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E-Tourism in the Smart City Framework: Development and Validation of SEM Models for Digital Tourism Adoption in Indonesia

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ABSTRACT

Digital transformation has reshaped urban tourism by integrating smart technologies into city ecosystems. However, empirical models that systematically connect Smart City dimensions, E-tourism capabilities, and technology adoption remain limited in emerging economies. This study develops and validates a multilevel Structural Equation Modeling (SEM-PLS) framework that integrates Smart Governance, Smart Mobility, and Digital Infrastructure Readiness with E-tourism capabilities (Information Quality, Service Integration, Smart Tourism Capability) and the Technology Acceptance Model (TAM). Using simulated structural data (n = 300) to demonstrate model feasibility, results indicate that Smart City dimensions significantly influence E-tourism capabilities, which in turn shape perceived usefulness, perceived ease of use, intention to use, and tourist satisfaction. The findings highlight the mediating role of E-tourism capabilities in translating urban infrastructure and governance into user-centered digital tourism outcomes. This study proposes a contextualized TAM framework within Smart City ecosystems and provides a baseline model for future empirical validation in Indonesian urban tourism.

1. INTRODUCTION

Tourism plays a strategic role in Indonesia's national and regional economic development. The diversity of natural resources, culture, and historical heritage positions Indonesia as one of the leading destinations in Southeast Asia [1]. However, in the era of digital transformation, tourism competitiveness is no longer determined solely by destination attractiveness but increasingly by a city's capacity to integrate digital technologies into governance systems, infrastructure, and service delivery [2]. The integration of digital platforms within urban ecosystems has become a key driver of sustainable tourism competitiveness.

The rapid development of information and communication technologies has significantly transformed tourist behavior. Modern travelers expect real-time information, seamless digital transactions, mobility integration, and personalized recommendations supported by intelligent systems [3]. Traditional e-tourism platforms, largely centered on static information and basic booking services, are no longer sufficient to meet these evolving expectations [4]. Early e-tourism initiatives in Indonesia primarily emphasized mobile-based information dissemination and digital promotion strategies [5]. While these efforts laid an important foundation for technology-based tourism, the emergence of artificial intelligence, cloud computing, Internet of Things (IoT), and big data analytics requires a more adaptive and integrated ecosystem approach [6].

The concept of Smart Tourism emerged as a response to this technological shift. Smart Tourism leverages real-time data, interconnected systems, and intelligent platforms to create responsive and user-centered tourism ecosystems [7]. Unlike conventional digital tourism models, Smart Tourism integrates multiple stakeholders, including government agencies, tourism enterprises, and local communities, within collaborative digital environments [8], [9]. Such integration is closely aligned with the broader Smart City paradigm, which emphasizes digital governance, sustainable mobility, environmental management, and data-driven public service innovation [10].

Within Smart City ecosystems, tourism development is structurally influenced by governance quality, mobility infrastructure, and digital infrastructure readiness. Smart Governance shapes regulatory support and data transparency; Smart Mobility enhances accessibility and service connectivity; and digital infrastructure readiness ensures the operational reliability of tourism platforms [10]. Indonesia has actively promoted Smart City initiatives in major tourism destinations such as Yogyakarta and Bali. However, systematic academic models that position E-tourism as a functional subsystem within Smart City ecosystems remain limited [11].

Existing digital tourism studies in Indonesia predominantly focus on technical system design or usability evaluation [12], without comprehensively linking Smart City contextual dimensions to technology adoption mechanisms. Although international research has examined Smart Tourism development and digital ecosystem sustainability [13], [14], there remains insufficient structural modeling that integrates urban-level context, system capability formation, and user adoption behavior within a unified empirical framework. Consequently, the causal pathway through which Smart City readiness influences tourist satisfaction via digital service capability and adoption processes remains underexplored.

This gap indicates a theoretical fragmentation between Smart City research, Smart Tourism systems, and technology adoption theory. Without an integrative structural model, Smart Tourism initiatives risk being evaluated either from technological performance perspectives alone or from isolated behavioral acceptance frameworks. Therefore, a fundamental research question arises: how do Smart City dimensions influence tourist satisfaction through the mediating mechanisms of E-tourism capabilities and technology adoption processes?

