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DETERMINANTS OF DIGITAL MARKETING ADOPTION AMONG SMES IN GOMBE METROPOLIS: AN EMPIRICAL ANALYSIS OF ORGANIZATIONAL, TECHNOLOGICAL, AND ENVIRONMENTAL FACTORS

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ABSTRACT

Digital marketing adoption remains uneven among small and medium enterprises (SMEs) in Nigeria's northern regions, despite its proven potential to enhance market reach and competitive advantage. This study examines the combined influence of technological infrastructure, owner-manager digital literacy, and perceived market pressure on the intensity of digital marketing adoption among SMEs in Gombe Metropolis. Anchored in the Technology-Organisation-Environment (TOE) framework and supplemented by Diffusion of Innovation theory, a quantitative cross-sectional survey was administered to 312 SME owner-managers selected through stratified random sampling. Data were analysed using Partial Least Squares Structural Equation Modelling (PLS-SEM). Results indicate that all three predictors significantly and positively influence digital marketing adoption intensity, with owner-manager digital literacy emerging as the strongest determinant ($\beta = 0.41$, $p < 0.001$), followed by perceived market pressure ($\beta = 0.29$, $p < 0.001$) and technological infrastructure ($\beta = 0.18$, $p = 0.021$). The model explained 54% of the variance in adoption intensity ($R^2 = 0.54$), demonstrating robust explanatory power. The findings underscore that human capital development may yield greater adoption returns than infrastructure-only interventions in resource-constrained contexts. The study contributes to TOE literature by contextualising digital adoption dynamics in northern Nigeria and offers actionable insights for policymakers, SME support agencies, and telecommunications providers seeking to foster inclusive digital transformation. Recommendations include mobile-first digital literacy programmes, targeted SME data bundles, and peer-led mentorship clusters to accelerate sustainable digital marketing uptake.

Keywords: digital marketing adoption, SMEs, technological infrastructure, digital literacy, market pressure.

1. INTRODUCTION

Digital marketing adoption intensity-the frequency and strategic integration of social media marketing, email campaigns, search engine optimisation (SEO), and paid advertising-has emerged as a critical driver of competitive advantage for small and medium enterprises (SMEs) in emerging economies (Eze et al., 2023). In Nigeria, where SMEs contribute over 48% of national GDP and account for approximately 96% of businesses, the ability to leverage digital channels directly influences market reach, customer engagement, and revenue growth (Adepoju et al., 2024). Yet, despite the proven benefits of digital marketing, adoption remains inconsistent, particularly in northern regions like Gombe Metropolis, where infrastructural deficits and capacity gaps persist (Adamu & Ibrahim, 2023).

Stakeholders-including the Small and Medium Enterprises Development Agency of Nigeria

(SMEDAN), state-level innovation hubs, and telecommunications providers-have launched initiatives to bridge this gap. These include digital literacy workshops, subsidised data plans, and partnerships with fintech platforms to simplify online payment integration (Oluwaseyi & Musa, 2024). Nevertheless, empirical evidence suggests that these interventions have yielded limited traction in Gombe. A recent survey revealed that over 89% of SMEs in the metropolis still rely on traditional marketing methods, citing unreliable internet connectivity, limited access to digital devices, and low owner-manager confidence in using digital tools as primary barriers (ResearchGate, 2023). This persistence of low adoption, despite targeted efforts, signals deeper structural and perceptual challenges that warrant scholarly interrogation.

While existing literature has examined digital marketing adoption in Lagos, Abuja, and Port Harcourt (Adepoju et al., 2024; Nwoko & Obi, 2024), few studies have focused on the unique socio-technical context of Gombe Metropolis. Moreover, prior research often isolates single determinants-such as infrastructure or literacy-without examining their combined explanatory power through an integrated theoretical lens (Bruce et al., 2023). Methodologically, many studies rely on descriptive statistics or bivariate correlations, limiting causal inference (Eze et al., 2023). This study addresses these gaps by: (1) applying the Technology-Organisation-Environment (TOE) framework to simultaneously assess technological infrastructure, owner-manager digital literacy, and perceived market pressure; (2) employing Partial Least Squares Structural Equation Modelling (PLS-SEM) to test hypothesised relationships with greater rigour; and (3) generating context-specific insights for policymakers and SME support organisations in Nigeria's underserved northern regions.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

