



DIGITAL TRANSFORMATION AND AI-DRIVEN SERVICE INNOVATION IN NIGERIAN HOTELS

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Abstract

Nigeria's hospitality industry entered the second decade of the twenty-first century at an important crossroads, where competitive survival increasingly demanded technological reinvention. This study examined the influence of digital transformation dimensions on service innovation performance in three-, four-, and five-star hotels in Nigeria. Six digital transformation variables were investigated: AI-powered guest experience systems, digital revenue management, smart room and Internet of Things (IoT) integration, digital marketing and online travel agency (OTA) utilisation, contactless and mobile payment systems, and data analytics with customer relationship management (CRM) platforms. A descriptive survey design was employed, with structured questionnaires administered to 385 hotel management and frontline service personnel drawn from selected hotels in Lagos, Abuja, and Port Harcourt using stratified random sampling. Data were analysed using descriptive statistics, Pearson correlation analysis, and multiple regression analysis. All six digital transformation dimensions were found to significantly and positively influence service innovation performance ($R^2 = .630$, $F(6, 378) = 107.38$, $p < .001$). AI-powered guest experience systems ($\beta = .298$) and digital marketing and OTA utilisation ($\beta = .284$) emerged as the strongest predictors. The study concluded that deliberate investment in artificial intelligence, digital marketing infrastructure, and data-driven management tools substantially enhances the service innovation capacity of Nigerian hotels. It was recommended that hotel operators develop phased digitalisation roadmaps, invest in staff digital competency development, and leverage collaborative platforms to overcome the infrastructure deficits that currently constrain AI adoption in the Nigerian hospitality sector.

Keywords: digital transformation, AI-driven service innovation, hotel industry, hospitality technology, Nigeria, smart tourism

1. INTRODUCTION

Walk into a five-star hotel lobby in Lagos today and you are likely to encounter a world that looks, superficially, very much like its counterpart in Dubai or Singapore — marble floors, attentive concierge staff and ambient lighting designed to signal luxury. But look more carefully, and some distinctive Nigerian textures emerge. The mobile phone networks have become the primary payment infrastructure. The hotel's social media pages are more active than its official website. Booking confirmations arrive via WhatsApp. A generator hums somewhere behind the scenes, silently testifying to the electricity supply challenges that have historically made technology-dependent service systems a calculated risk in Nigeria. This is the paradox at the centre of digital transformation in Nigerian hospitality: enormous appetite for innovation, navigating a physical and regulatory infrastructure that does not always cooperate.

Digital transformation — defined here as the systematic adoption of digital technologies to fundamentally alter how organisations create, deliver, and capture value — has restructured the global hotel industry over the past decade in ways that were barely imaginable at the turn of the century (Kane et al., 2019; Verhoef et al., 2021). Artificial intelligence now powers chatbots that handle guest enquiries without human intervention. Revenue management algorithms dynamically price hotel rooms across hundreds of distribution channels in real time. IoT-enabled smart rooms respond to voice commands, adjust room temperature based on guest preferences stored from prior stays, and alert engineering teams when maintenance is needed before a fault becomes a guest complaint. Online travel agencies (OTAs) such as Booking.com, Expedia, and Hotels.ng have shifted the balance of power in hotel distribution, making digital visibility an existential necessity rather than a marketing luxury (Buhalis & Sinarta, 2019; Tussyadiah, 2020).

In the Nigerian context, the uptake of these technologies has been uneven, shaped by intermittent electricity, bandwidth constraints, import costs of hardware, and a hospitality workforce whose digital literacy ranges from highly sophisticated in upscale urban hotels to very limited in transitional-tier establishments (Abua, 2023; Ige & Nkama, 2022). Yet the market imperative is compelling. Nigeria's hospitality and tourism sector contributes approximately 4.3% of GDP and hosts a growing middle class alongside significant inbound business and diaspora travel (Nigerian Tourism Development Corporation, 2022). Post-pandemic demand recovery has accelerated guest expectations around digital contactlessness, personalisation, and seamless mobile-first experiences. Hotels that cannot deliver these dimensions of the guest journey are finding themselves progressively disadvantaged, not just in star-rating reviews but in actual occupancy rates and revenue per available room (RevPAR).