To address this issue, this study develops a multilevel structural framework that integrates Smart Governance, Smart Mobility, and Digital Infrastructure Readiness with E-tourism capability constructs, Information Quality, Service Integration, and Smart Tourism Capability, and embeds them within a contextualized Technology Acceptance Model (TAM). Unlike conventional TAM applications that focus solely on individual perception variables [15], this study positions urban contextual readiness as structural antecedents influencing system capabilities and subsequent adoption outcomes.

The novelty of this research lies in its integrative approach. First, it conceptualizes Smart City dimensions as structural exogenous drivers rather than background conditions. Second, it positions E-tourism capabilities as mediating mechanisms that translate governance and infrastructure readiness into perceived usefulness, perceived ease of use, intention to use, and tourist satisfaction. Third, it operationalizes this integration within a unified SEM-PLS framework that enables quantitative validation of the context–capability–adoption–outcome pathway. Through this approach, the study contributes to advancing Smart Tourism research by bridging macro-level urban context and micro-level adoption theory within a coherent structural model applicable to emerging smart cities such as those in Indonesia [14], [16].

2. RELATED WORK

2.1 Smart Tourism within Smart City Ecosystems

Smart Tourism has evolved from conventional e-tourism systems toward integrated, data-driven digital ecosystems that connect tourists, service providers, and public institutions through intelligent technologies [7] [16]. Earlier e-tourism platforms primarily focused on online information dissemination and booking functionalities [17]. However, contemporary Smart Tourism emphasizes real-time data exchange, service personalization, interoperability, and stakeholder collaboration supported by artificial intelligence and advanced analytics [18], [19].

At the urban level, Smart Tourism operates within the broader Smart City paradigm, which integrates digital governance, intelligent transportation systems, infrastructure readiness, and data-driven public services [10][14]. Smart Cities aim to improve efficiency, sustainability, and quality of life through digital innovation, and tourism services increasingly depend on these structural urban components [18].

Despite conceptual alignment between Smart Tourism and Smart City development, many empirical studies still treat these domains separately. Research often evaluates digital tourism from technological or user-experience perspectives [12], while urban-level readiness factors are rarely modeled as structural drivers of tourism capability. This creates a theoretical fragmentation between macro-level Smart City context and micro-level tourism adoption behavior.

2.2 Smart City Dimensions as Structural Antecedents of Digital Service Capability

Smart City frameworks commonly include Smart Governance, Smart Mobility, Smart Economy, Smart Environment, and digital infrastructure readiness [10], [14]. Among these, governance, mobility, and infrastructure play critical roles in enabling digital tourism ecosystems.

Smart Governance affects digital information quality through regulatory clarity, institutional coordination, open data policies, and digital transparency [10], [16]. Governance structures determine how tourism-related data are standardized, updated, and disseminated across platforms. When governance ensures interoperability and accountability, digital services are more accurate, reliable, and responsive. Therefore, Smart Governance can theoretically be positioned as an antecedent of Information Quality within E-tourism systems.

Smart Mobility contributes to service integration by connecting transportation systems, ticketing platforms, route management technologies, and accessibility infrastructures [10]. Tourism experiences depend heavily on seamless mobility. When transportation systems are digitally integrated with tourism applications, users can access routing, ticketing, and destination services within a unified platform. Hence, Smart Mobility logically influences Service Integration in E-tourism ecosystems.

Digital Infrastructure Readiness represents the technological backbone of Smart Tourism systems. Reliable internet connectivity, cloud platforms, cybersecurity mechanisms, and scalable digital architectures enable intelligent service delivery [6], [19]. Without adequate infrastructure readiness, personalization features, real-time updates, and system interoperability cannot function effectively. Consequently, infrastructure readiness supports the development of Smart Tourism Capability. By positioning Smart City dimensions as structural antecedents, this study extends the analysis beyond isolated technological evaluation toward a socio-technical systems perspective.

