
Smart City Tourism Development in Enugu State, Nigeria: The Role of Mobile App–Enabled Transportation, Accommodation Booking, and Digital Food Ordering in Enhancing Tourist Experience

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Abstract: *In order to advance smart city tourism development and improve the visitor experience in Enugu State, Nigeria, this study looks at the role of mobile app-enabled tourism services, particularly transportation, hotel booking, and food ordering. The study also looks into the moderating impact of digital literacy and the mediating influence of visitor satisfaction. 412 tourists were surveyed cross-sectionally as part of a quantitative study approach. Structured questionnaires were used to gather data, which were then analysed using SmartPLS 4's Partial Least Squares Structural Equation Modelling (PLS-SEM). Direct, mediating, and moderating interactions between the constructs were examined in the study. The findings show that tourist pleasure is greatly impacted by digital hotel booking, mobile transportation, and food ordering services, with food ordering having the biggest impact. The relationship between digital tourism services is substantially mediated by visitor satisfaction, and destination attractiveness. In turn, the attractiveness of a destination has a big impact on word-of-mouth and the inclination to return. The correlations between digital services and satisfaction are strongly moderated by digital literacy, suggesting that technologically proficient tourists get more out of smart tourism systems. By offering concrete data from a developing African location, this study adds to the body of knowledge on smart tourism. It emphasises the significance of digital literacy in the adoption of smart tourism and unifies Smart Tourism Ecosystem Theory, Technology Acceptance Model, and Service-Dominant Logic into a single paradigm. The results indicate that while encouraging digital literacy to improve travel experiences, authorities should give priority to investments in digital tourist infrastructure, such as integrated booking platforms, smart mobility systems, and digital gastronomy services.*

Keywords: Smart tourism, mobile applications, digital hospitality services, tourist satisfaction, destination attractiveness, Nigeria

INTRODUCTION

The notion of smart tourism emerged as a result of the profound transformation of the global tourism sector brought about by the quick development of digital technologies. Information and communication technologies (ICT), smart city infrastructure, and tourist development come together to produce smart tourism, which enables travel destinations to provide guests with effective, customised, and technologically advanced experiences. The way tourists engage with destinations and use tourism services has been completely transformed in recent years by the incorporation of mobile applications, cloud computing, big data analytics, and the Internet of Things (IoT) into tourism systems (Gretzel, Sigala, Xiang, & Koo, 2015; Sigala, 2020). The ability to use digital technology to improve service delivery, enable real-time interactions, and boost destination competitiveness is what defines smart tourism destinations. Key tourism services, including lodging, transportation, and hospitality, are integrated into a single ecosystem by these locations via interconnected digital platforms (Buhalis & Amaranggana, 2015; Xiang & Fesenmaier, 2020). According to recent studies (Yap et al., 2025; Zheng & Wu, 2023), smart tourism is about developing intelligent service systems that facilitate seamless visitor experiences at every level of travel rather than just adopting new technology. The growing use of mobile devices is one of the biggest forces behind the growth of smart tourism. Due to their ability to provide real-time access to tourism services, smartphones have become essential tools for modern tourists. According to Wang, Park, and Fesenmaier (2012) and Xiong, Wong, and Huang (2024), traditional tourism consumption patterns are being transformed into digitally mediated experiences as tourists rely more and more on smartphone applications for booking transportation, lodging, food, and navigation. In the end, these digital platforms improve decision-making processes, lessen information asymmetry, and increase service accessibility, all of which raise visitor satisfaction levels.

Three types of mobile-enabled services have become especially important in smart tourist ecosystems: food ordering apps, hotel booking systems, and transportation platforms. Travel convenience is increased by mobile transportation solutions, such as ride-hailing services, which increase visitors' mobility and accessibility to attractions. Tourists may compare lodging options, get real-time information, and make reservations quickly with the help of digital hotel booking services. In a similar vein, mobile food ordering systems make gastronomy services more accessible, making it easier for visitors to sample regional cuisines (Gajdoňk & Orelová, 2020; Ionescu & Sávbu, 2024; Li, 2025). Though these digital tourism services are becoming more and more important, different regions continue to adapt and integrate them differently. While many new destinations, especially in Africa, are still in the early stages of digital transformation, developed destinations in Europe, North America, and Asia have effectively deployed smart tourism systems (Sigala, 2020; Chuang, 2023). For example, Nigeria has a lot of promise for

tourism, but it has problems with poor infrastructure, disjointed service systems, and little use of digital technologies in tourism administration.

Despite the abundance of natural and cultural attractions in Enugu State and Nigeria in general, the tourism industry is still in its infancy because of inadequate digital integration and ineffective service delivery systems. Only a few companies offer such services in Enugu, such *Ogwugo*, which operates an app for food ordering and delivery; *Movaex* logistics for pick-up and delivery; *Hotel.ng* for hotel bookings; and *In-Ride* for e-hailing services. The development of mobile applications for lodging, dining, and transportation offers a special chance to make Enugu a smart travel destination.