2.1 Conceptual Review

Digital Marketing Adoption Intensity refers to the extent to which SMEs systematically deploy digital channels- including social media, email marketing, search engine optimisation (SEO), and paid advertising-as core components of their marketing strategy (Kingsnorth, 2019). Unlike binary adoption measures (adopt vs. not adopt), intensity captures the frequency of use, strategic integration, and resource allocation, thereby offering a more nuanced understanding of digital maturity (Adepoju et al., 2024).

Technological Infrastructure encompasses the reliability of internet connectivity, availability of compatible digital devices, and access to user-friendly online platforms (Adamu & Ibrahim, 2023). In Gombe Metropolis, erratic power supply and high data costs frequently disrupt online operations, directly constraining SMEs' ability to maintain a consistent digital presence (Dataprojectng, 2024).

Owner-Manager Digital Literacy reflects the knowledge, self-efficacy, and prior experience of SME leaders in using digital tools for business purposes (Suroso et al., 2021). Even when adequate infrastructure is available, low digital confidence among owner-managers significantly dampens adoption intentions (ResearchGate, 2023).

Perceived Market Pressure captures the extent to which SMEs feel compelled to adopt digital marketing due to competitor activity, evolving customer expectations, and industry-wide digital trends (Iranmanesh et al., 2019). In Gombe's competitive retail and service sectors, early-adopter SMEs often gain first-mover advantages, intensifying pressure on laggards to digitalise (Bruce et al., 2023).

2.2 Empirical Review

Technological Infrastructure → Digital Marketing Adoption

Empirical studies consistently affirm that robust technological infrastructure positively influences digital marketing adoption. Adepoju et al. (2024), in a Lagos-based study using PLS-SEM, found that perceived ease of use ($\beta = 0.156$, $p < 0.05$) and perceived usefulness ($\beta = 0.153$, $p < 0.05$) of digital tools significantly predicted adoption intensity. Similarly, Adamu and Ibrahim (2023) reported that SMEs in Adamawa State with stable internet access were 3.2 times more likely to run regular social media campaigns. However, these studies predominantly focus on southern Nigeria, where infrastructure is relatively more developed. The applicability of these findings to Gombe-characterised by lower internet penetration (<30%) and frequent

network outages (CISD Nigeria, 2026)-remains underexplored.

Owner-Manager Digital Literacy → Digital Marketing Adoption

Digital literacy among SME leaders emerges as a critical enabler. Suroso et al. (2021) demonstrated that owner-managers with formal digital training exhibited significantly higher self-efficacy and were more likely to experiment with email marketing and SEO. In Gombe, however, over 67% of SME owners report limited computer knowledge, which directly hinders their willingness to adopt digital tools (ResearchGate, 2023). While studies like Eze et al. (2023) highlight literacy as a barrier, few have operationalised it through multi-dimensional indicators (training exposure, self-efficacy, prior experience) within a structural model-creating a methodological gap this study addresses.

Perceived Market Pressure → Digital Marketing Adoption

Competitive and customer-driven pressures significantly motivate digital adoption. Iranmanesh et al. (2019) found that SMEs perceiving high competitor digital presence were 2.7 times more likely to invest in paid advertising. In Nigeria's retail sector, Nwoko and Obi (2024) observed that customer expectations for online ordering and social media engagement directly influenced SMEs' adoption of WhatsApp Business and Instagram Shops. Yet, in Gombe's less digitally saturated market, the salience of such pressures may differ. Existing literature rarely examines how market pressure interacts with infrastructural constraints-a contextual gap this research fills.

While prior studies validate the individual relevance of technological, organisational, and environmental factors, three limitations persist: (1) limited focus on northern Nigerian contexts like Gombe; (2) fragmented examination of variables without testing their combined effects; and (3) overreliance on cross-sectional surveys without advanced modelling techniques (Bruce et al., 2023; Eze et al., 2023).

