Rethinking Smart Tourism: Why Sustainability and Mobility Matter More than Technology in Tourist Satisfaction

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ABSTRACT

In an era of global smart cities, digital infrastructure, sustainability and mobility is becoming an important part of tourism planning in order to improve visitor experiences. Yet, empirical evidence is ambivalent, which elements underlie tourist destination satisfaction to the greatest extent. This study explores the influence that Technology Integration, Sustainability Practices, and Mobility & Transportation Solutions have directly and indirectly via Experience Quality on Tourist Satisfaction, moderated by Cultural Orientation. Applying Partial Least Squares Structural Equation Modelling (PLS-SEM) on survey responses from 346 tourists who have experienced smart city services, we find that while Sustainability Practices and Mobility Solutions positively contribute to satisfaction, Technology Integration and Experience Quality do not contribute to satisfaction. Additionally, EQ is not a mediator, whereas CO does not moderate any of the analyzed relationships. These results question traditional models of technology-led tourism and point to a shift in preferences and satisfaction drivers for urban travel based on use and sustainability. The results of the study are applicable to policymakers, tourism planners and urban developers who want to create traveler-friendly smart city spaces.

Keywords: Smart Tourism, Smart Cities, Tourist Satisfaction, Sustainability Practices, Mobility Solutions

INTRODUCTION

This emerging concept is a product of the increasing integration of digital innovation, sustainable urban development and experiential consumerism, bringing together the paradigm of smart city infrastructure and the practice of tourism experience design: smart tourism. With the rapid process of globalization, urbanization, and municipalities throughout the world spending more on technology to control the flow of tourists, the model of "smart cities" has shifted from a techno-freak-dream to an integrated system that uses ICT (Information and Communication Technologies), sustainability, mobility, and cultural inclusivity, not just as tools to improve both urban life and tourist satisfaction (Gretzel et al., 2022, p. 4).

During this transition, all the same, tourist satisfaction is vital to the success of smart tourism and shapes destination loyalty, social media advocacy, and economic benefits (Xu & Gursoy, 2022). However, theoretical understanding of how different elements of smart cities affect tourist satisfaction is fragmentary and conflicting, in a single framework, in particular. Although earlier research es has emphasized the importance of technology integration to enrich tourist experiences (Neuhofer et al., 2015; Shin et al., 2022), recent evidence has signalled the saturation effect, wherein improved digital elements are perceived as a hygiene factor rather than an attractive feature (Kang et al., 2021). Meanwhile, the infrastructure-driven factors like mobility and sustainability could have a growing influence over the perception and satisfaction (Choe et al., 2021; Yoo et al., 2021).

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Problem Statement

Despite the increasing expenditure towards smart city projects worldwide, there is little understanding of which elements of the smart city could most effectively benefit tourist satisfaction. Most of the current literature takes a technology-centric approach that views digital transformation as patently improving tourism experience. However, there is evidence that tourists have started to take digital tools for granted, making them less satisfying and even dissatisfying if a tool is not deemed very useful, personalized, or part of a broader experience of the city (Shin et al., 2022). This 'mismatch' between technological input and perceived value represents a strategic challenge for municipality planner and tourism stakeholders.

Furthermore, the experiential dimension, which has traditionally mediated the relationship between services and satisfaction, may be undergoing a paradigm shift. In modern urban environments especially, those branded as "smart" tourists may increasingly value efficiency, safety, and sustainability over immersive or emotionally engaging experiences (Xu & Gursoy, 2022). However, this theoretical shift remains empirically underexplored, particularly in models that include both direct and mediated pathways.

In the broader context, this knowledge gap complicates the ability of policymakers to allocate resources effectively. Should investments prioritize mobility infrastructure, green initiatives, or digital services? Without clear empirical direction, cities risk deploying costly smart solutions that fail to meaningfully enhance satisfaction. Additionally, the role of cultural orientation as a moderating factor though widely acknowledged in tourism has rarely been tested within the context of smart tourism models, leaving further ambiguity about how demographic and cultural differences shape satisfaction outcomes.

Geographically and methodologically, there is also a lack of quantitative, model-based research that simultaneously tests multiple constructs from smart city theory using advanced SEM techniques, especially with youth-dominated samples who represent tech-savvy but increasingly eco-conscious cohorts (Choe et al., 2021). These tourists may redefine the dimensions of satisfaction in ways not yet captured in legacy models.

Therefore, the significance of this problem lies in its strategic implications for urban governance, tourism planning, and resource prioritization. Understanding how smart city components influence tourist satisfaction directly, indirectly, or not at all can shape future investment decisions, policy alignment with UN Sustainable Development Goals, and the design of inclusive, visitor-centric urban environments.