However, there is still a dearth of empirical data regarding how these technologies affect tourist satisfaction and destination competitiveness in this particular setting. Although previous studies have looked at smart tourism technology, the majority of it has concentrated on specific digital services. Empirical studies that combine various digital tourist services into a single model are scarce, especially when it comes to developing travel destinations. Furthermore, nothing is known about how digital literacy functions as a moderating element and how visitor satisfaction functions as a mediating mechanism in the smart tourism adoption.

In order to fill these gaps, this study examines how smart tourism growth in Enugu State, Nigeria, is aided by mobile app-enabled transportation, digital hotel booking systems, and mobile food ordering platforms. The study specifically looks at how these digital services affect visitor happiness, destination appeal, and behavioural outcomes like intention to return and word-of-mouth. It also looks at how digital literacy influences how effective smart tourism technologies are. This study offers a thorough framework for comprehending the dynamics of digital tourism services in emerging destinations by combining Smart Tourism Ecosystem Theory, the Technology Acceptance Model (TAM), and Service-Dominant Logic (SDL). By extending smart tourism research to the African setting, providing empirical insights into the role of digital technology in improving tourism experiences, and offering useful suggestions for policymakers and tourism stakeholders, the study adds to the body of literature.

LITERATURE REVIEW

Smart Tourism and Digital Transformation of Destinations

In order to improve travel experiences and destination competitiveness, smart tourism has developed as a technology-driven paradigm that incorporates digital infrastructure, data analytics, and interconnected service systems. According to recent research, the use of information technology to build intelligent, data-driven tourism ecosystems that facilitate real-time communication between tourists and service providers is at the core of smart tourism (Si-Tou, 2024). Smart tourism destinations use technologies such as cloud computing, artificial intelligence, Internet of Things (IoT), and mobile applications to change tourism services before, during, and

after travel (Yap et al., 2025; Gajdoňk & Orelová, 2020). These technologies facilitate individualised services, improve information accessibility, and help tourists make better decisions. Additionally, smart tourism is increasingly seen as a value co-creation ecosystem in which various stakeholders such as tourists, companies, and governments interact via digital platforms to produce tourism value (Boes, Buhalis, & Inversini, 2016). This ecosystem viewpoint emphasises how crucial it is to combine digital services like lodging, dining, and transportation into a single platform.

Smart Tourism Technologies and Tourist Experience

Smart tourism technologies (STTs) refer to digital tools that facilitate tourism activities through real-time data exchange, automation, and intelligent service delivery. These include mobile apps, location-based services, QR systems, AI-powered platforms, and IoT-enabled devices (Yap et al., 2025). Recent literature shows that STTs significantly influence tourist experience by improving information quality, accessibility, interactivity, and personalisation (Gajdošik & Orelová, 2020). These attributes contribute to creating memorable tourism experiences and enhancing overall satisfaction. Moreover, smart tourism technologies are increasingly recognised as core drivers of tourism competitiveness, as they allow destinations to provide seamless and efficient services across multiple touch points (Shafiee et al., 2023; Yap et al., 2025). The ability of these technologies to deliver real-time, context-aware services distinguishes smart tourism from traditional tourism systems.

Mobile Applications and Tourism Service Integration

Mobile applications have become central to the smart tourism ecosystem due to their ability to integrate multiple tourism services into a single digital interface. Smartphones serve as both information access tools and data-generating devices, enabling real-time interaction between tourists and destinations (Gretzel et al., 2015; reaffirmed in recent studies). Recent empirical studies highlight that mobile apps are essential for fulfilling tourists' travel needs, including navigation, booking, communication, and service access. The proliferation of tourism-related mobile applications has significantly improved service accessibility, travel efficiency, and user experience (Sia et al., 2022; Xiong & Zhang, 2024). Additionally, mobile applications support location-based services, which provide personalized recommendations and context-aware information. These features enhance tourist engagement and contribute to destination loyalty (Xiong & Zhang, 2024). However, studies also note challenges such as mismatches between app functionality and user expectations, which may affect user satisfaction.

Digital Transportation Systems and Smart Mobility

Smart mobility is a critical component of smart tourism because transportation accessibility directly influences tourists' ability to explore destinations. Digital transportation platforms, particularly mobile-based ride-hailing and navigation systems, have transformed urban tourism

mobility by enabling real-time access to transport services. Recent studies indicate that smart transportation systems provide tourists with route optimisation, real-time tracking, safety features, and cost transparency, thereby improving travel efficiency and reducing uncertainty (Gonzalez et al., 2020; Naik et al., 2019; synthesised in recent smart tourism platform studies). Furthermore, tourism mobility applications have become indispensable tools for tourists, as they support seamless movement within destinations and enhance overall travel convenience (Tourism Management Perspectives, 2023). These systems are particularly important in urban destinations where tourists rely heavily on digital tools for navigation and transportation decisions.