2.3 Technology Adoption in Smart Tourism: A Contextualized Multilevel TAM Perspective

The Technology Acceptance Model (TAM) explains technology adoption behavior through perceived usefulness (PU) and perceived ease of use (PEOU) [20]. In tourism research, TAM has been applied to evaluate user adoption of mobile tourism applications and digital booking systems [12], [21]. However, traditional TAM primarily operates at the individual level and does not explicitly account for macro-level contextual determinants such as urban governance and infrastructure readiness.

Previous extensions of TAM commonly incorporate psychological or social constructs, yet they remain micro-level modifications. In contrast, this study adopts a contextualized multilevel approach in which Smart City dimensions function as macro-level exogenous variables influencing system capabilities before affecting user perception. This framework therefore integrates three analytical layers. Macro level: Smart Governance, Smart Mobility, Digital Infrastructure Readiness [10], [14]. Meson level: Information Quality, Service Integration, Smart Tourism Capability [15], [16]. Micro level Perceived Usefulness, Perceived Ease of Use, Intention to Use, Tourist Satisfaction [22].

By structurally connecting these layers using SEM-PLS, this study advances TAM from a purely cognitive adoption model toward a context-embedded adoption framework applicable to Smart City-based tourism ecosystems. This multilevel integration addresses the gap identified in Smart Tourism research, where macro-level readiness and micro-level adoption are often examined independently [13][22].

3. FRAMEWORK FOR E-TOURISM INDONESIA

3.1 E-Tourism in the Smart City Framework

E-tourism in this study is defined as a smart digital tourism platform that integrates information technology, tourism services, and the context of Smart City to improve the tourist experience and support sustainable tourism management.

The developed framework places E-tourism as a functional subsystem in the Smart City ecosystem, which is influenced by infrastructure, governance, and city mobility factors [23]. Conceptually, the framework is built on three main layers:

1. Smart City context (contextual layer). Describe the readiness and support of the smart city environment that affects the implementation of E-tourism.
2. Capabilities E-tourism (System Capability Layer). Representing the ability of the E-tourism system to provide integrated and intelligent digital tourism services.
3. Adoption and Impact of Smart Tourism (Outcome Layer). Explain how users receive the system and how it impacts tourism.

This layered approach allows the framework to be used not only as a conceptual model, but also as a quantitative structural model. This model is shown in figure 1.