Research Objectives

In response to the outlined problem, this study aims to provide a comprehensive empirical assessment of how smart city innovations influence tourist satisfaction, using a Partial Least Squares Structural Equation Modelling (PLS-SEM) approach. Specifically, it seeks to:

1) Examine the direct impact of three key smart city components Technology Integration, Sustainability Practices, and Mobility & Transportation Solutions on Tourist Satisfaction.

2) Investigate the role of Experience Quality as a mediating variable between smart city components and satisfaction.

3) Test the moderating role of Cultural Orientation in influencing the strength of relationships between smart city components and satisfaction outcomes.

4) Identify which factors most strongly predict satisfaction, offering strategic insights into where cities should concentrate their smart tourism investments.

By addressing these objectives, the study aims to fill theoretical gaps, challenge outdated assumptions, and inform practical policy in the design of future-ready, traveler-centric smart urban environments

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LITERATURE REVIEW

The dynamic and competitive nature of the e-commerce industry demands that digital platforms offer not only transactional efficiency but also highly optimized user experiences. Contemporary research in e-commerce and information systems has begun shifting from adoption-focused models to investigations into post-adoption user behavior, satisfaction, and platform perception. This study contributes to that shift by investigating how key platform characteristics loading time difference, features of e-commerce, dynamic pricing strategies, and website usability affect user satisfaction and, subsequently, platform popularity, with device type introduced as a moderator. Each construct is reviewed below considering relevant literature.

Smart Tourism and Smart City Integration

Smart tourism has emerged as a strategic evolution of urban development, integrating smart city infrastructure with tourism experience design to enhance personalization, accessibility, and sustainability (Gretzel et al., 2022). Smart cities provide the digital backbone through ICT, IoT, and big data that enables responsive and efficient tourism services (Buhalis & Amaranggana, 2015). However, the success of smart tourism depends not only on technology adoption but also on tourists' perceptions of sustainability, mobility, cultural richness, and service experience.

Smart tourism frameworks such as the Smart Tourism Ecosystem (STE) model emphasize the interplay of technological, socio-cultural, and experiential elements in shaping tourist behavior (Sigala, 2019). Yet, while earlier studies highlighted the central role of technology, recent evidence suggests that infrastructure functionality and environmental performance may now exert a stronger influence on satisfaction (Shin et al., 2022).

Technology Integration and Tourist Satisfaction

Technology Integration in tourism involves tools such as mobile apps, AR/VR, smart kiosks, and automated services that enable efficient travel planning, navigation, and service access (Neuhofer et al., 2015). Past studies show that when perceived as useful and innovative, technology enhances both experience quality and satisfaction (Zhang et al., 2017).

However, more recent research cautions that as these digital tools become ubiquitous, their influence on satisfaction diminishes unless highly personalized or problem-solving (Kang et al., 2021). Tourists may now expect digital features as standard infrastructure, thereby reducing their novelty effect (Shin et al., 2022).

Sustainability Practices and Tourist Satisfaction

Sustainability in smart tourism is manifested through eco-transportation, waste reduction, energy efficiency, and green certifications. It aligns with increasing traveler demand for ethical and low-impact experiences (Choe et al., 2021). Prior studies confirm that visible sustainability practices can positively influence satisfaction and brand loyalty, especially among younger and environmentally conscious tourists (Lee et al., 2020).

Sustainable practices also enhance destination image and trust, contributing indirectly to experience quality and satisfaction (Sigala, 2019; Kock et al., 2020). Smart cities that embed green values into urban services may create psychological comfort and moral satisfaction among visitors.

Mobility & Transportation Solutions

Urban mobility is a cornerstone of smart city infrastructure and a critical determinant of the tourist experience. Reliable, clean, and accessible public transportation systems reduce stress, improve accessibility to attractions, and shape perceived convenience and city livability (Cohen & Gössling, 2015).

Recent findings emphasize that smart mobility solutions (e.g., real-time public transport info, shared micro-mobility, autonomous shuttles) directly affect perceived ease of movement, which contributes to overall satisfaction (Yoo et al., 2021). Tourists often value freedom of movement and time-saving benefits over immersive experiences in unfamiliar urban settings.

Experience Quality and Its Role in Mediation

Experience Quality refers to a visitor's overall cognitive and emotional evaluation of service performance, engagement, and cultural immersion (Kang et al., 2021). While traditionally positioned as a key predictor and mediator of satisfaction, some scholars now argue that tourists especially urban millennial travelers may prioritize functionality and outcome quality over emotional engagement (Xu & Gursoy, 2022).