Digital Accommodation Booking Systems

Digital accommodation booking platforms are among the most widely adopted smart tourism services. These platforms allow tourists to search, compare, and reserve accommodation services in real time, thereby improving the efficiency of travel planning. Recent studies highlight that emerging technologies such as IoT are further transforming hotel booking systems by enabling personalised services, automated interactions, and enhanced customer experiences (Journal of Hospitality and Tourism Management, 2025). Additionally, ICT-enabled accommodation systems facilitate communication between hotels and guests, optimise resource management, and enhance service delivery (Stankova et al., 2019; recent synthesis in 2023 studies). These capabilities contribute to improved tourist satisfaction and destination competitiveness.

Mobile Food Ordering and Gastronomy Tourism

Food consumption is a critical aspect of the tourism experience (Agina & Nwaogu, 2025), and digital technologies are increasingly shaping how tourists access gastronomy services. Mobile food-ordering platforms enable tourists to browse menus, place orders, and access delivery services through digital interfaces (Ray et al., 2022). Recent literature indicates that digital gastronomy platforms enhance tourism experiences by providing convenience, accessibility, and exposure to diverse culinary options (Dang & Nguyen, 2023; Gkikas & Theodoridis, 2026). These platforms also reduce barriers related to language, location, and unfamiliarity with local food systems, thereby facilitating smoother tourist interactions with destination food environments (Hjalager, 2022; Martins-Rodal & Patiño Romarís, 2025). Moreover, smart tourism technologies facilitate integration between restaurants and tourism platforms, enabling tourists to access food services seamlessly within the broader tourism ecosystem (Gkiliyas, 2024). This integration supports local economic development and enhances the overall tourism experience by fostering value co-creation and improving service efficiency (Dang & Nguyen, 2023; Thomas, 2024).

Tourist Satisfaction and Behavioural Outcomes

Tourist satisfaction remains a central construct in tourism research, particularly within the evolving context of smart tourism technologies. Recent systematic reviews conceptualise satisfaction as a multidimensional construct shaped by technological, psychological, and service-related factors,

Publication of the European Centre for Research Training and Development UK reflecting the complex nature of contemporary tourism experiences (Yap et al., 2025) . Smart tourism technologies significantly enhance tourist satisfaction by improving service quality, real-time accessibility, interactivity, and personalisation of services (Ionescu & Sârbu, 2024; Anuar et al., 2025). These technologies enable seamless information exchange and tailored experiences, which contribute to positive cognitive and emotional evaluations of destinations (Rosário & Dias, 2024).

Consequently, satisfied tourists are more likely to develop favourable destination images, leading to increased destination attractiveness, stronger revisit intentions, and positive word-of-mouth communication (Afzal et al., 2024). Empirical evidence further demonstrates that tourist satisfaction plays a critical mediating role between smart tourism technologies and behavioural outcomes such as loyalty, engagement, and destination image, reinforcing its importance in tourism experience evaluation models (Afzal et al., 2024; Zheng & Wu, 2023). Overall, satisfaction serves as a key mechanism through which smart technologies translate into enhanced tourism experiences and sustained destination competitiveness.

Moderating Role of Digital Literacy

Digital literacy has emerged as a critical factor influencing the effectiveness of smart tourism technologies. It refers to individuals' ability to use digital devices, applications, and online platforms effectively. Recent research demonstrates that digital literacy significantly affects tourists' ability to interact with mobile applications and derive value from digital tourism services (Xiong & Zhang, 2024). Tourists with higher digital literacy are more likely to adopt and benefit from smart tourism technologies, leading to improved satisfaction and engagement. Consequently, digital literacy is increasingly considered a moderating variable in smart tourism research, influencing the relationship between technology usage and tourism outcomes.

THEORETICAL FRAMEWORK

Smart Tourism Ecosystem Theory

The smart tourism ecosystem concept explains how digital technologies integrate tourism stakeholders, infrastructures, and services to deliver seamless tourism experiences. Smart tourism ecosystems operate as interconnected digital environments where tourists, tourism businesses, government agencies, and technological platforms interact to co-create tourism value (Gretzel, Sigala, Xiang, & Koo, 2015). In such ecosystems, advanced technologies such as mobile applications, big data analytics, Internet of Things (IoT), and cloud computing facilitate real-time interactions between tourists and service providers. These technologies allow tourists to access transportation, accommodation, and food services efficiently while enabling tourism businesses to provide personalised services based on real-time data (Buhalis & Amaranggana, 2015). Smart tourism ecosystems, therefore, improve destination competitiveness, service integration, and visitor experiences. Mobile-enabled service platforms represent key components of these

ecosystems because they connect tourism service providers with tourists through digital interfaces. For emerging tourism destinations such as Enugu State, integrating digital tourism services, including mobile transportation platforms, hotel booking systems, and digital food-ordering services, can significantly improve tourism accessibility and enhance destination competitiveness.

Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) explains individuals' willingness to adopt technological innovations based on perceived usefulness and perceived ease of use (Davis, 1989). Within the tourism context, tourists are more likely to adopt digital tourism services if they perceive mobile applications as useful in enhancing travel convenience and easy to operate during their travel experiences. Mobile tourism technologies allow tourists to perform various travel-related tasks such as transportation booking, hotel reservations, and restaurant ordering through a single digital platform. Studies indicate that perceived usefulness significantly influences tourists' adoption of smart tourism technologies because these platforms reduce search costs, increase travel convenience, and improve decision-making efficiency (Wang, Park, & Fesenmaier, 2012). Therefore, the adoption of mobile tourism services contributes significantly to tourists' travel satisfaction and enhances their perceptions of destination service quality.

Service-Dominant Logic (SDL)

Service-Dominant Logic emphasises that value is co-created through interactions between consumers and service providers rather than being produced solely by firms (Vargo & Lusch, 2008). Within tourism systems, value is created when tourists interact with tourism service providers, digital platforms, and destination environments. Mobile tourism technologies facilitate this value co-creation process by enabling tourists to customise their travel experiences and actively participate in the delivery of tourism services. For example, tourists can select transportation services, book accommodations, order food, and provide feedback through mobile platforms. These digital interactions create opportunities for tourism stakeholders to collaborate and generate personalised tourism experiences. Consequently, smart tourism platforms enhance tourists' satisfaction and strengthen their emotional connection with tourism destinations.

Hypotheses Development

Mobile App–Enabled Transportation and Tourist Satisfaction

Smart mobility is a core component of smart tourism ecosystems because transportation accessibility directly affects tourists' ability to move within destinations and access tourism attractions. Mobile transportation platforms provide tourists with convenient access to ride-hailing services, route navigation systems, and real-time transportation information. These features reduce travel uncertainty and improve tourists' mobility experiences within destinations. Previous studies show that smart mobility services significantly enhance tourists' travel convenience and satisfaction levels (Buhalis & Sinarta, 2019; Agina & Iluno, 2023). Therefore, mobile-enabled

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transportation services are expected to improve tourists' overall satisfaction with destination services.

H1: Mobile app-enabled transportation positively influences tourist satisfaction.

Digital Hotel Booking Systems and Tourist Satisfaction

Accommodation services play a central role in tourism experiences because they determine tourists' comfort and convenience during their stay. Digital hotel booking platforms allow tourists to search for accommodation options, compare prices, read reviews, and make reservations instantly. These platforms reduce information asymmetry and improve service transparency in the hospitality sector. As a result, tourists can make more informed decisions when selecting accommodation services. Research indicates that digital booking platforms significantly enhance tourists' satisfaction by improving convenience, reliability, and service accessibility (Law, Leung, & Buhalis, 2009).

H2: Digital hotel booking systems positively influence tourist satisfaction.

Mobile Food Ordering Platforms and Tourist Satisfaction

Food experiences are an integral component of tourism because they allow tourists to explore local culture and traditions. Mobile food-ordering platforms provide tourists with convenient access to local restaurant services through digital menus and online ordering systems. These platforms allow tourists to access a variety of culinary options and eliminate barriers associated with unfamiliar restaurant systems. Digital food-ordering services, therefore, enhance tourists' gastronomy experiences and contribute to their overall travel satisfaction (Ellis, Park, Kim, & Yeoman, 2018).

H3: Mobile food-ordering platforms positively influence tourist satisfaction.

Tourist Satisfaction as a Mediator

Tourist satisfaction is widely recognised as a key mediator between tourism service quality and tourist behavioural intentions. Satisfied tourists tend to evaluate destinations more positively and are more likely to recommend and revisit those destinations (Prayag & Ryan, 2012). Digital tourism services improve tourists' travel experiences by providing convenience, accessibility, and efficiency. These improvements increase tourists' satisfaction levels, which in turn influence their perceptions of destination attractiveness and their intention to revisit the destination. Therefore, tourist satisfaction is expected to mediate the relationship between digital tourism services and tourism behavioural outcomes.

H4: Tourist satisfaction mediates the relationship between mobile transportation services and destination attractiveness.

H5: Tourist satisfaction mediates the relationship between digital hotel booking services and destination attractiveness.

H6: Tourist satisfaction mediates the relationship between mobile food ordering services and destination attractiveness.