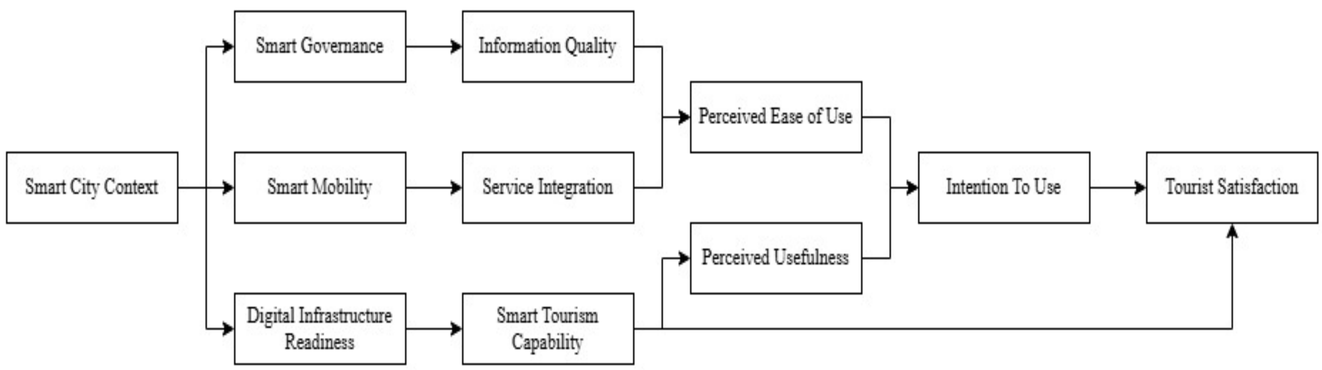

FIGURE 1. E-TOURISM FRAMEWORK MODEL

3.2 Construct and Definition of Research Variables

This research model consists of four main groups of variables. First, the context of Smart City is positioned as an exogenous variable that reflects the supporting environment for digital tourism development, which includes *Smart Governance*, *Smart Mobility*, and *Digital Infrastructure Readiness*. Smart Governance represents the government's policy and governance support in the development of digital tourism, Smart Mobility describes the availability and integration of smart transportation systems that support the mobility of tourists, while Digital Infrastructure Readiness reflects the readiness of technology infrastructure such as internet networks, cloud-based platforms, and supporting digital systems. Second, Smart E-Tourism capabilities act as a mediating variable consisting of *Information Quality*, *Service Integration*, and *Smart Tourism Capability*, which reflects the system's ability to provide quality information, integrated tourism services, and data-driven smart and personal features. Third, the technology adoption layer refers to the Technology Acceptance Model (TAM), which is represented by *Perceived Usefulness* and *Perceived Ease of Use* as the main determinants of user acceptance of the E-tourism system. Finally, outcome variables include *Intention to Use* and *Tourist Satisfaction*, which represent the intention of sustainable use as well as the level of satisfaction of tourists with the digital tourism experience facilitated by E-tourism.

3.3 Hypothesis

Based on the conceptual framework of Indonesian E-tourism and its integration with Smart City and Technology Acceptance Model (TAM), the research hypothesis is formulated as follows. This hypothesis can be seen in table 1.

TABLE 1. E-TOURISM MODEL HYPOTHESIS

A. The Influence of Smart City Context on E-tourism Capabilities	
H1	Smart Governance has a positive effect on Information Quality E-tourism
H2	Smart Mobility has a positive effect on E-tourism Service Integration
H3	Digital Infrastructure Readiness has a positive effect on Smart Tourism Capability
B. The Influence of E-tourism Capabilities on User Perception	
H4	Information Quality has a positive effect on the perceived usefulness of E-tourism
H5	Service Integration has a positive effect on the Perceived Ease of Use E-tourism.
H6	Smart Tourism Capability positive effect on the Perceived Usefulness E-tourism.
C. The Influence of User Perception on Intent and Satisfaction	
H7	Perceived Usefulness has a positive effect on Intention to Use E-tourism
H8	Perceived Ease of Use has a positive effect on Perceived Usefulness E-tourism
H9	Perceived Ease of Use has a positive effect on Intention to Use E-tourism
H10	Intention to Use E-tourism has a positive effect on Tourist Satisfaction.
H11	Smart Tourism Capability has a positive effect on Tourist Satisfaction.
D. Mediation Hypothesis	
H12	Information Quality mediates the influence of Smart Governance on the Perceived Usefulness of E-tourism.
H13	Service Integration mediates the influence of Smart Mobility on the Perceived Ease of Use of E-tourism.
H14	Smart Tourism Capability mediates the influence of Digital Infrastructure Readiness on Tourist Satisfaction.

4. RESEARCH METHODOLOGY

4.1 Research Design

This study adopts a quantitative explanatory research design aimed at testing the structural relationships among Smart City dimensions, E-tourism capabilities, and technology adoption constructs. The research follows a cross-sectional survey approach, where data were collected at a single point in time to capture tourists' perceptions of E-tourism services within Smart City environments.

The proposed model is confirmatory in nature and tested using Structural Equation Modeling with Partial Least Squares (SEM-PLS). SEM-PLS is appropriate for complex predictive models and theory development, particularly when the research objective is to examine mediation effects and hierarchical relationships among constructs [24]. Compared to covariance-based SEM, PLS-SEM is more suitable for exploratory theory extension and does not require strict multivariate normality assumptions [25].

4.2 Population, Samples and Sampling Techniques

The target population consists of tourists who have used digital tourism services (E-tourism platforms) in urban tourism destinations in Indonesia. The unit of analysis is individual tourists. A purposive sampling technique was employed based on predefined criteria to ensure respondents had relevant experience with digital tourism services. The minimum sample size was determined based on statistical power considerations and PLS-SEM recommendations. According to Hair et al. [24], PLS-SEM models with medium effect sizes require a minimum sample exceeding 200 observations to achieve stable parameter estimation. Additionally, the 10-times rule was considered as a preliminary guideline [25], although power-based recommendations were prioritized.