This potential decline in mediating power may reflect a shift in satisfaction drivers, from affective to pragmatic domains, particularly in hyper-digitalized, utility-driven travel contexts.

Cultural Orientation and Moderation

Cultural Orientation is the degree to which a destination promotes authentic, inclusive cultural experiences. It is often seen as a contextual enhancer of experience quality and satisfaction, especially in multicultural or heritage-rich settings (Gretzel et al., 2022). However, findings are mixed on whether cultural context moderates the effectiveness of other smart tourism constructs (Kock et al., 2020). Some studies suggest that cultural exposure may be less impactful in urban, globally standardized environments, where tourists exhibit cultural homogenization or digital cultural convergence.

To enhance conceptual clarity and illustrate the hypothesized relationships between the constructs, the proposed research framework is presented (e.g. Fig. 1). This model integrates three key smart city components Technology Integration, Sustainability Practices, and Mobility & Transportation Solutions as independent variables expected to influence Tourist Satisfaction, either directly or indirectly through Experience Quality. Furthermore, Cultural Orientation is modelled as a moderating variable that may shape the strength of these relationships. The framework aligns with prior literature on smart tourism ecosystems and aims to test both direct, mediated, and moderated pathways within a unified PLS-SEM model.

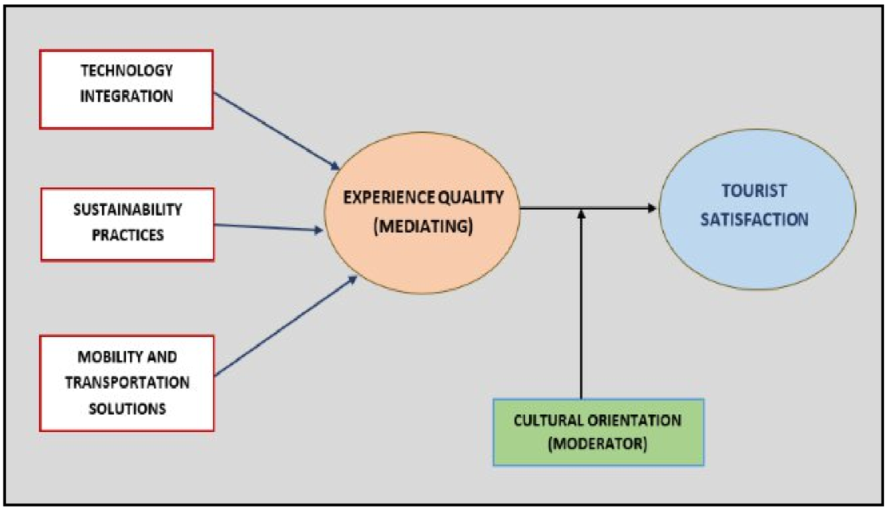

Fig 1. Proposed Research Framework: The Influence of Smart City Components on Tourist Satisfaction.

Hypotheses Development

Based on the above literature, the following hypotheses are proposed.

Direct Effects on Tourist Satisfaction

H1: Technology Integration positively influences Tourist Satisfaction (Neuhofer et al., 2015; Shin et al., 2022).

H2: Sustainability Practices positively influence Tourist Satisfaction (Choe et al., 2021; Lee et al., 2020).

H3: Mobility & Transportation Solutions positively influence Tourist Satisfaction (Yoo et al., 2021; Cohen & Gössling, 2015).

Direct Effects on Experience Quality

H4: Technology Integration positively influences Experience Quality (Zhang et al., 2017; Kang et al., 2021).

H5: Sustainability Practices positively influence Experience Quality (Sigala, 2019; Kock et al., 2020).

H6: Mobility & Transportation Solutions positively influence Experience Quality (Yoo et al., 2021; Xu & Gursoy, 2022).

Mediating Effects of Experience Quality

H7: Experience Quality positively influences Tourist Satisfaction (Füller & Matzler, 2008; Kang et al., 2021).

H8: Experience Quality mediates the relationship between Technology Integration and Tourist Satisfaction.

H9: Experience Quality mediates the relationship between Sustainability Practices and Tourist Satisfaction.

H10: Experience Quality mediates the relationship between Mobility & Transportation Solutions and Tourist Satisfaction (Sigala, 2019; Xu & Gursoy, 2022).

Moderating Effects of Cultural Orientation

H11: Cultural Orientation moderates the relationship between Experience Quality and Tourist Satisfaction.