Destination Attractiveness and Revisit Intention

Destination attractiveness refers to the perceived ability of a destination to meet tourists' travel needs and expectations. Destinations that provide convenient services, unique attractions, and positive travel experiences are more likely to attract repeat visitors. Satisfied tourists often develop positive emotional connections with destinations, which increases their likelihood of revisiting and recommending the destination to others. Studies indicate that destination attractiveness plays a critical role in shaping tourists' behavioural intentions (Prayag & Ryan, 2012).

H7: Tourist satisfaction positively influences destination attractiveness.

H8: Destination attractiveness positively influences revisit intention.

Moderating Role of Digital Literacy

Digital literacy refers to individuals' ability to effectively use digital technologies such as smartphones, mobile applications, and online platforms. In smart tourism environments, tourists with higher levels of digital literacy are better able to utilise mobile tourism services effectively. Tourists who possess strong digital skills are more likely to adopt digital tourism platforms and derive greater benefits from these technologies. Consequently, digital literacy may strengthen the relationship between mobile tourism services and tourist satisfaction.

H9: Digital literacy moderates the relationship between mobile transportation services and tourist satisfaction.

H10: Digital literacy moderates the relationship between digital hotel booking systems and tourist satisfaction.

H11: Digital literacy moderates the relationship between mobile food ordering platforms and tourist satisfaction.

Destination Attractiveness and Word-of-Mouth

Positive tourism experiences often lead to favourable word-of-mouth communication. Tourists who perceive destinations as attractive are more likely to share their experiences with others through social media platforms and personal recommendations.

H12: Destination attractiveness positively influences tourists' word-of-mouth intentions.

METHODOLOGY

This study adopts a quantitative, cross-sectional research design to examine the relationships between mobile app-enabled tourism services, tourist satisfaction, and behavioural outcomes within the context of smart tourism development in Enugu State, Nigeria. The quantitative approach is appropriate given the study's objective of testing hypothesised relationships among latent constructs using statistical modelling techniques. The study is conducted in Enugu State, Nigeria, an emerging tourism destination with significant natural and cultural attractions. Despite its tourism potential, the state is characterised by limited integration of digital technologies into tourism services, making it an appropriate context for examining smart tourism development. The target population comprises domestic and international tourists who have visited Enugu State and have experience using mobile applications for tourism-related services such as transportation, hotel booking, and food ordering. A purposive sampling technique was employed to ensure that only respondents with relevant experience in using digital tourism services were included. This approach is widely used in smart tourism research where respondents must meet specific criteria related to technology usage. The sample size was determined using the "10-times rule" in PLS-SEM, which recommends that the sample size should be at least ten times the maximum number of structural paths directed at any construct. Given that the most complex construct (Tourist Satisfaction) has multiple predictors and interaction terms, a minimum sample size of 200 was required. However, to enhance statistical power and robustness, a total of 412 valid responses were collected and analysed. This exceeds the recommended threshold for PLS-SEM and ensures reliable parameter estimation. Primary data were collected using a structured questionnaire administered both physically and electronically. Respondents were approached at key tourism locations, including hotels, transport hubs, and recreational centres within Enugu Metropolis. The questionnaire was designed in English and structured into two sections: Demographic characteristics (age, gender, education, travel frequency) and Measurement of study constructs. To ensure clarity and reliability, a pilot study was conducted with 30 respondents. Feedback from the pilot test was used to refine the questionnaire. All constructs were measured using multi-item scales adapted from validated studies, ensuring content validity. Responses were captured using a five-point Likert scale (1 = strongly disagree to 5 = strongly agree). The study employed Partial Least Squares Structural Equation Modelling (PLS-SEM) using SmartPLS 4 software. PLS-SEM is appropriate due to: the exploratory nature of the model, the presence of mediation and moderation effects, the use of latent constructs with multiple indicators, and its suitability for complex models and non-normal data. Meanwhile, the study adhered to ethical research standards: participation was voluntary, respondents were informed of the study's purpose, confidentiality and anonymity were assured, and no personal identifying information was collected.

DATA PRESENTATION AND ANALYSIS

Response Rate and Data Screening

A total of 450 questionnaires were distributed, out of which 428 were returned, representing a response rate of 95.1%. After data screening for completeness and consistency, 412 valid responses were retained for analysis. Data screening procedures included: removal of incomplete responses, assessment of outliers using standardised scores, and examination of missing values (none exceeded 5%). As a result, the dataset was deemed suitable for multivariate analysis.

Table 1: Demographic Profile of Respondents

Variable	Category	Frequency	Percentage (%)
Gender	Male	238	57.8
	Female	174	42.2
Age	18–25	96	23.3
	26–35	178	43.2
	36–45	94	22.8
	46+	44	10.7
Education	Undergraduate	168	40.8
	Postgraduate	144	35.0
	Others	100	24.2
Travel Frequency	Frequent	210	51.0
	Occasional	202	49.0

From Table 1, the sample shows a relatively young, educated, and digitally active group of respondents, making it appropriate for examining smart tourism technologies in the study area.