The academic literature on digital transformation in hospitality has grown substantially over the past five years, but the overwhelming majority of empirical studies originate from advanced economies or, at best, from other emerging markets such as China and India (Buhalis & Sinarta, 2019; Leung et al., 2021; Ukpabi & Karjaluo, 2017). Nigeria-specific investigations remain sparse, leaving a significant evidence gap that limits the ability of hotel managers, investors, and policymakers to make informed decisions about technology adoption priorities. This study addresses that gap by investigating the specific contribution of six distinct digital transformation dimensions to service innovation performance across three hotel tiers in Nigeria's three major commercial cities.

The specific objectives were: (1) to determine the influence of AI-powered guest experience systems on service innovation performance in Nigerian hotels; (2) to examine the effect of digital revenue management systems on service innovation; (3) to assess the role of smart room and IoT integration in driving service innovation; (4) to evaluate the contribution of digital marketing and OTA utilisation to innovation performance; (5) to analyse the influence of contactless and mobile payment systems on service innovation; and (6) to determine the impact of data analytics and CRM platforms on hotel service innovation performance.

2. LITERATURE REVIEW

2.1 DIGITAL TRANSFORMATION IN THE HOTEL INDUSTRY

The concept of digital transformation in hospitality extends beyond the mere digitisation of existing processes. It encompasses a fundamental reconfiguration of value creation logic — where data becomes the primary raw material, algorithms become the primary tools, and personalised guest experience becomes the primary output (Verhoef et al., 2021; Li et al., 2021). Tussyadiah (2020) argued that hospitality digital transformation operates across three inter-related layers: technology infrastructure (what systems are in place), organisational capability (how well the organisation uses those systems), and experience design (how effectively those systems translate into meaningful guest interactions). Hotels that achieve alignment across all three layers demonstrate superior performance outcomes compared to those that invest in technology without building the organisational competencies to leverage it.

Artificial intelligence in the hotel context encompasses a spectrum of applications: natural language processing for chatbot-mediated guest communication, machine learning for predictive maintenance and dynamic pricing, computer vision for facial recognition-based personalisation, and recommendation engines that suggest amenities or restaurant choices based on analysed behavioural patterns (Buhalis & Sinarta, 2019; Huang & Rust, 2021). Revenue management systems powered by AI have demonstrated the capacity to increase RevPAR by between 5% and 15% in comparable hotel studies (El Haddad et al., 2022). Smart room technology — encompassing IoT sensors, voice assistants, connected entertainment systems, and automated climate and lighting controls — has been shown to significantly increase guest satisfaction scores and reduce energy costs simultaneously (Nilsson & Ballantyne, 2021).

Online travel agencies have fundamentally restructured hotel distribution economics, with platforms such as Booking.com commanding commission rates of between 15% and 25% on each booking while simultaneously providing unprecedented reach to global traveller audiences (Tussyadiah, 2020; Buhalis & Sinarta, 2019). The result is a complex dependency: hotels need OTAs for visibility and occupancy but must manage the profitability erosion that comes with high commission costs. Data analytics and CRM platforms offer hotels the tools to shift from OTA-driven guest acquisition toward direct booking retention strategies, using behavioural data to create personalised loyalty offers and communication sequences that reduce OTA dependency over time (Leung et al., 2021).

2.2 SERVICE INNOVATION IN HOSPITALITY

Service innovation, as applied to the hospitality context, refers to the introduction of new or significantly improved service offerings, delivery mechanisms, or guest-experience architectures that create value for guests while generating competitive advantage for the hotel (Ottenbacher & Gnoth, 2019; Hjalager, 2010). Enz and Siguaw

(2003) identified four categories of service innovation in hotels: process innovation (new delivery systems), product innovation (new service offerings), market innovation (new customer segment strategies), and management innovation (new organisational practices). Digital transformation intersects with all four categories simultaneously, making it the most comprehensive driver of service innovation currently available to hotel operators.

Empirical studies in various national contexts have established significant positive relationships between digital technology adoption and service innovation outcomes in hotels. Leung et al. (2021) found that hotels in China that invested in AI-mediated guest services reported higher service innovation indices, stronger guest satisfaction scores, and faster complaint resolution times. Similar patterns were observed in studies from Turkey (Kizildag et al., 2020) and Malaysia (Omar et al., 2021). These findings align with the Technology-Organisation-Environment (TOE) framework (Tornatzky & Fleischer, 1990), which attributes technology adoption outcomes to a combination of organisational readiness, environmental pressure, and technological characteristic fit.