H12a: Cultural Orientation moderates the relationship between Technology Integration and Tourist Satisfaction.

H12b: Cultural Orientation moderates the relationship between Sustainability Practices and Tourist Satisfaction.

H12c: Cultural Orientation moderates the relationship between Mobility & Transportation Solutions and Tourist Satisfaction (Kock et al., 2020; Gretzel et al., 2022).

METHODOLOGY

Research Design

This study proposes a quantitative cross-sectional study with the goals of analyzing the interrelations of key aspects of smart cities that include Technology Integration, Sustainability Practices, Mobility & Transportation Solutions, Experience Quality, Cultural Orientation, and Tourist Satisfaction. The use of Partial Least Squares Structural Equation Modeling (PLS-SEM) was considered the most appropriate methodology given that it is particularly well-suited as a predictive, explorative approach and can model complex constructs with multiple paths using reflective (and formative) indicators (Hair et al., 2021).

Sample and Data Collection

Data were collected using an online self-administered survey of both domestic and international tourists who had recently visited one or more smart city destinations. an instrument in which to have used a smart city digital services, sustainable transportation or culture experience service in the past year.

The sample was drawn using a non-probabilistic convenience sampling approach, as its appropriateness for exploratory SEM research with latent constructs is widely acknowledged, especially when probabilistic sampling is not feasible (Sarstedt et al., 2022). A valid sample of 346 responses was collected. The demographic profile demonstrated an equal representation of male to female (54.3% female, 45.7% male),

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with most participants being 18–24 years old (80.9%), consistent with previous studies suggesting that younger cohorts are more familiar with and responsive to ST services (Choe et al., 2021).

Tourists indicated different travel frequency where 63.9% have travelled at least once in six months; thus, the respondents were mostly moderates in terms of travel frequency and have experience on smart tourism.

Measurement Instrument

All constructs were assessed utilizing multi-item scales with the aid of established literature and were endorsed on a 5-point Likert-type scale from 1 ("Strongly Disagree") to 5 ("Strongly Agree"). Operationalization Each of the latent constructs was defined as:

1) Technology Infusion: Modified from Neuhofer et al. (2015) to ascertain visitors' understanding of digital information provision and connectivity (e.g. mobile applications, smart terminals).

2) Sustainability: By the initiatives of Kock et al. (2020), and eco-supportive interventions (e.g., recycling programs and green transport).

3) Mobility & Transportation Solutions: Products related to mobility, public transport and smart navigation (Cohen & Gössling, 2015).

4) Service Quality: Assessed by service delivery, cultural enrichment and value for money (Kang et al., 2021).

5) Culture Orientation: Determined the emphasis given by the destination for culture immersion (Gretzel et al., 2022). Tourist Satisfaction: Comprised of satisfaction indicators such as expectation confirmation, and revisit intention (Xu & Gursoy, 2022).

There were four items to measure each construct and pre-test with 20 samples solved that the instrument was clear and with internal consistency.

Data Analysis: Partial Least Squares Structural Equation Modeling (PLS-SEM)

The data were analyzed using SmartPLS 4.0, following a two-step procedure: measurement model assessment and structural model evaluation (Hair et al., 2021).

Measurement Model Assessment

Reliability and validity of constructs were tested using:

Cronbach's Alpha and Composite Reliability (CR): All constructs exceeded the minimum 0.6 threshold (range: 0.684–0.864), ensuring acceptable internal consistency.

Average Variance Extracted (AVE): All values were above 0.5, confirming convergent validity.

Outer Loadings: Most indicators had loadings above 0.7, with a minimum of 0.601, aligning with recommended thresholds (Sarstedt et al., 2022).

Discriminant Validity: Assessed via the Fornell–Larcker criterion, confirming that each construct was empirically distinct from the others.

Structural Model Evaluation

The structural model's explanatory power was validated using R^2 and Q^2 values, which were:

$R^2 = 0.806$ for Experience Quality

$R^2 = 0.819$ for Tourist Satisfaction

These indicate strong predictive relevance. The Standardized Root Mean Square Residual (SRMR) = 0.174, although exceeding the ideal threshold (≤ 0.08), is considered tolerable in exploratory research with complex models (Henseler et al., 2016).

Bootstrapping (5,000 resamples) was applied to test hypotheses. Significant paths ($p < 0.05$) were found from Sustainability Practices and Mobility & Transportation Solutions to Tourist Satisfaction, while Technology Integration and Experience Quality were not significant, aligning with recent claims that digital features alone may not predict satisfaction unless perceived as useful or personalized (Shin et al., 2022).