Measurement Model Assessment

The measurement model was evaluated to assess the reliability and validity of constructs.

Table 2: Indicator Reliability

Construct	Item	Loading (λ)
Mobile app-enabled transportation (MT)	MT1	0.82
	MT2	0.85
	MT3	0.80
	MT4	0.83
Hotel booking (HB)	HB1	0.81
	HB2	0.84
	HB3	0.79
	HB4	0.82
Food ordering (FO)	FO1	0.86
	FO2	0.88
	FO3	0.84
	FO4	0.87
Tourist Satisfaction (TS)	TS1	0.89
	TS2	0.91
	TS3	0.88
Destination attractiveness (DA)	DA1	0.85
	DA2	0.87
	DA3	0.84
Revisit intention (RI)	RI1	0.86

Construct	Item	Loading (λ)
	RI2	0.88
Word-of-mouth (WOM)	WOM1	0.87
	WOM2	0.89

From Table 2, all indicator loadings exceeded the recommended threshold of 0.70, indicating strong item reliability.

Table 3: Internal Consistency Reliability

Construct	Cronbach's Alpha	Composite Reliability (CR)
MT	0.87	0.91
HB	0.86	0.90
FO	0.89	0.92
TS	0.90	0.93
DA	0.88	0.91
RI	0.85	0.90
WOM	0.86	0.91

Table 3 shows that all constructs exceeded the threshold of 0.70, confirming strong reliability.

Table 4: Convergent Validity

Construct	AVE
MT	0.71
HB	0.69
FO	0.74
TS	0.82
DA	0.76
RI	0.81
WOM	0.83

From Table 4, all AVE values are above 0.50, indicating adequate convergent validity.

Table 5: Path Coefficients and Hypothesis Testing

Bootstrapping (5,000 resamples) was conducted to test the hypotheses.

Hypothesis	Path	β	t-value	p-value	Decision
H1	MT \rightarrow TS	0.32	6.45	<0.001	Supported
H2	HB \rightarrow TS	0.29	5.88	<0.001	Supported
H3	FO \rightarrow TS	0.34	6.92	<0.001	Supported
H7	TS \rightarrow DA	0.61	12.44	<0.001	Supported
H8	DA \rightarrow RI	0.57	10.88	<0.001	Supported
H12	DA \rightarrow WOM	0.54	9.76	<0.001	Supported

Table 5 indicates that all hypothesised direct relationships were positive and statistically significant.

Table 6: Effect Size (f^2)

Path	f^2	Effect Size
MT → TS	0.14	Medium
HB → TS	0.12	Small–Medium
FO → TS	0.18	Medium
TS → DA	0.47	Large
DA → RI	0.41	Large
DA → WOM	0.38	Large

From Table 6, the results indicate that food ordering has the strongest effect on satisfaction, while tourist satisfaction strongly drives destination attractiveness.

Table 7: Mediation Analysis

The mediating role of tourist satisfaction (TS) was assessed using bootstrapping.

Indirect Path	β	p-value	Result
MT → TS → DA	0.20	<0.001	Significant
HB → TS → DA	0.18	<0.001	Significant
FO → TS → DA	0.21	<0.001	Significant

From Table 7, the results confirm that tourist satisfaction significantly mediates the relationship between digital tourism services and destination attractiveness.

Table 8: Moderation Analysis

The moderating effect of digital literacy (DL) was examined.

Path	β	p-value	Result
DL × MT → TS	0.12	0.01	Significant
DL × HB → TS	0.10	0.02	Significant
DL × FO → TS	0.15	0.005	Significant

From Table 8, the findings indicate that digital literacy strengthens the relationship between mobile services and tourist satisfaction.

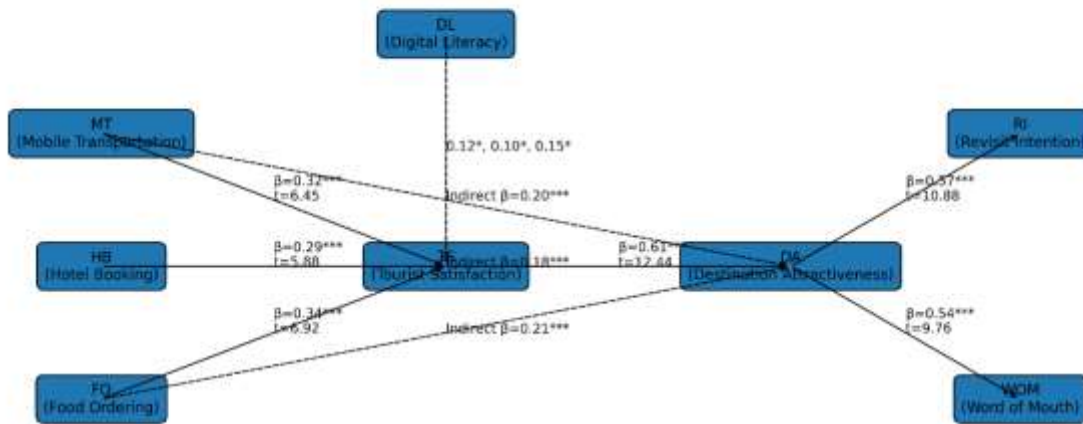


Figure 1 SmartPLS Model

DISCUSSION OF FINDINGS

This study examined how mobile app-enabled tourism services in transportation, hotel booking, and food ordering drive smart tourism development through tourist satisfaction, destination