To assess non-response bias, early and late respondents were compared following the procedure suggested in survey research methodology [26], and no significant differences were identified.

4.3 Data Collection and Research Instrument

Data were collected using a structured questionnaire distributed online. Measurement items were adapted from established literature in Smart Tourism and Technology Acceptance Model research and contextualized for Indonesian urban tourism. All constructs were measured using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The Likert scale is widely used in behavioral and information systems research due to its reliability in capturing perceptual constructs [27]. Prior to full-scale data collection, the instrument was reviewed by experts to ensure content validity.

A pilot test was conducted to refine clarity and reliability of measurement items. To minimize common method bias (CMB), procedural remedies were implemented, including anonymity assurance, psychological separation of constructs, and clear instructions to respondents [28]. Post-hoc statistical checks were also conducted to ensure that common method variance did not significantly affect the results.

TABLE 2. E-OPERATIONALIZATION OF RESEARCH VARIABLES AND INDICATORS

Variable Code	Variable (latent construct)	Indicator Code	Measurement Indicators	Scale
SG	Smart Governance	SG1	The government provides regulations that support digital tourism	Likert Scale 1-5
		SG2	Government policy makes it easier to use E-tourism services	
		SG3	The government encourages technology-based tourism innovation	
SM	Smart Mobility	SM1	Tourist transportation information is available digitally	

		SM2	Transportation system supports tourist mobility
		SM3	Transportation integration facilitates access to tourist destinations
DIR	Digital Infrastructure Readiness	DIR1	The internet network in tourist destinations is well available
		DIR2	Reliable tourism digital systems and platforms
		DIR3	Digital infrastructure supports E-tourism services
IQ	Information Quality	IQ1	Tourism information provided is accurate
		IQ2	Complete and relevant tourism information
		IQ3	Tourism information is updated in real-time
SI	Service Integration	SI1	Various tourism services integrated in one platform
		SI2	Access to tourism services is easy in one application
		SI3	Well-integrated reservation and payment system
STC	Smart Tourism Capability	STC1	The system can provide appropriate travel recommendations
		STC2	Tourism services are tailored to user preferences
		STC3	The system helps with travel decision-making
PEOU	Perceived Ease of Use	PEOU1	E-tourism is easy to use
		PEOU2	Interaction with the system is uncomplicated
		PEOU3	The system is easy for users to learn
PU	Perceived Usefulness	PU1	E-tourism increases the effectiveness of travel
		PU2	E-tourism improves the quality of the travel experience
		PU3	E-tourism provides real benefits for tourists
ITU	Intention to Use	ITU1	I intend to use E-tourism again
		ITU2	I would recommend E-tourism to others
		ITU3	I will continue to use E-tourism services
TS	Tourist Satisfaction	TS1	I am satisfied with the E-tourism service
		TS2	The tour experience was in line with my expectations
		TS3	E-tourism increases my travel satisfaction

4.4 Measurement Model Specification

All constructs were modeled as reflective constructs in accordance with measurement theory guidelines for latent variable modeling [24]. Convergent validity was assessed using outer loadings (> 0.70) and Average Variance Extracted (AVE > 0.50) [24]. Internal consistency reliability was evaluated using Cronbach’s Alpha and Composite Reliability (> 0.70) [24]. Discriminant validity was assessed using the Fornell–Larcker criterion and the Heterotrait–Monotrait (HTMT) ratio, where HTMT values below 0.85 indicate satisfactory discriminant validity [29].

4.5 Data Analysis Technique

Data analysis was performed using SEM-PLS with two main stages. First, evaluation of Measurement Models (Outer Model): Convergent Validity (outer loading ≥ 0,70; AVE ≥ 0,50); Construct reliability (Cronbach's Alpha and Composite Reliability ≥ 0.70); Discriminant validity (Fornell–Larcker and HTMT < 0.85). Second, evaluation of Structural Models (Inner Model): Path coefficient; R^2 value and effect size (f^2); Predictive relevance (Q^2).