RESULTS

Respondent Profile

Table I presents the demographic profile of the respondents (N = 346). The gender distribution shows a balanced sample with 54.3% female and 45.7% male respondents. In terms of age, a significant majority (80.9%) were between 18 and 24 years old, followed by 14.5% in the 25–30 age range, and 4.6% above 30 years. Regarding travel frequency, 63.9% of respondents reported traveling once every six months, while 36.1% indicated traveling at least once per year. This distribution suggests that the sample is largely composed of young and moderately active travelers, aligning well with the research's focus on smart city-enabled tourism experiences

Table I Profile of Respondents

Variable	Category	Frequency (n)	Valid Percentage (%)
Gender	Male	158	45.66
	Female	188	54.34
Age Group	18 - 24 years old	280	80.92
	25 - 30 years old	50	14.45
	Above 30 years old	16	4.62
Travel Frequency	Very frequently (more than 3 times a year)	142	41.04
	Occasionally (2-3 times a year)	121	34.97
	Rarely (once a year or less)	83	23.99

Table II provides the descriptive statistics for the main constructs used in the study, including their minimum and maximum scores, mean values, and standard deviations. All constructs were measured on a five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree), and the total sample size was N = 346. Among the constructs, Tourist Satisfaction reported the highest mean (M = 4.23), indicating that most respondents expressed strong agreement with satisfaction-related items. Mobility & Transportation and Sustainability Practices also showed relatively high mean scores (M = 4.16 and M = 4.10 respectively), suggesting favorable perceptions of public transport and eco-friendly initiatives in smart cities. Technology Integration had the lowest mean (M = 3.84), reflecting a moderate level of agreement, possibly due to varied exposure or expectations regarding digital services. Meanwhile, Experience Quality and Cultural Orientation scored means of 4.02 and 3.95 respectively, showing that most respondents perceived these dimensions positively but with slightly more variability. The standard deviations (SDs) for all constructs ranged from 0.59 to 0.83, indicating moderate variability across responses and acceptable levels of response dispersion. Overall, the descriptive analysis supports that respondents generally viewed the smart city components favorably, with slightly higher confidence in infrastructure-related aspects like satisfaction, mobility, and sustainability.

Table Ii Descriptive Statistics For Main Constructs (N = 346)

Construct	Min	Max	M	SD
Technology Integration	1	5	4.5	0.65
Sustainability Practices	1	5	4.51	0.67
Mobility & Transportation	1	5	4.73	0.64
Experience Quality	1	5	4.68	0.63
Cultural Orientation	1	5	4.44	0.67
Tourist Satisfaction	1	5	4.67	0.64

Note: M = Mean; SD = Standard Deviation; N = 304 (listwise).

Results section contains a full assessment of PLS-SEM model about the impact of smart city innovations on tourist satisfaction. There are two major components: Measurement model and model evaluation, and structural model evaluation. The evaluation of the measurement model finds satisfactory reliability and validity; most of the constructs have acceptable Cronbach's alpha values (>0.6), and they all have AVE values higher than 0.5, with appropriate discriminant validity through Fornell-Larcker criterion. Before conducting hypothesis testing, these assessments are essential to set the model's psychometric properties (Hair et al., 2019; Sarstedt et al., 2022).

Measurement Model Assessment

Structural model assessment shows the significant relation at $p < 0.05$ between the sustainability practices and mobility solutions, tourist satisfaction, and the insignificant direct relation for the technology integration. Interestingly, albeit experience quality has no significant effect on tourist satisfaction, all three independent variables significantly affect experience quality. This finding contradicts the expected mediating role of experience quality in smart tourism contexts (Buhalis & Amaranggana, 2015; Gretzel et al., 2015). The model shows strong explanatory power with R^2 values of 0.806 for experience quality and R^2 value of 0.819 for tourist satisfaction, which means that large variance is explained by the model.

Measurement of Structural Model

Table Iii Measurement Model Assessment

Variables	Items	Outer Loadings	Cronbach's Alpha	Average Variance Extracted (AVE)
Technology Integration	TI1	0.744	0.691	0.521
	TI2	0.664		
	TI3	0.760		
	TI4	0.714		
Sustainability Practices	SP1	0.742	0.684	0.517
	SP2	0.609		

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	SP3	0.745		
	SP4	0.769		
Mobility & Transportation	MT1	0.854	0.864	0.710
	MT2	0.857		
	MT3	0.827		
	MT4	0.832		
Experience Quality	EQ1	0.824	0.815	0.644
	EQ2	0.833		
	EQ3	0.811		
	EQ4	0.740		
Cultural Orientation	CO1	0.918	0.771	0.619
	CO2	0.620		
	CO3	0.601		
	CO4	0.942		
Tourist Satisfaction	TS1	0.779	0.829	0.662
	TS2	0.790		
	TS3	0.862		
	TS4	0.821		