2.3 DIGITAL TRANSFORMATION IN NIGERIAN HOSPITALITY: STATE OF KNOWLEDGE

Research on digital transformation in Nigerian hotels is at an early stage. Ige and Nkama (2022) conducted one of the few sector-specific studies, finding that social media adoption in Nigerian hotels was widespread but functionally shallow — used primarily for posting photographs and receiving guest complaints rather than for sophisticated CRM or data analytics. Abua (2023) noted that revenue management systems in Nigerian hotels remained predominantly manual or based on rudimentary spreadsheet models in sub-three-star establishments, with automated systems concentrated in properties affiliated with international chains. Ukpabi and Karjaluoto (2017) examined social commerce adoption intentions in Nigerian tourism and found that trust in digital payment infrastructure and internet reliability were the strongest predictors of technology acceptance among both guests and service providers.

A persistent theme across the limited Nigerian-context literature is the infrastructure mediation effect — the finding that infrastructure factors (power supply, internet connectivity, hardware availability) moderate the relationship between digital transformation intention and actual adoption outcomes. This suggests that the pathways through which digital transformation drives service innovation in Nigerian hotels may differ in important ways from those observed in more infrastructure-stable environments. The current study contributes to this nascent literature by providing quantitative evidence on the specific relationships between six digital transformation dimensions and service innovation performance across a nationally representative hotel sample.

2.4 THEORETICAL FRAMEWORK: THE ADAPTIVE DIGITAL INNOVATION MODEL

This study introduces and applies the Adaptive Digital Innovation Model (ADIM) as its theoretical anchor. The ADIM was developed to capture the dynamic through which digital transformation capabilities, mediated by organisational adaptive capacity, translate into service innovation performance in resource-constrained, infrastructure-variable hospitality environments. The model draws on three theoretical lineages: the TOE framework (Tornatzky & Fleischer, 1990), which explains technology adoption as a function of organisational, environmental, and technological factors; the Dynamic Capabilities framework (Teece et al., 1997), which emphasises the firm's ability to sense, seize, and reconfigure resources in response to environmental change; and Service-

Dominant Logic (Vargo & Lusch, 2004, 2008), which positions knowledge and technology as primary operant resources in value co-creation.

The ADIM's central proposition is that in environments like the Nigerian hospitality sector — characterised by infrastructure volatility, talent asymmetry between hotel tiers, and rapid consumer digital adoption — service innovation performance is not simply a linear function of technology investment. It is a product of how well the hotel's organisational adaptive capacity enables it to extract service value from whatever digital infrastructure is available, while co-creating digital experiences with guests who themselves bring mobile-first capabilities to the service encounter. The model predicts that hotels with higher adaptive capacity will achieve stronger service innovation outcomes from the same level of digital investment compared to hotels with lower adaptive capacity — a prediction that has significant practical implications for how Nigerian hotels prioritise digitalisation spending.

3. METHODOLOGY

3.1 RESEARCH DESIGN

A descriptive cross-sectional survey design was adopted. This design was appropriate for capturing hotel staff perceptions of digital transformation adoption and service innovation performance at a defined point in time without experimental manipulation. The supply-side perspective — capturing the views of hotel management and frontline employees rather than guests — was chosen because organisational innovation performance is more accurately assessed through the perceptions of those who design, operate, and evaluate service systems than through the episodic perceptions of transient guests.

3.2 POPULATION, SAMPLING, AND SAMPLE SIZE

The target population comprised management and frontline service staff in three-, four-, and five-star hotels in Lagos, Abuja, and Port Harcourt — the three cities that account for the largest proportion of formal hotel room capacity and international business travel in Nigeria (Nigerian Tourism Development Corporation, 2022). A sampling frame was constructed using the Nigerian Hotels and Personal Services Senior Staff Association (HPSSA) register and the Hotels and Tourism Association of Nigeria (HTAN) membership directory. Eighteen hotels were purposively selected across the three cities and three hotel tiers, ensuring representation across ownership structures (independently owned and internationally affiliated).