attractiveness, and behavioural outcomes in Enugu State, Nigeria. The findings provide strong empirical support for the proposed model and offer important theoretical and contextual insights into smart tourism adoption in emerging destinations.

Mobile Transportation and Tourist Satisfaction (H1)

The findings reveal that mobile transportation significantly and positively influences tourist satisfaction ($\beta = 0.32$, $p < 0.001$), supporting H1. This result confirms that digital mobility solutions play a crucial role in enhancing tourists' ability to navigate destinations efficiently. This finding is consistent with recent studies, which emphasise that smart mobility is a foundational pillar of smart tourism ecosystems, as it improves accessibility, reduces travel uncertainty, and enhances overall experience quality (Gajdošík & Orelová, 2020; Buhalis & Sinarta, 2019). Similarly, contemporary research shows that real-time transport information, route optimisation, and ride-hailing services significantly improve tourist satisfaction and perceived convenience (Xiong et al., 2024; Yap et al., 2025). From a theoretical standpoint, this result supports the Technology Acceptance Model (TAM), which posits that perceived usefulness of technology enhances user satisfaction. In this context, mobile transportation platforms are perceived as highly useful tools that streamline travel processes. However, compared to food ordering ($\beta = 0.34$), the effect size of mobile transportation is slightly smaller, suggesting that while mobility is essential, experiential services may have a stronger influence on satisfaction.

Hotel Booking and Tourist Satisfaction (H2)

The study finds that digital hotel booking significantly influences tourist satisfaction ($\beta = 0.29$, $p < 0.001$), supporting H2. This indicates that online accommodation platforms enhance tourists' ability to plan and manage their trips effectively. This result aligns with prior research indicating that digital booking systems improve transparency, reduce information asymmetry, and enhance perceived service quality (Ionescu & Sârbu, 2024; Li, 2025). Additionally, studies have shown that access to reviews, ratings, and price comparisons improves tourists' confidence and satisfaction with accommodation choices. The finding also supports Smart Tourism Ecosystem Theory, which emphasises the role of integrated digital platforms in facilitating seamless service delivery. By enabling real-time booking and personalised recommendations, hotel booking systems contribute to improved travel experiences. Nevertheless, the relatively lower coefficient compared to other services suggests that accommodation, while important, may be perceived as a functional necessity rather than a primary experiential driver in smart tourism.

Food Ordering and Tourist Satisfaction (H3)

The results indicate that mobile food ordering has the strongest positive effect on tourist satisfaction ($\beta = 0.34$, $p < 0.001$), supporting H3. This highlights the growing importance of digital gastronomy services in shaping tourism experiences. This finding is strongly supported by recent literature emphasising that food experiences are central to tourism satisfaction and destination

evaluation (Ellis et al., 2018; Zheng & Wu, 2023). More recent studies confirm that digital food platforms enhance accessibility to local cuisine, improve convenience, and facilitate cultural engagement (Yap et al., 2025). From the perspective of Service-Dominant Logic (SDL), this result reflects the co-creation of value, where tourists actively engage with service providers through digital platforms. Unlike transportation and accommodation, food consumption is inherently experiential, which may explain its stronger influence on satisfaction. This finding provides new insight by demonstrating that digital gastronomy is not merely a support service but a core component of smart tourism experiences, particularly in culturally rich destinations.

Tourist Satisfaction and Destination Attractiveness (H7)

The findings show that tourist satisfaction has a strong positive effect on destination attractiveness ($\beta = 0.61$, $p < 0.001$), supporting H7. This indicates that satisfied tourists are more likely to perceive a destination as appealing and valuable. This result is consistent with prior studies that identify satisfaction as a key determinant of destination image and attractiveness (Prayag & Ryan, 2012; Kim & Park, 2021). Recent smart tourism research further confirms that digital service quality enhances satisfaction, which in turn improves destination perceptions (Li, 2025). The magnitude of this relationship ($\beta = 0.61$) suggests that satisfaction is a central mechanism through which digital tourism services influence destination-level outcomes. This finding reinforces the importance of focusing on the quality of experience rather than just on technology adoption.