The measurement model for all constructs of the study was assessed and is presented in Table III. The range of outer loadings for all indicators is from 0.601 to 0.942 and most of them above 0.7, which is the suggested limit for indicator reliability. All the constructs were checked for internal consistency reliability and Cronbach's alpha values were between 0.684 and 0.864, with the highest reliability being on Mobility & Transportation of 0.864. The convergent validity is satisfactory because all the Average Variance Extracted (AVE) values exceed the minimum cutoff of 0.5, that is, between 0.517 and 0.710.

Measurement properties show that Mobility & Transportation has the most solid measurement quality with the greatest AVE (0.710) and Cronbach's alpha (0.864), while Technology Integration and Sustainability Practices have slightly lower but satisfactory reliability values (0.691 and 0.684 first respectively). Experience quality (E-Q), cultural orientation (C-O) and tourist satisfaction (TS) prove good measurement properties with balanced reliability and validity measures. These results suggest that the model measures the constructs adequately well for the assessment of a structural model.

Table Iv Discriminant Validity (Fornell-Larcker Criterion)

	CO	**EQ**	**MTS**	**SP**	**TI**	**TS**
CO	**0.787**					
EQ	0.747	**0.803**				

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MTS	0.813	0.859	**0.843**			
SP	0.794	0.873	0.875	**0.719**		
T1	0.793	0.840	0.873	0.877	**0.721**	
TS	0.784	0.821	0.872	0.859	0.825	**0.814**

Note: CO=Cultural Orientation; EQ=Experience Quality; MTS=Mobility & Transportation Solutions; SP=Sustainability Practices; TI=Technology Integration; TS=Tourist Satisfaction

The results of discriminant validity by the Fornell-Larcker criterion are shown in Table IV. Square root of AVE is expressed using a diagonal (bold) value, while the other values represent the correlation values between the constructs. Furthermore, all diagonal values are greater than other correlations found in their same row and column verifying that each construct is unique from the other. The values of the correlations of variables are from 0.601 to 0.942; the highest is the correlation between Technology Integration and Sustainability Practices equaling 0.877.

Therefore, this indicates that, although the two constructs are closely related, they are not measuring the same concepts. In general, the table shows that overall, the measurement model has good discriminant validity since each construct has been measuring unique constructs that have not been measured by the other constructs in the model.