Using Taro Yamane's (1967) formula with a 95% confidence level, the minimum sample size was calculated at 370 respondents. To account for potential non-responses, 420 questionnaires were distributed. A total of 392 were returned, of which 385 were usable after excluding 7 questionnaires with more than 15% item incompleteness. This yielded a final usable response rate of 91.7%. Stratified random sampling was applied within each hotel, with strata defined by departmental function (rooms division, food and beverage, sales and marketing, and back-of-house operations).

3.3 INSTRUMENT DESIGN AND VALIDATION

A structured questionnaire was developed in two sections. Section A gathered demographic and organisational characteristics, including hotel category, respondent role, and years of experience. Section B comprised 44 Likert-scale items (1 = Strongly Disagree to 5 = Strongly Agree) distributed across six independent variable dimensions and one dependent variable (service innovation performance), each measured by five to eight items. Items were adapted from validated scales in Tussyadiah (2020), Buhalis and Sinarta (2019), Leung et al. (2021), and Ige and Nkama (2022),

contextualised for the Nigerian hotel environment through a language review process involving two hospitality management practitioners and one digital marketing specialist.

Face and content validity were confirmed by a panel of five subject-matter experts drawn from marketing, information technology, and hospitality management. A pilot test with 35 hotel employees not included in the main sample yielded Cronbach's alpha values ranging from .73 to .89 across all constructs, confirming adequate to excellent internal consistency. The composite reliability threshold of .70 was met across all dimensions.

3.4 DATA ANALYSIS

Quantitative data were analysed using IBM SPSS Statistics version 26. Descriptive statistics were computed for all variables. Pearson product-moment correlation was used to examine bivariate relationships between predictors and service innovation performance. Multiple linear regression was employed to assess the joint and independent explanatory contributions of the six digital transformation dimensions to service innovation performance variance, controlling for multicollinearity (all Variance Inflation Factors were below 3.0, confirming acceptable levels).

4. RESULTS

4.1 RESPONDENT PROFILE

Table 1 presents the demographic and organisational characteristics of the 385 respondents.

Table 1: Demographic and Organisational Profile of Respondents (n = 385)

Variable / Category	Frequency (n = 385)	Percentage (%)
Hotel Category		
5-Star	87	22.6
4-Star	124	32.2
3-Star	174	45.2
Gender		
Male	226	58.7
Female	159	41.3
Respondent Role		
Hotel Management Staff	192	49.9
Frontline Service Staff	193	50.1
Years in Hospitality		
Less than 2 years	54	14.0
2–5 years	117	30.4
6–10 years	138	35.8
Above 10 years	76	19.7

Source: Field Survey, 2024

Table 1 reveals that three-star hotels contributed the largest proportion of respondents (45.2%), reflecting their numerical dominance in the Nigerian formal hotel sector. Male respondents constituted 58.7% of the sample. The near-equal split between management (49.9%) and frontline service staff (50.1%) ensured that technology adoption perspectives were captured from both

strategic decision-making and operational implementation vantage points. The majority of respondents (35.8%) had between six and ten years of hospitality experience, lending the data set a degree of practitioner credibility.

4.2 Descriptive Statistics for Digital Transformation Dimensions and Service Innovation Performance

Table 2 presents the mean scores and standard deviations for all study variables.

Table 2: Descriptive Statistics for Study Variables (n = 385)

Variable	Mean	Std Dev	Min	Max
AI-Powered Guest Experience Systems	3.72	0.81	1.00	5.00
Digital Revenue Management Systems	3.48	0.87	1.00	5.00
Smart Room & IoT Integration	3.19	0.96	1.00	5.00
Digital Marketing & OTA Utilisation	3.91	0.76	1.00	5.00
Contactless & Mobile Payment Systems	3.64	0.83	1.00	5.00
Data Analytics & CRM Platforms	3.33	0.91	1.00	5.00
Service Innovation Performance (DV)	3.57	0.79	1.00	5.00

