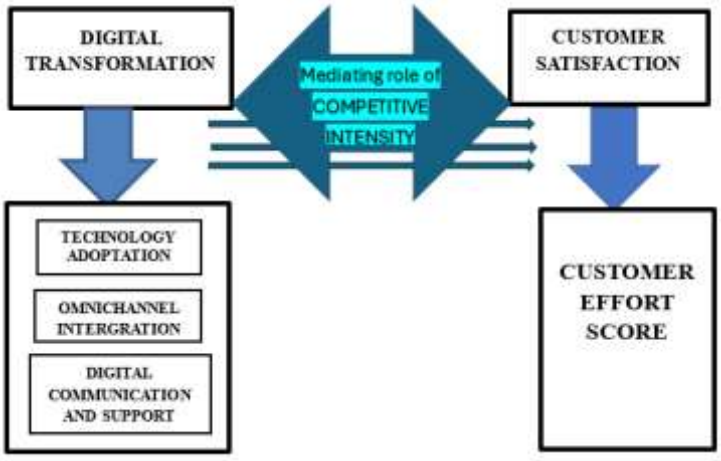


Figure 1: Author's conceptualization (2026)

THEORETICAL FRAMEWORK

This study is anchored in an integrated framework bridging strategic management and consumer behavior theories to examine the impact of Digital Transformation proxied by Technology Adoption, Omnichannel Integration, and Digital Communication and Support on Customer Satisfaction, operationalized through the Customer Effort Score (CES). Introduced by Teece et al. (1997) and expanded by Teece (2007), Dynamic Capabilities Theory posits that in highly turbulent environments, sustained competitive advantage depends on an organization's ability to sense opportunities and threats, seize those opportunities through resource mobilization, and reconfigure operational assets continuously. In modern service sectors, digital transformation represents an organizational dynamic capability. Organizations sense shifting customer demands, seize emerging digital possibilities through technology adoption and omnichannel integration, and reconfigure internal workflows to enhance digital communication and support. This structural reconfiguration directly minimizes friction, reducing customer effort and optimizing service delivery (Eisenhardt & Martin, 2000; Teece, 2007). Although critics highlight DCT's operationalization difficulties and context dependence (Helfat et al., 2007), empirical evidence highlights its strength in linking IT capabilities to customer experience improvements (Bharadwaj et al., 2013; Liu, 2022). The Resource-Based View (Barney, 1991; Wernerfelt, 1984) asserts that firm heterogeneity and superior performance stem from deploying resources that are Valuable, Rare, Imperfectly Imitable, and Non-substitutable (VRIO/VRIN). Proprietary digital architecture, integrated omnichannel infrastructures, and specialized support systems serve as key strategic resources (Bharadwaj, 2000; Wade & Hulland, 2004). However, because RBV is inherently static and struggles to explain rapid adaptation in fast-changing digital markets (Peteraf, 1993), it is paired with DCT to explain how strategic assets are actively deployed.

Empirical Review

Recent empirical literature has increasingly explored the linkages between digital transformation (DT) dimensions, competitive environmental pressures, and customer-centric performance outcomes. Understanding how specific technological proxies translate into reduced friction and enhanced customer satisfaction requires evaluating studies across global, regional, and sector-specific contexts. Globally, scholars have established that digital capability deployment directly influences service delivery metrics. Martínez de Miguel et al. (2022) quantified how dynamic capabilities generated via digital transformation affect customer satisfaction in the automotive sector. Utilizing a mixed-methods two-stage Structural Equation Modeling (SEM) approach on Spanish firms, they revealed that digitally enabled capabilities such as Big Data analytics, AI, and IoT significantly improved customer satisfaction by optimizing firm sensing and seizing mechanisms.

Similarly, in a broad cross-sectoral analysis, Awais et al. (2025) applied regression and mediation analysis to examine technological advancements in manufacturing firms, concluding that technological advancements indirectly enhance business growth, with customer satisfaction serving as a pivotal mediator. Focusing on e-commerce and retail contexts, Wang et al. (2023) demonstrated through SEM mediation analysis that digital transformation positively impacts service quality, which fully mediates the path to customer satisfaction. Nguyen et al. (2024) expanded this framework using Partial Least Squares SEM (PLS-SEM), finding that digital transformation exerts a significant positive effect on both e-service quality and perceived value, both of which act as parallel mediators in driving satisfaction. In the telecommunications sector, Zafar et al. (2022) analyzed 400 subscribers using SEM and confirmed that technological advancements only translate into customer satisfaction when they visibly improve perceived service quality.