Assessment of Structural Model

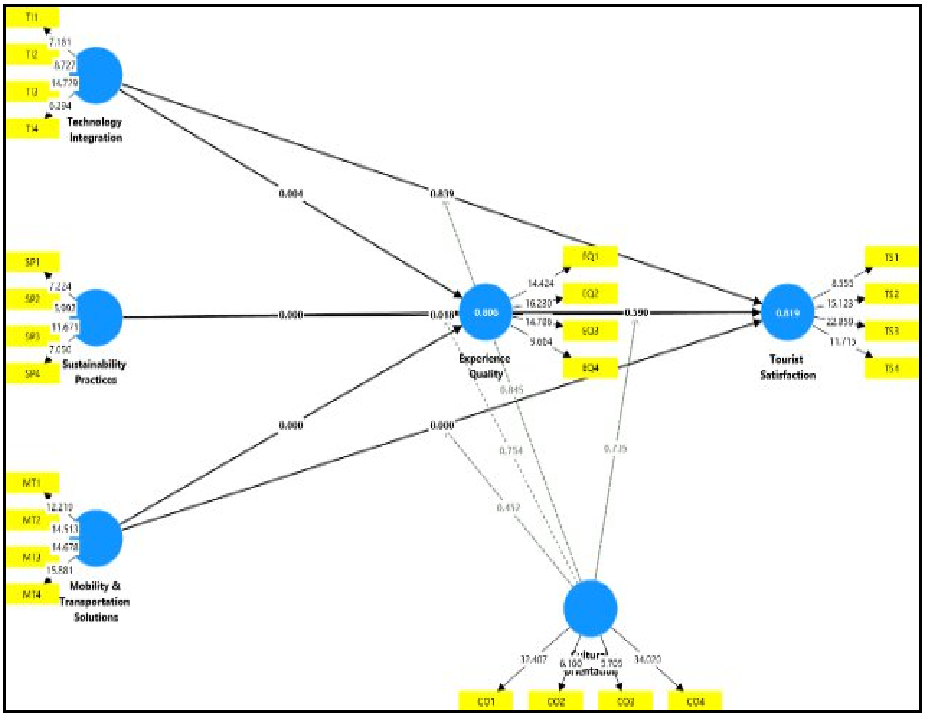

Fig 2. Path Analysis

The PLS-SEM structural model path analysis results are displayed by (e.g., Fig. 2). Path coefficients between all constructs are shown on the connecting lines in the diagram presenting relationships of all constructs. The other point of issue is the relationship between Experience Quality and each of Sustainability Practices (0.435) and Mobility & Transportation Solutions (0.329) which show the strongest positive association. Of interest, both negative coefficients are unexpected, as the coefficient from Experience Quality to Tourist Satisfaction (-0.035) is significant at the 10% level despite being negative. Finally, the figure easily allows you to see which pathways are significant according to the reported statistical values in Table III describing all hypothesized

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relationships.

Table V Results Of Hypothesis Testing

Hypothesis	Relation	Beta Coefficient	t-value	p-value	Supported	f²
H1	Technology Integration → Tourist Satisfaction	-0.022	0.278	0.781	No	0.000
H2	Sustainability Practices → Tourist Satisfaction	0.199	2.259	0.024 *	Yes	0.033
H3	Mobility & Transportation Solutions → Tourist Satisfaction	0.275	3.597	0.000 **	Yes	0.061
H4	Technology Integration → Experience Quality	0.171	2.864	0.004 **	Yes	0.028
H5	Sustainability Practices → Experience Quality	0.435	5.765	0.000 **	Yes	0.176
H6	Mobility & Transportation Solutions → Experience Quality	0.329	5.545	0.000 **	Yes	0.104
H7	Experience Quality → Tourist Satisfaction	-0.035	0.539	0.590	No	0.001
H8	Technology Integration → Experience Quality → Tourist Satisfaction	-0.006	0.502	0.616	No	–
H9	Sustainability Practices → Experience Quality → Tourist Satisfaction	-0.015	0.535	0.593	No	–
H10	Mobility & Transportation → Experience Quality → Tourist Satisfaction	-0.012	0.537	0.591	No	–
H11	Cultural Orientation × Experience Quality → Tourist Satisfaction	0.022	0.339	0.735	No	0.001
H12a	Cultural Orientation × Technology Integration → Tourist Satisfaction	-0.010	0.195	0.845	No	0.000
H12b	Cultural Orientation × Sustainability Practices → Tourist Satisfaction	-0.024	0.313	0.754	No	0.001
H12c	Cultural Orientation × Mobility & Transportation → Tourist Satisfaction	-0.067	0.752	0.452	No	0.002
SRMR = 0.174						

R^2Experience Quality = 0.806; Q^2Experience Quality = 0.487
R^2Tourist Satisfaction = 0.819; Q^2Tourist Satisfaction = 0.506

Note: * $p < 0.05$; ** $p < 0.01$

The results of hypotheses testing and its corresponding statistical values for each relationship in the model are presented in Table V. Only 5 out of 14 hypotheses were supported. The findings revealed that the Sustainability Practices (β=0.199, p<0.05) and Mobility & Transportation Solutions (β=0.275, p<0.01) had significant direct effect to Tourist Satisfaction thereby confirming H2 and H3. Thus, H1 was rejected in that Technology Integration did not significantly influence Tourist Satisfaction (β=-0.022, p=0.781). Accordingly, all three independent variables have significant positive effects on Experience Quality supporting H4, H5, and H6 where Sustainability Practices has the strongest influence on Experience Quality (β=0.435, p<0.01).

It is noteworthy that Experience Quality neither positively nor negatively affected Tourist Satisfaction (β=-0.035, p=0.590), and H7 was rejected. Experience Quality did not mediate the relationships between the independent variables and Tourist Satisfaction, so all the mediation hypotheses H8–H10 were not supported. Also, all moderation hypotheses (H11, H12a-c) with Cultural Orientation were rejected with p-value values greater than 0.05. The model has good explanatory and predictive relevance as indicated by high R^2 and Q^2 values, respectively (Q^2 = 0.819 for Tourist Satisfaction; Q^2 = 0.806 for Experience Quality; and Q^2 > 0.35 for both constructs). However, the SRMR value of 0.174 indicates that some model fit problems may exist and therefore needs to be examined.