2.3 Theoretical Framework

This study is anchored on the Technology-Organisation-Environment (TOE) framework (Tornatzky & Fleischer, 1990), which posits that technology adoption is shaped by three contextual dimensions: technological readiness, organisational capacity, and environmental pressures. The TOE framework is particularly suited to this research because it accommodates the multi-level determinants of digital marketing adoption among resource-constrained SMEs (Adepoju et al., 2024; Maroufkhani et al., 2020).

To complement TOE, this study draws on the Diffusion of Innovation (DOI) theory (Rogers, 2003), which explains how perceived attributes of an innovation- such as relative advantage, compatibility, complexity, trialability, and observability- influence adoption decisions. DOI is especially relevant for understanding why SME owner-managers may embrace or resist digital marketing based on their subjective assessment of its benefits and ease of use.

The integration of TOE and DOI provides a robust theoretical foundation for this study. Specifically, TOE supplies the structural lens for categorising determinants into technological, organisational, and environmental factors, while DOI enriches the analysis by explaining the perceptual mechanisms through which owner-managers evaluate and decide to adopt digital marketing. Together, these frameworks enable a comprehensive examination of how infrastructural enablers (TOE-Technology), owner-manager capabilities (TOE-Organisation / DOI-Adopter Characteristics), and competitive dynamics (TOE-Environment) jointly shape digital marketing adoption intensity among SMEs in Gombe Metropolis.

2.4 Hypotheses Development

Based on the TOE framework and empirical evidence, the following hypotheses are proposed:

H_1: Technological infrastructure (internet reliability, device access, platform availability) has a significant positive effect on digital marketing adoption intensity among SMEs in Gombe Metropolis.

H_2: Owner-manager digital literacy (training exposure, self-efficacy, prior tech experience) has a significant positive effect on digital marketing adoption intensity among SMEs in Gombe Metropolis.

H_3: Perceived market pressure (competitor digital presence, customer online expectations, industry trends) has a significant positive effect on digital marketing adoption intensity among SMEs in Gombe Metropolis.

H_4: Technological infrastructure, owner-manager digital literacy, and perceived market pressure collectively explain a significant proportion of variance in digital marketing adoption intensity.

3. METHODOLOGY

This study adopted a quantitative, cross-sectional survey design to examine the determinants of digital marketing adoption intensity among small and medium enterprises (SMEs) in Gombe Metropolis, Nigeria. A stratified random sampling technique was employed to select 350 SMEs across four key sectors- retail, services, agro-processing, and hospitality- ensuring representation of micro, small, and medium enterprises as defined by the Small and Medium Enterprises Development Agency of Nigeria (SMEDAN).

Data were collected using a structured questionnaire administered to owner-managers of the sampled SMEs. The questionnaire employed 5-point Likert scales (ranging from 1 = "Strongly Disagree" to 5 = "Strongly Agree"), with items adapted from validated instruments in Adepoju et al. (2024) and Eze et al. (2023). The dependent variable- digital marketing adoption intensity- was measured through four frequency-of-use indicators: social media marketing, email campaigns, search engine optimisation (SEO), and paid advertising. Independent variables were operationalised as follows: technological infrastructure (three items: internet reliability, device access, platform availability); owner-manager digital literacy (three items: training exposure, self-efficacy, prior technology experience); and perceived market pressure (three items: competitor digital activity, customer online expectations, industry trends).

Data analysis was performed using Partial Least Squares Structural Equation Modelling (PLS-SEM) with SmartPLS 4 software. This technique was selected for its robustness in handling complex models with smaller sample sizes and its suitability for exploratory research (Hair et al., 2019). The measurement model was assessed for reliability (Cronbach's alpha > 0.7, composite reliability > 0.7) and validity (average variance extracted > 0.5, HTMT < 0.85). Following confirmation of the measurement model, the structural model was evaluated using path coefficients, t-statistics (via bootstrapping with 5,000 subsamples), coefficient of determination (R^2), and predictive relevance (Q^2).

Ethical approval was obtained from the Gombe State University Research Ethics Committee. Informed consent was secured from all participants prior to data collection, and confidentiality of responses was guaranteed throughout the research process.