Furthermore, Qing et al. (2023) investigated young e-commerce consumers in China using PLS-SEM, demonstrating that technology adaptation capabilities significantly mediate the relationship between service quality attributes and customer satisfaction, emphasizing that digital investments must be absorbed by the end-user to yield friction-reducing benefits. Saranya (2024) evaluated technology adoption across service sectors, confirming that rapid, technology-driven service delivery optimizes service completion times and directly creates high customer value and loyalty. In small business contexts, Ruzwa et al. (2024) applied regression analysis to prove that the effective deployment of IT infrastructure and e-commerce capabilities significantly and positively impacts customer satisfaction. In B2B environments, Patel and Gupta (2023) demonstrated that 24/7 digital support portals significantly elevate client satisfaction levels. Sony and Naik (2023) investigated the depth of omnichannel functionality among 400 bank customers in India, finding that integrating complex, high-value tasks across digital platforms directly reduces the Customer Effort Score (CES). Deng et al. (2022) similarly established that real-time channel synchronization across e-commerce logistics touchpoints drastically cuts processing friction, thereby elevating satisfaction. Addressing personalization, Tang (2024) applied AMOS path analysis to 350 high-net-worth clients, discovering that deep integration of

customer transaction data enables proactive, predictive service that delivers the "effortless" experience expected by premium users.

In financial services, Al-Dmour et al. (2023) analyzed 550 commercial bank customers in Jordan using multiple regression, proving that FinTech innovation dimensions specifically mobile payment platforms serve as the strongest positive contributors to customer satisfaction. Similarly, Al-Haddad and Al-Ma'aitah (2022) observed that digital banking adoption significantly enhanced customer convenience and satisfaction during periods of heightened operational disruption. While direct relationships are well-documented, emerging research underscores that environmental rivalry acts as a vital mechanism channeling digital capabilities into customer satisfaction. Garcia and Martinez (2025) conducted a mediation analysis on 315 tech-product users, revealing that competitive intensity partially mediates the relationship between e-support tools and satisfaction, as market rivalry compels firms to deploy superior digital communication. Zhao et al. (2024) utilized hierarchical regression on 500 retail consumers, confirming that competitive intensity mediates the path between omnichannel communication and satisfaction by forcing firms to adopt integrated support systems.

In regional and emerging market settings, Ibrahim and Ali (2025) applied PLS-SEM to 420 SMEs, demonstrating that competitive intensity bridges the gap between digital service quality and satisfaction by forcing service providers to maintain a relentless customer-centric orientation. In the financial sector, Al-Haddad et al. (2024) analyzed 520 digital banking users across the MENA region using multiple regression and Sobel tests, finding that competitive intensity significantly mediates the link between FinTech product launches and customer loyalty. They noted that aggressive rival responses effectively "raise the bar" for baseline service quality, driving firms toward lower-effort customer solutions.

Within the Sub-Saharan African and Nigerian banking environments, empirical studies highlight the unique operational conditions shaping digital adoption. Abiodun and Oniku (2025) surveyed 450 Tier-1 commercial bank customers in Lagos and Abuja using SEM, revealing that market competition partially mediates the relationship between omnichannel service consistency and customer loyalty. Their findings indicated that aggressive rivalry from traditional banks and FinTech entrants compels institutions to optimize cross-channel data flows.

Specific to North Central Nigeria, Bello and Musa (2023) utilized PLS-SEM on a sample of 320 bank employees and 150 customers, demonstrating that competitive intensity significantly mediates the relationship between technology adoption and Customer Effort Score (CES). The perceived threat from emerging FinTech rivals was shown to accelerate Tier-1 banks' efforts to simplify customer touchpoints and reduce cognitive friction. Further supporting this, Adekunle and Obi (2024) analyzed 420 bank users in the Federal Capital Territory (FCT) using regression models, showing that high competitive rivalry post-2021 drove commercial banks to refine their digital-physical channel mix, directly driving customer satisfaction. Finally, Nwankwo and Eze (2025) applied PLS-SEM to 450 commercial bank clients across Nigeria, concluding that digital product innovation heightens competitive pressure, which in turn acts as a partial mediator that forces rivals to minimize user effort and maximize service ease.

METHODOLOGY

Research Design

This study adopts a quantitative, cross-sectional survey design under a positivist philosophy to evaluate the mediating role of Competitive Intensity between Digital Transformation and Customer Satisfaction. Digital transformation is operationalized through three key dimensions: Technology Adoption, Omnichannel Integration, and Digital Communication and Support while customer satisfaction is operationalized by customer effort score.

Population and Sampling Strategy

The target population comprises active digital banking customers of three leading Tier-1 commercial banks in Nigeria (Access Bank, Zenith Bank, and GTCO) across four key locations in the North Central zone: the Federal Capital Territory (FCT), Nasarawa, Plateau, and Benue states. Given the large and dynamic nature of this population, Cochran's (1977) formula for infinite populations was applied at a 95% confidence level ($Z = 1.96$) and a 5% margin of error ($e = 0.05$):

$$n = \frac{Z^2 \cdot p \cdot q}{e^2} = \frac{1.96^2 \cdot 0.5 \cdot 0.5}{0.05^2} = 384.16$$

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To accommodate non-response and satisfy Structural Equation Modeling (SEM) requirements, the sample was increased to 400. A stratified random sampling technique was applied across twelve (12) strata combining state market density weights and institutional market share to ensure proportional representation.