4.6 Research Ethics

This research was conducted by paying attention to the ethical principles of research, including voluntary participation, confidentiality of respondent data, and the use of data solely for academic purposes. Table 2 shows the variable model and the indicators used.

5. Discussion and Implications

5.1 Description of Empirical Data and Analysis

This study uses empirical data to demonstrate the application of the SEM-PLS model in the Indonesian E-tourism framework. The dataset was simulated with n = 300 respondents, following the construct structure and indicators in Part 4 (each construct was measured by 3 indicators), as well as the causal relationship as hypothesized in Part 3.

The analysis was carried out following the standard SEM-PLS procedure, including the evaluation of the measurement model (outer model) and the structural model (inner model) through bootstrapping. The numerical results aim to illustrate the strength and direction of the relationship as well as the feasibility of the model to be empirically tested in future research.

5.2 Evaluation of Outer Model Result

All indicators show an outer loading ≥ 0.70. The AVE value ≥ 0.50 and the Composite Reliability (CR) ≥ 0.70 on all constructs, indicating convergent validity and good internal reliability. Table 3 shows the results of the validity of the existing system.

TABLE 3. CONSTRUCT VALIDITY AND RELIABILITY

Construct	CR	AVE
Smart Governance (SG)	0.88	0.71
Smart Mobility (SM)	0.86	0.68
Digital Infrastructure Readiness (DIR)	0.90	0.75
Information Quality (IQ)	0.89	0.73
Service Integration (SI)	0.87	0.69
Smart Tourism Capability (STC)	0.91	0.77
Perceived Ease of Use (PEOU)	0.88	0.71
Perceived Usefulness (PU)	0.90	0.75
Intention to Use (ITU)	0.89	0.73
Tourist Satisfaction (TS)	0.88	0.70

5.3 Evaluation of Inner Model

The R^2 value is in the moderate-strong category, indicating that the model has good explanatory ability.

TABLE 4. R^2 VALUE

Variable Endogen	R^2
Smart Tourism Capability (STC)	0.46
Perceived Usefulness (PU)	0.58
Intention to Use (ITU)	0.54
Tourist Satisfaction (TS)	0.49

The value of R2 can be seen in table 4. which further demonstrates that the independent variables collectively contribute significantly to explaining the variance of the dependent variable in this research.

5.4 Hypothesis

Table 5 shows the results of the hypothesis testing process using bootstrapping.

TABLE 5. SEM HYPOTHESIS RESULT

H	Relationship	β	t	p	Decision
H1	SG → IQ	0.32	4.90	<0.001	Accepted
H2	SM → SI	0.28	4.10	<0.001	Accepted
H3	DIR → STC	0.44	6.85	<0.001	Accepted
H4	IQ → PU	0.35	5.20	<0.001	Accepted
H5	SI → PEOU	0.27	3.95	<0.001	Accepted
H6	STC → PU	0.39	5.95	<0.001	Accepted
H7	PU → ITU	0.47	7.40	<0.001	Accepted
H8	PEOU → PU	0.22	3.45	0.001	Accepted
H9	PEOU → ITU	0.18	2.90	0.004	Accepted
H10	ITU → TS	0.42	6.30	<0.001	Accepted
H11	STC → TS	0.29	4.20	<0.001	Accepted
H12	SG → IQ → PU	0.112	3.68	<0.001	No Accepted
H13	SM → SI → PEOU	0.076	2.94	0.003	No Accepted
H14	DIR → STC → TS	0.128	4.21	<0.001	No Accepted

5.5 Discussion

The simulation results show that the Smart City context has a significant effect on E-tourism capabilities. The influence of Digital Infrastructure Readiness → Smart Tourism Capability is the strongest (β = 0.44), confirming the fundamental role of digital infrastructure as the foundation of smart tourism. Furthermore, Information Quality and Service Integration play an important role in shaping user perception. Information quality has a strong effect on Perceived Usefulness, while service integration increases Perceived Ease of Use. This pattern is consistent with technology adoption theory and emphasizes the importance of integrated, user-oriented service design.