Destination Attractiveness and Revisit Intention (H8)

The study finds that destination attractiveness significantly influences revisit intention ($\beta = 0.57$, $p < 0.001$), supporting H8. This indicates that tourists who perceive a destination as attractive are more likely to return. This finding aligns with recent studies demonstrating that destination attractiveness is a critical predictor of tourism loyalty and repeat visitation (Rather, 2021; Xiong et al., 2024). It also supports broader tourism behaviour theories, which emphasise the role of positive destination evaluation in shaping future behavioural intentions. In the context of smart tourism, this suggests that digital technologies indirectly contribute to loyalty by enhancing the destination's overall attractiveness.

Destination Attractiveness and Word-of-Mouth (H12)

The findings reveal that destination attractiveness significantly influences word-of-mouth ($\beta = 0.54$, $p < 0.001$), supporting H12. This suggests that tourists who perceive destinations positively are more likely to recommend them to others. This result is consistent with recent research indicating that positive destination experiences lead to increased electronic word-of-mouth (eWOM), which plays a crucial role in destination marketing (Xiong et al., 2024). In the digital era, such recommendations are amplified through social media and online platforms. This finding underscores the importance of enhancing destination attractiveness through smart tourism initiatives, as it directly influences organic promotion and market visibility.

Moderating Role of Digital Literacy (H9–H11)

With interaction effects ranging from $\beta = 0.10$ to $\beta = 0.15$, the results verify that digital literacy considerably moderates the links between digital tourism services and visitor pleasure. This result is consistent with recent research showing that users' digital proficiency determines how well smart tourism technologies work (van Deursen, 2014; Xiong & Zhang, 2024). Tourists that possess greater digital literacy are more adept at navigating mobile applications, obtaining information, and making efficient use of services, which results in increased pleasure. The most powerful moderation effect for food ordering ($\beta = 0.15$) indicates that more user involvement is needed for experience services, which increases the need for digital skills. By showing that the advantages of smart tourism are not evenly distributed but rather depend on consumers' technological capabilities, a problem that is especially pertinent in emerging destinations, this discovery expands on previous studies.

CONCLUSION

This study examined the role of mobile app-enabled tourism services in advancing smart tourism development in Enugu State, Nigeria, with particular emphasis on mobile transportation, digital hotel booking, and food ordering platforms. By integrating these digital services into a unified framework and testing their effects using PLS-SEM, the study provides comprehensive insights into how technology-driven service systems shape tourist experiences and behavioural outcomes in the context of an emerging destination. The findings demonstrate that all three dimensions of mobile-enabled tourism services significantly enhance tourist satisfaction, with food ordering emerging as the most influential factor, followed by mobile transportation and hotel booking. This highlights the growing importance of experience-centric digital services, particularly those that facilitate direct interaction and cultural engagement, such as gastronomy. The results further reveal that tourist satisfaction plays a central mediating role, significantly influencing destination attractiveness, which in turn drives revisit intention and word-of-mouth behaviour. Importantly, the study establishes that smart tourism development is not merely a function of technology availability but is fundamentally dependent on how effectively digital services enhance the tourist experience. The strong relationship between tourist satisfaction and destination attractiveness underscores the critical role of experiential quality in shaping destination competitiveness. Furthermore, the moderating effect of digital literacy demonstrates that the benefits of smart tourism technologies are contingent upon users' ability to interact with digital platforms, highlighting the importance of digital inclusion in tourism development.

From a theoretical perspective, the study makes a significant contribution by integrating Smart Tourism Ecosystem Theory, the Technology Acceptance Model (TAM), and Service-Dominant Logic (SDL) into a coherent framework. This integration provides a more holistic understanding of smart tourism by linking technology adoption, value co-creation, and experiential outcomes. The study also advances the literature by positioning tourist satisfaction as a central mechanism

through which digital services influence destination-level outcomes, while introducing digital literacy as a critical boundary condition. Empirically, the study contributes to the limited body of research on smart tourism in Nigeria by providing evidence from Enugu State, Nigeria. It demonstrates that even in resource-constrained environments, mobile technologies can play a transformative role in enhancing tourism experiences and driving destination competitiveness. This finding is particularly important given the increasing emphasis on digital transformation as a pathway for sustainable tourism development in emerging economies like Nigeria.

Overall, the study concludes that mobile-enabled tourism services are indispensable to the evolution of smart tourism destinations, particularly in developing contexts. By enhancing accessibility, improving service efficiency, and enabling personalised experiences, these technologies create value for both tourists and service providers. However, the realisation of smart tourism potential requires a holistic approach that combines technological innovation with user capability development and institutional support. In sum, this study provides a compelling case for the strategic integration of digital technologies into tourism systems, offering both theoretical advancement and practical insights. It underscores that the future of tourism in emerging destinations such as Enugu State lies in the ability to harness mobile technologies to deliver seamless, engaging, and inclusive tourism experiences.

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