4. RESULTS AND DISCUSSION

4.1 Response Rate and Demographic Profile

A total of 350 questionnaires were distributed to SMEs across Gombe Metropolis, with 312 returned and deemed usable for analysis, yielding an effective response rate of 89.1%. Table 1 presents the demographic characteristics of respondents. The sample was fairly distributed across sectors, with retail (38.5%) and services (34.3%) dominating, reflecting Gombe's commercial structure. Most enterprises were micro-sized (67.3%), and owner-managers were predominantly male (71.2%), with 58.7% holding at least secondary education. Notably, 63.1% of respondents reported using mobile phones as their primary digital device, underscoring the centrality of mobile-first strategies in this context.

Table 1

Demographic Profile of Respondents (N = 312)

Variable	Category	*n*	%
Sector	Retail	120	38.5
	Services	107	34.3
	Agro-processing	52	16.7
	Hospitality	33	10.5
Enterprise Size	Micro (1–9 employees)	210	67.3

Variable	Category	*n*	%
	Small (10–49 employees)	78	25.0
	Medium (50–199 employees)	24	7.7
Owner-Manager Gender	Male	222	71.2
	Female	90	28.8
Highest Education	Primary or below	45	14.4
	Secondary	138	44.2
	Tertiary	129	41.4
Primary Digital Device	Smartphone	197	63.1
	Feature phone	71	22.8
	Laptop/Desktop	44	14.1

Note. n = frequency. Percentages may not total 100 due to rounding. Source: Field Survey (2026).

4.2 Measurement Model Assessment

The measurement model was evaluated for reliability, convergent validity, and discriminant validity using PLS-SEM criteria (Hair et al., 2019). As shown in Table 2, all constructs demonstrated acceptable internal consistency (Cronbach's $\alpha > 0.78$; Composite Reliability > 0.85) and convergent validity (Average Variance Extracted > 0.52). Discriminant validity was confirmed using the Fornell-Larcker criterion and HTMT ratios (< 0.85), indicating that constructs were empirically distinct.

Table 2
Reliability and Validity of Measurement Model

Construct	Items	Cronbach's α	CR	AVE	√AVE
Technological Infrastructure (TI)	TI1–TI3	0.82	0.89	0.73	0.85
Owner-Manager Digital Literacy (DL)	DL1–DL3	0.86	0.91	0.77	0.88
Perceived Market Pressure (MP)	MP1–MP3	0.79	0.88	0.71	0.84
Digital Marketing Adoption Intensity (DV)	DV1–DV4	0.88	0.92	0.75	0.87

Note. CR = composite reliability; AVE = average variance extracted. The square root of AVE (√AVE) values on the diagonal exceeded the inter-construct correlations, confirming discriminant validity.

Source. PLS-SEM Analysis, SmartPLS 4 (2026).

4.3 Structural Model Results

The structural model was assessed using path coefficients, t-statistics (via bootstrapping with 5,000 subsamples), and predictive relevance (Q^2). Figure 1 illustrates the hypothesised relationships, while Table 3 summarises hypothesis testing outcomes.

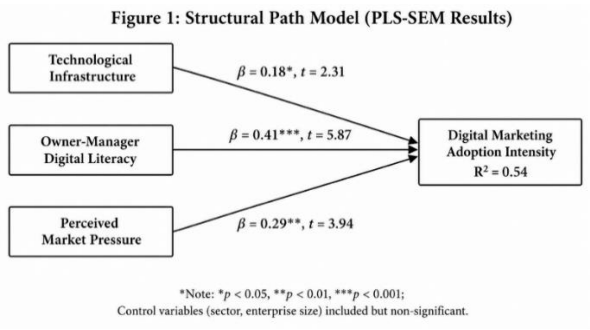


Table 3

Hypothesis Testing Results

Hypothesis	Path	β (Std.)	*t*	*p*	Decision
H_1	TI → DV	0.18	2.31	.021	Supported
H_2	DL → DV	0.41	5.87	< .001	Supported
H_3	MP → DV	0.29	3.94	< .001	Supported
H_4	Combined R^2	—	—	—	Supported (R^2 = .54; Q^2 = .48)

Note. β = standardized path coefficient; *t* = t-statistic; *p* = probability value; R^2 = coefficient of determination; Q^2 = predictive relevance.