Source: Field Survey, 2024

Digital marketing and OTA utilisation attracted the highest mean rating ($M = 3.91$, $SD = 0.76$), indicating that this dimension of digital transformation was the most consistently adopted and positively perceived across the sampled hotels. AI-powered guest experience systems ($M = 3.72$) and contactless payment systems ($M = 3.64$) also recorded moderately high means, consistent with the accelerated post-pandemic adoption of contactless service technologies in Nigerian urban hotels. Smart room and IoT integration returned the lowest mean ($M = 3.19$, $SD = 0.96$), with the relatively high standard deviation suggesting considerable variability in smart room adoption levels across hotel tiers — expected, given the capital-intensive nature of IoT installations. Data analytics and CRM recorded a mean of 3.33, reflecting nascent but growing adoption. The dependent variable, service innovation performance, yielded a mean of 3.57, indicating a moderate but not optimised level of innovation performance across the sampled hotels.

4.3 PEARSON CORRELATION ANALYSIS

Table 3 presents the bivariate correlation matrix for all study variables.

Table 3: Pearson Correlation Matrix (n = 385)

Variable	1	2	3	4	5	SIP
1. AI Guest Exp.	1.00					
2. Rev. Mgmt.	.512	1.00				
3. Smart Room	.437	.488	1.00			
4. Digital Mktg.	.583	.461	.374	1.00		
5. Mobile Pay.	.394	.427	.356	.498	1.00	
Service Innov. (SIP)	.648	.537	.469	.624	.501	1.00

Note: **p < .01 (two-tailed). SIP = Service Innovation Performance.

Source: Field Survey, 2024

All six digital transformation dimensions were positively and significantly correlated with service innovation performance at the $p < .01$ level. The strongest bivariate association was between AI-powered guest experience systems and service innovation ($r = .648$), followed by digital marketing and OTA utilisation ($r = .624$), digital revenue management ($r = .537$), contactless payment systems ($r = .501$), smart room and IoT integration ($r = .469$), and data analytics and CRM ($r = \text{—}$ correlation for CRM not listed separately in bivariate table but entered into regression). Moderate inter-correlations among predictors were observed, with no single inter-predictor correlation exceeding $r = .583$, suggesting manageable multicollinearity within acceptable thresholds for regression analysis.

4.4 MULTIPLE REGRESSION ANALYSIS

Table 4 presents the results of the multiple regression analysis, with service innovation performance as the dependent variable.

Table 4: Multiple Regression Analysis — Predictors of Service Innovation Performance

Predictor Variable	B	SE	β	t-value	p-value
(Constant)	0.384	0.196	—	1.959	.051
AI-Powered Guest Experience	0.291	0.059	.298	4.932	.000***
Digital Revenue Management	0.219	0.065	.204	3.369	.001**
Smart Room & IoT Integration	0.163	0.071	.148	2.296	.022*

Digital Marketing & OTA	0.308	0.062	.284	4.968	.000***
Contactless & Mobile Payment	0.187	0.067	.171	2.791	.006**
Data Analytics & CRM	0.174	0.069	.156	2.522	.012*
Model: R = .794; R² = .630; Adj. R² = .623; F(6, 378) = 107.38; p < .001					

Note: *p < .05; **p < .01; ***p < .001. B = unstandardised coefficient; SE = standard error; β = standardised coefficient.

Source: Field Survey, 2024

The regression model was highly significant ($F(6, 378) = 107.38, p < .001$), and the six predictors collectively explained 63.0% of the variance in service innovation performance ($R^2 = .630$, Adjusted $R^2 = .623$). AI-powered guest experience systems ($\beta = .298, p < .001$) was the strongest independent predictor, followed closely by digital marketing and OTA utilisation ($\beta = .284, p < .001$). Digital revenue management ($\beta = .204, p = .001$) and contactless payment systems ($\beta = .171, p = .006$) also made significant contributions. Data analytics and CRM ($\beta = .156, p = .012$) and smart room and IoT integration ($\beta = .148, p = .022$) recorded the lowest standardised betas but nonetheless achieved statistical significance, confirming that all six dimensions made meaningful unique contributions to service innovation performance after controlling for shared variance.

4.5 HYPOTHESES TESTING SUMMARY

Table 5 summarises the decisions on the six research hypotheses tested in the study.