Data Collection and Measurement

Data were gathered using a structured, self-administered questionnaire structured on a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). All construct items demonstrated high internal consistency in pilot testing, exceeding the 0.70 Cronbach's alpha threshold ($\alpha_{TA} = 0.79, \alpha_{OI} = 0.74, \alpha_{DC} = 0.76, \alpha_{CI} = 0.79, \alpha_{CES} = 0.73$).

Model Specification

Partial Least Squares Structural Equation Modeling (PLS-SEM) via SmartPLS was chosen to evaluate both measurement (outer) and structural (inner) models due to its superior predictive capability in complex mediation analysis. The direct, mediating, and full structural models are specified as:

$$CES_i = \beta_0 + \beta_1 TA_i + \beta_2 OI_i + \beta_3 DC_i + \varepsilon_i \quad \text{..... (1)}$$

$$CI_i = \beta_0 + \beta_1 TA_i + \beta_2 OI_i + \beta_3 DC_i + \varepsilon_i \quad \text{.....(2)}$$

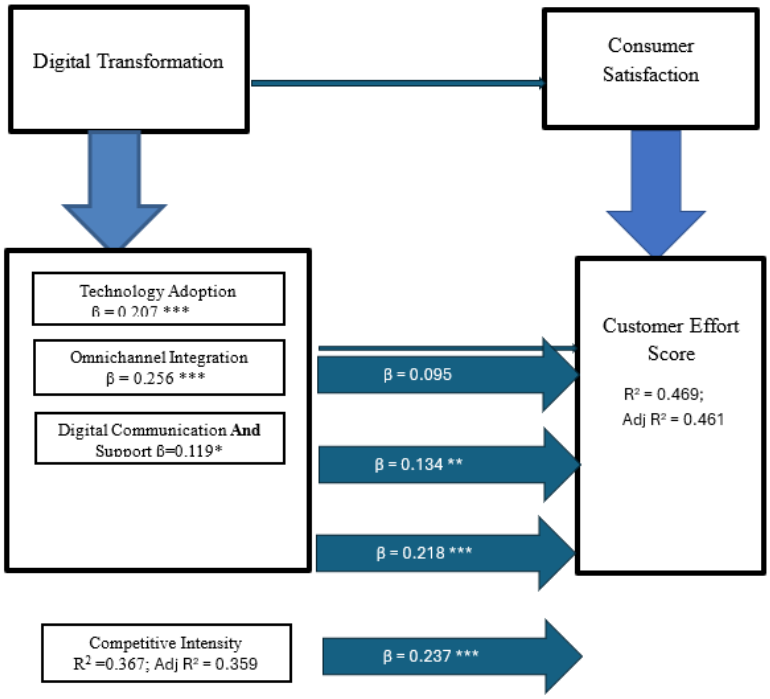
$$CES_i = \beta_0 + \beta_1 (TA_i \; X \; CI_i) + \beta_2 (OI_i \; X \; CI_i) + \beta_3 (DC_i \; X \; CI_i) + \varepsilon_i \quad \text{..... (3)}$$

Hypotheses are evaluated at a 5% ($\alpha = 0.05$) significance level using bootstrapping routines (5,000 resamples).

Results and Structural Model Analysis

To evaluate the empirical framework connecting Digital Transformation (DT) to Customer Satisfaction (CES) under the mediating effect of Competitive Intensity (CI), Partial Least Squares Structural Equation Modeling (PLS-SEM) was executed via SmartPLS.

Structural Model Assessment and Direct Effects



Note: *p < 0.05, **p < 0.01, ***p < 0.001

Figure 2: Author's conceptualization (2026)

The figure above reveals the structural model which demonstrates strong explanatory power, accounting for 46.9% of the variance in Customer Effort Score ($R^2 = 0.469$, $R^2_{adj} = 0.461$) and 36.7% of the variance in Competitive Intensity ($R^2 = 0.367$, $R^2_{adj} = 0.359$).