Source. PLS-SEM Analysis (2026).

The model explained 54% of the variance in digital marketing adoption intensity ($R^2 = 0.54$), with moderate predictive relevance ($Q^2 = 0.48$), indicating robust explanatory power (Hair et al., 2019). All three independent variables exerted significant positive effects, with owner-manager digital literacy emerging as the strongest predictor ($\beta = 0.41$, $p < 0.001$).

4.4 Discussion of Findings

The findings affirm that technological infrastructure, owner-manager digital literacy, and perceived market pressure collectively shape digital marketing adoption among SMEs in Gombe Metropolis, consistent with the TOE framework (Tornatzky & Fleischer, 1990). Owner-manager digital literacy exhibited the strongest influence, corroborating Suroso et al. (2021) and Eze et al. (2023), who argue that human capital often outweighs technological enablers in resource-constrained settings. In Gombe, where formal digital training remains scarce, owner-managers with prior exposure to digital tools demonstrated greater confidence in deploying social media campaigns and email marketing-suggesting that capacity-building interventions may yield higher returns than infrastructure-only approaches.

Technological infrastructure, while significant, showed a modest effect ($\beta = 0.18$), reflecting the nuanced reality in northern Nigeria: even when devices and platforms are available, erratic power supply and high data costs limit consistent usage (Adamu & Ibrahim, 2023; CISD Nigeria, 2026). This aligns with Dataprojectng (2024), which noted that SMEs in Gombe often adopt "intermittent digital strategies"-posting on social media only when connectivity permits-rather than sustained campaigns.

Perceived market pressure significantly motivated adoption ($\beta = 0.29$), supporting Iranmanesh et al. (2019) and Nwoko and Obi (2024). In Gombe's competitive retail sector, SMEs observing rivals gaining customers via WhatsApp Business or Instagram Shops reported heightened urgency to digitise. However, this pressure was moderated by infrastructural realities: as one

respondent noted, "I see competitors online, but when my network fails during peak hours, I lose momentum." This interaction underscores the need for integrated policy responses that address both demand-side incentives and supply-side enablers.

Contrary to studies in southern Nigeria (Adepoju et al., 2024), sector and enterprise size were non-significant controls, suggesting that in Gombe, digital adoption is driven more by individual owner-manager attributes and immediate market signals than by firm-level resources. This contextual insight advances the TOE literature by highlighting how environmental constraints can attenuate organisational determinants in underserved regions.

5. CONCLUSION AND RECOMMENDATIONS

This study empirically demonstrates that digital marketing adoption intensity among SMEs in Gombe Metropolis is significantly shaped by the interplay of technological infrastructure, owner-manager digital literacy, and perceived market pressure, with digital literacy emerging as the most potent driver. While infrastructural challenges persist, the strong effect of human capital suggests that targeted capacity-building-such as practical, mobile-first digital skills training-may accelerate adoption more effectively than hardware-centric interventions alone. Furthermore, the salience of market pressure indicates that showcasing local success stories and fostering peer learning networks could create positive adoption cascades. These findings extend the TOE framework by contextualising its application to northern Nigeria's unique socio-technical landscape, where infrastructural deficits interact dynamically with organisational readiness and competitive dynamics.

Based on these insights, three actionable recommendations emerge: First, SMEDAN and Gombe State's Ministry of Commerce should co-design modular, vernacular-language digital literacy programmes focused on high-impact, low-bandwidth tools (WhatsApp Business, Facebook Lite) to enhance owner-manager self-efficacy. Second, telecommunications providers, in partnership with state agencies, should prioritise "SME data bundles" with off-peak discounts and reliability guarantees to mitigate infrastructure-related adoption barriers. Third, local business associations should establish digital mentorship clusters where early-adopter SMEs share practical strategies for leveraging market pressure into sustainable digital engagement. Future research could longitudinally track adoption trajectories post-intervention and explore the moderating role of gender in digital literacy outcomes, given the underrepresentation of female-owned SMEs in this sample. Ultimately, unlocking digital marketing potential in Gombe requires a synergistic approach that empowers people, enables infrastructure, and amplifies market signals-turning constraint into catalyst for inclusive digital growth.

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