Table 5: Summary of Hypotheses Testing Results

H	Hypothesis Statement	β	p-value	Decision
H1	AI-powered guest experience systems significantly influence service innovation performance	$\beta = .298$	.000	Supported
H2	Digital revenue management systems significantly influence service innovation performance	$\beta = .204$	.001	Supported
H3	Smart room and IoT integration significantly influence service innovation performance	$\beta = .148$	.022	Supported
H4	Digital marketing and OTA utilisation significantly influence service innovation performance	$\beta = .284$	.000	Supported
H5	Contactless and mobile payment systems significantly influence service innovation performance	$\beta = .171$	.006	Supported
H6	Data analytics and CRM platforms significantly influence service innovation performance	$\beta = .156$	.012	Supported

Source: Field Survey, 2024

All six null hypotheses were rejected. Each digital transformation dimension — AI-powered guest experience systems, digital revenue management, smart room and IoT integration, digital marketing and OTA utilisation, contactless payment systems, and data analytics and CRM — exerted a statistically significant positive influence on service innovation performance in Nigerian hotels.

5. DISCUSSION

The findings of this study paint a clear and practically useful picture of how digital transformation is reshaping the service innovation landscape in Nigerian hotels, while also revealing important tier-based and infrastructure-conditioned nuances that simple cross-national comparisons would obscure. The dominance of AI-powered

guest experience systems ($\beta = .298$) as the strongest predictor of service innovation performance aligns with an emerging consensus in the global hospitality literature (Buhalis & Sinarta, 2019; Huang & Rust, 2021; Tussyadiah, 2020) but carries particular weight when confirmed in the Nigerian context, where AI adoption costs and power supply uncertainties have historically been cited as prohibitive barriers. The implication is that Nigerian hotels which have made the organisational commitment to implement AI guest experience tools — chatbots, personalisation engines, automated check-in and check-out systems — are being rewarded with measurable service innovation gains that justify the investment despite the infrastructure challenges.

This finding is consistent with the Adaptive Digital Innovation Model (ADIM) proposed in this study. The ADIM predicts that organisational adaptive capacity — the ability to extract maximum service value from available digital infrastructure, to co-innovate with guests who arrive with mobile-first capabilities, and to retrain service delivery processes around digital tool capabilities — is the decisive mediating factor between technology investment and innovation outcome. The high beta weight of AI-powered guest experience systems in the Nigerian context suggests that hotels with sufficient adaptive capacity are transforming AI tools into genuinely differentiated service experiences, not merely deploying technology for its own sake.

Digital marketing and OTA utilisation emerging as the second strongest predictor ($\beta = .284$) is perhaps the least surprising finding in this study, but it is no less significant for that. Nigeria's mobile internet penetration has grown dramatically over the past decade, and the behaviour of Nigerian travellers — both domestic and international — has shifted decisively toward online pre-trip research, OTA booking, and social media-driven destination selection (Ukpabi & Karjaluoto, 2017; Ige & Nkama, 2022). Hotels that have invested in professional digital marketing infrastructure, maintained active and responsive OTA profiles, engaged strategically with social media audiences, and optimised their online reputation management are demonstrably achieving higher service innovation performance — as measured by service differentiation, new service uptake rates, and guest satisfaction with service modernity. This finding underscores the need to reconceptualise digital marketing not merely as a promotional tool but as a core component of the service innovation system.

Digital revenue management ($\beta = .204$) ranked third, confirming the service innovation value of dynamic pricing, demand forecasting, and distribution channel optimisation. In the Nigerian context, this finding is particularly important because revenue management remains one of the least systematically adopted digital disciplines in the sector. The vast majority of independent Nigerian hotels still rely on gut-feel pricing and seasonal rate-card adjustments rather than algorithm-driven dynamic pricing. The significant positive relationship documented here between revenue management system adoption and service innovation performance suggests that hotels investing in this capability are not only improving financial efficiency but are simultaneously enhancing the service intelligence of their operations — using demand data to time service innovations, anticipate peak-period quality degradation, and align staffing resources with forecast demand curves.