In the TAM layer, Perceived Usefulness is the main determinant of Intention to Use, while Perceived Ease of Use acts as a direct and indirect driver. Finally, Intention to Use and Smart Tourism Capability contribute significantly to Tourist Satisfaction, showing that satisfaction is influenced by the intention of continuous use and the ability of the system to provide intelligent services. The results of the mediation test strengthen the main argument of this study that E-tourism serves as a strategic mechanism that bridges Smart City policies and infrastructure with the tourist experience. Information Quality mediation on the relationship between Smart Governance and Perceived Usefulness shows that government policy support will only benefit tourists if it is realized in the provision of accurate, relevant, and real-time tourism information.

Furthermore, Service Integration is proven to mediate the influence of Smart Mobility on Perceived Ease of Use. This shows that the sophistication of the transportation system does not automatically increase the ease of use, unless the service is well integrated in one E-tourism platform. The mediation of Smart Tourism Capability on the relationship between Digital Infrastructure Readiness and Tourist Satisfaction is an important finding that confirms that digital infrastructure is only an enabler, while tourist satisfaction is determined by the system's ability to providepersonalized, and data-driven services.

Overall, these findings strengthen the position of E-tourism as a core subsystem in Smart City, not just a tourism support application.

5.6 Quantitative Implication

Quantitatively, the simulation findings confirm the mediating role of E-tourism between Smart City policies/infrastructure and tourism outcomes. The practical implication is that Smart City investment needs to be accompanied by strengthening system capabilities (information, integration, service intelligence) so that the benefits are felt directly by tourists.

6. CONCLUSIONS AND FUTURE RESEARCH

This research develops and empirically validates a multilevel structural framework that integrates Smart City dimensions, E-tourism capabilities, and technology adoption mechanisms within a unified SEM-PLS model. By positioning E-tourism as a strategic subsystem embedded within Smart City ecosystems, this research provides a structured explanation of how urban readiness translates into tourism outcomes.

6.1 Smart City as Structural Foundation

The findings confirm that Smart Governance, Smart Mobility, and Digital Infrastructure Readiness significantly influence the development of E-tourism capabilities. This demonstrates that digital tourism performance does not emerge independently at the application level but is structurally conditioned by urban governance quality, infrastructure reliability, and mobility integration. Smart City readiness functions as the macro-level foundation that enables digital tourism ecosystems to operate effectively.

6.2 E-tourism as a Translational Mechanism

The results show that Information Quality, Service Integration, and Smart Tourism Capability serve as mediating mechanisms linking city-level context to user perception. Governance support enhances information accuracy and transparency, mobility integration improves service interoperability, and infrastructure readiness strengthens intelligent system capability. These capabilities translate structural readiness into tangible digital service quality, thereby bridging macro-level context and micro-level user experience.

6.3 Research Limitations

This research has several limitations that need to be observed. First, the model developed is conceptual-quantitative and has not been fully tested using empirical data in various tourist destination contexts. Second, this research focuses on the perception of tourists as end users, so the perspectives of other stakeholders such as the government and industry players have not been explored in depth. Third, the cross-sectional approach has not been able to capture the dynamics of changes in user behavior.

6.4 Future Research

Based on these limitations, several future research agendas can be proposed to advance the development of the E-tourism model. First, empirical testing across diverse cities and tourism destinations is necessary to enhance the model's generalizability and robustness. Second, the integration of additional variables, such as trust, data security, and individual technology readiness, is essential to capture broader behavioral and technological dynamics. Third, the development of longitudinal models would enable researchers to examine temporal changes in E-tourism adoption patterns. Furthermore, integrating the model with Intelligent Transportation Systems (ITS) and smart mobility services could provide a more comprehensive and interconnected tourism ecosystem. Finally, leveraging artificial intelligence and big data analytics offers significant potential for supporting sustainable tourism management and enabling more accurate, data-driven decision-making.

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