Table 1 Showing the Direct (Regression Analysis Between Digital Transformation and Customer Satisfaction)

Structural Path	Path Coeff (β)	Sample Mean (M)	STDEV	t-Statistic	p-Value	95% CI [BC]	Decision
TA → CES	0.095	0.096	0.050	1.899	0.058	[-0.002, 0.192]	Not Supported
OI → CES	0.134	0.134	0.048	2.787	0.005	[0.041, 0.229]	Supported
DC → CES	0.218	0.217	0.040	5.491	0.000	[0.140, 0.295]	Supported
CI → CES	0.237	0.237	0.046	5.188	0.000	[0.148, 0.326]	Supported

Source: Authors' Computation, (2026)

From the table above, the direct regression results of the effect between digital transformation proxied by technological adoption, omnichannel integration and digital communication and support and customer satisfaction revealed that, among the direct paths to CES, Digital Communication and Support exhibited the strongest direct influence ($\beta = 0.218, t = 5.491, p < 0.001$), followed by Omnichannel Integration ($\beta = 0.134$, $t = 2.787$, $p = 0.005$). Direct Technology Adoption did not achieve statistical significance ($\beta = 0.095, t = 1.899, p = 0.058$; 95% CI $[-0.002, 0.192]$).

Results of Mediation Analysis of Competitive Intensity

Bootstrapping procedures (5,000 resamples) revealed that Competitive Intensity significantly mediates the indirect paths for all three primary dimensions. Competitive intensity forces commercial banks to deploy seamless digital architectures, indirectly reducing effort barriers for customers. This can be explained from the table below:

Table 2 Showing the Indirect (Mediation Regresion Analysis of Competitive Intensity)

Indirect Path	Path Coeff (β)	STDEV	t-Statistic	p-Value	Mediation Type
TA → CI → CES	0.049	0.015	3.180	0.001	Full Mediation
OI → CI → CES	0.061	0.017	3.666	0.000	Partial Mediation
DC → CI → CES	0.028	0.014	2.045	0.041	Partial Mediation

Source: Authors' Computation, (2026)

Notably, while direct Technology Adoption fails to lower CES directly, it exerts a significant indirect effect through Competitive Intensity ($\beta = 0.049, p = 0.001$), confirming full mediation.

Discussion of Findings

The empirical results provide robust insights into how distinct digital transformation dimensions interact with competitive intensity to determine customer effort outcomes in Nigerian commercial banking. Digital Communication and Support (DC) emerged as the single strongest direct driver of reduced customer effort ($\beta = 0.218, p < 0.001$), emphasizing that real-time dispute resolution and automated assistance are critical for minimizing friction during customer interactions. Conversely, Omnichannel Integration (OI) yielded the strongest indirect effect through Competitive Intensity ($\beta = 0.061, p < 0.001$), demonstrating that cross-channel platform synchronization operates as a strategic capability refined primarily under market

pressure. Most notably, direct Technology Adoption (TA) failed to yield a statistically significant direct reduction in customer effort ($\beta = 0.095, p = 0.058$); however, it achieved statistical significance when channeled through competitive pressure ($\beta = 0.049, p = 0.001$). This full mediation confirms that baseline infrastructure deployment alone does not lessen customer effort unless market rivalry forces financial institutions to optimize these technological assets for a seamless user experience.

First, Digital Communication and Support (DC) emerged as the primary direct determinant of Customer Effort Score ($\beta = 0.218, p < 0.001$). This confirms TAM's emphasis on perceived ease of use; real-time resolving mechanisms (e.g., automated in-app support, fast USSD dispute handling) directly diminish cognitive friction during service failures.

Second, Omnichannel Integration (OI) significantly reduces customer effort both directly ($\beta = 0.134, p = 0.005$) and indirectly ($\beta = 0.061, p < 0.001$). Grounded in the Resource-Based View (RBV), cross-channel synchronization serves as a complex organizational capability that prevents redundant data entry, streamlining user interactions across mobile app, USSD, and web platforms.

Third, Technology Adoption (TA) exhibited a non-significant direct effect on customer effort ($\beta = 0.095, p = 0.058$). However, its indirect path through Competitive Intensity (CI) was highly significant ($\beta = 0.049, p = 0.001$), demonstrating *full mediation*. Merely adopting digital infrastructure is insufficient to minimize effort; market rivalry forces Tier-1 commercial banks to refine raw technology into customer-centric, low-friction interfaces to protect retail market share.

CONCLUSION

This study establishes that digital transformation reduces customer effort in North Central Nigeria's banking sector through both direct operational touchpoints and indirect market forces. While infrastructure deployment alone does not guarantee low customer effort, competitive pressure compels commercial banks to transform technology investments into seamless user experiences.

Recommendations

Theoretically, it is recommended that Technological Acceptance Model (TAM) and Resource Based View theory (RBV) should be extended by demonstrating that competitive intensity acts as an essential catalyst, converting internal digital resources into perceived ease-of-use outcomes.

Bank executives should prioritize responsive digital communication and cross-channel integration over basic feature expansion. Investments in raw technology must be accompanied by competitive benchmarking focused on friction reduction.

Limitations and Future Directions

This study is cross-sectional and geographically constrained to North Central Nigeria. Future research could utilize longitudinal designs across all six geopolitical zones to evaluate post-implementation shifts in customer effort over time.

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