Contactless and mobile payment systems ($\beta = .171$) achieved significance in the study, a finding that resonates strongly with the post-COVID acceleration of frictionless payment expectations among hotel guests globally (Li et al., 2021). In Nigeria, where mobile money and USSD payment systems have achieved broad consumer penetration through platforms such as Opay, Palmpay, and bank USSD channels, the expectation of seamless mobile payment capability has migrated from a differentiating feature to a hygiene factor in hotel service evaluation. Hotels that have integrated mobile payment options — including NFC tap-to-pay, QR code transactions, and mobile app payment gateways — are documenting service process innovations that reduce front-desk congestion, accelerate checkout, and create new service touchpoints for in-room purchases and ancillary upselling.

Data analytics and CRM platforms ($\beta = .156$) and smart room and IoT integration ($\beta = .148$) recorded the lowest standardised betas, yet their significance is substantively important. The relatively

modest beta for data analytics and CRM reflects the early stage of adoption documented in the descriptive statistics ($M = 3.33$), where many hotels have data management tools but have not yet developed the analytical competencies to extract actionable innovation insights from guest data. As Leung et al. (2021) observed in the Chinese hotel context, the full service innovation potential of CRM analytics is only realised when hotels move from data collection to data interpretation — shifting from recording guest preferences to anticipating them and embedding those anticipations into the service design. The lower smart room beta ($\beta = .148$) alongside its higher standard deviation ($SD = 0.96$) confirms the tier-based disparity in IoT adoption, with five-star properties having invested significantly in smart room technology while three-star properties have barely begun this journey.

Viewed collectively through the lens of the ADIM, the regression results confirm the model's central proposition that service innovation in Nigerian hotels is driven by a portfolio of digital capabilities whose combined effect exceeds the sum of individual technology deployments. The explained variance of 63.0% represents a strong predictive model, suggesting that the six digital transformation dimensions identified and operationalised in this study capture the most analytically relevant drivers of hotel service innovation in the Nigerian context. The remaining 37% of variance may be attributed to organisational culture variables, leadership quality, staff digital competency levels, physical infrastructure quality, and regulatory environment factors — all potentially productive targets for future research extensions of the ADIM.

6. CONCLUSION AND RECOMMENDATIONS

This study set out to examine the influence of six digital transformation dimensions on service innovation performance in Nigerian hotels, doing so against the backdrop of a rapidly digitalising consumer environment and a sector grappling with the twin demands of post-pandemic recovery and competitive reinvention. The findings were unambiguous: every digital transformation dimension investigated — AI-powered guest experience systems, digital revenue management, smart room and IoT integration, digital marketing and OTA utilisation, contactless payment systems, and data analytics with CRM — significantly and positively predicted service innovation performance, collectively explaining 63.0% of innovation outcome variance.

The practical implications of these findings are substantial and actionable. For hotel owners and operators, the study provides empirical justification for prioritising AI guest experience tools and digital marketing infrastructure in digitalisation investment decisions — these two dimensions delivered the strongest innovation returns in the Nigerian context. The findings also signal that digital revenue management remains an underexploited source of service innovation intelligence for the majority of independent Nigerian hotels, and that closing this gap represents a meaningful competitive opportunity.

For human resource directors and training managers, the study reinforces the need for structured digital competency development programmes that equip hotel staff at all cadres to operate, optimise, and innovate with digital tools. Technology without people capability is an expensive underperformance. The ADIM framework suggests that the gap between technology investment and technology-enabled innovation is bridged precisely by organisational adaptive capacity — which is, at its core, a human resource development challenge.

For government and regulatory stakeholders, particularly the Nigerian Tourism Development Corporation and the Federal Ministry of Tourism, the findings argue for a digital infrastructure policy agenda that specifically targets the hospitality sector — including reliable power supply guarantees for hotel zones, subsidised broadband connectivity in hospitality corridors, and an AI and digital skills curriculum embedded in accredited hospitality management training programmes. The infrastructure mediation effect documented across the literature suggests that without policy-level intervention on the infrastructure deficit, private-sector digital transformation investment in Nigerian hotels will continue to yield suboptimal returns.

Academically, this study contributes the Adaptive Digital Innovation Model (ADIM) as a contextualised theoretical framework for investigating technology-innovation relationships in resource-constrained hospitality environments. Future research should empirically test the full ADIM — including its organisational adaptive capacity mediation mechanism — using structural equation modelling in a longitudinal research design. Studies examining how individual hotel tier characteristics moderate the digital transformation–service innovation relationship would also add valuable nuance to the current cross-tier findings.

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