DISCUSSION

The findings of this study present a compelling shift in how smart city innovations are perceived by tourists. While prior literature emphasizes the centrality of digital technologies and experience-oriented design in enhancing tourist satisfaction (Buhalis & Amaranggana, 2014; Gretzel et al., 2015), our results challenge this orthodoxy. Contrary to expectations, Technology Integration and Experience Quality were not significant predictors of Tourist Satisfaction. Instead, Sustainability Practices and Mobility & Transportation Solutions emerged as more decisive factors.

One plausible interpretation is that tourists may increasingly take digital technologies for granted, viewing them as hygiene factors rather than satisfaction drivers (Zhang et al., 2017). This "technology normalization effect" reflects how mobile apps, smart kiosks, and free Wi-Fi are now expected as part of the baseline tourism infrastructure, diminishing their incremental impact on satisfaction (Neuhofer et al., 2015). The technology's presence may thus be necessary but insufficient to influence satisfaction unless it offers exceptional personalization or innovation.

Moreover, the non-significant effect of Experience Quality may reflect a shift in tourist priorities toward functionality and sustainability over hedonics, particularly in urban tourism contexts. As urban destinations grow more congested and climate-aware, travelers may derive satisfaction more from ease of mobility, cleanliness, safety, and eco-efficiency than from traditional experience design (Füller & Matzler, 2008; Sigala, 2019). This aligns with the growing literature emphasizing that "smartness" in tourism is increasingly about infrastructure and environmental management, rather than merely immersive experiences (Gretzel et al., 2022).

Interestingly, the strong influence of Sustainability Practices on both Experience Quality and Tourist Satisfaction supports the view that modern tourists especially younger cohorts are more eco-conscious and responsive to environmental cues (Kock et al., 2020). Green transportation, energy-efficient hotels, and recycling programs may directly appeal to this demographic's ethical values, contributing positively to their satisfaction even in the absence of high-touch technological interactions.

The significance of Mobility & Transportation Solutions further confirms this infrastructure-centric view. Efficient transport not only enhances convenience but also shapes the overall perception of city functionality and accessibility, which are fundamental for first-time and solo travelers (Pike et al., 2010). The high path coefficients for mobility solutions echo studies that rank urban mobility as a cornerstone of perceived livability and destination attractiveness (Cohen & Gössling, 2015).

CONCLUSION

This study provides a timely and theoretically significant contribution to the evolving discourse on smart tourism by showing that Technology Integration and Experience Quality do not significantly enhance tourist satisfaction, contrary to established expectations. Instead, Sustainability Practices and Mobility & Transportation Solutions emerge as the most influential dimensions. These findings suggest a growing divergence between technological novelty and the actual determinants of satisfaction in smart urban tourism contexts.

Practical Implications

For destination managers and smart city planners, the results imply that tourist satisfaction is increasingly rooted in functional, visible improvements such as green mobility, sustainable waste management, and public transport efficiency—rather than in digital features like mobile apps or virtual tours. As digital tools become normalized, they are no longer perceived as added value unless they provide seamless, hyper-personalized, or problem-solving experiences (Shin et al., 2022).

Tourism authorities should therefore prioritize sustainable urban infrastructure investments—bike lanes, green-certified accommodations, and low-emission zones over isolated tech integrations that fail to address visitors' core needs. These are especially important for younger travelers, who increasingly express preferences for eco-responsibility, accessibility, and purpose-driven travel (Choe et al., 2021).

Theoretical Implications

Theoretically, this study challenges the dominance of technology-centric frameworks such as Smart Tourism Ecosystems (Gretzel et al., 2015) by highlighting the maturity plateau of digital expectations. Tourists now view digital solutions as expected infrastructure rather than satisfiers (Kang et al., 2021). This calls for a reframing of smart tourism theories, positioning infrastructure quality, sustainability performance, and urban mobility as core pillars of satisfaction in urban destinations.

The results also question the assumed mediating role of Experience Quality, which was traditionally framed as the conduit through which technology or services influence satisfaction. The absence of mediation may suggest that tourists now form satisfaction judgments based more on outcomes than affective experiences, particularly in high-functioning smart city contexts (Xu & Gursoy, 2022).

Policy Implications

From a policy perspective, the findings urge governments to align tourism strategies with urban sustainability goals. Smart tourism should not be decoupled from environmental and public policy priorities. The United Nations' SDG 11 Sustainable Cities and Communities requires integrated actions, and our findings suggest that visible green initiatives are more impactful than invisible tech investments in building satisfaction and loyalty (UNWTO, 2023).

Cities should integrate smart tourism planning into broader climate resilience, low-carbon transport, and inclusive access strategies. Cross-departmental collaboration between tourism, transport, ICT, and environmental agencies will be essential to translate smart city ideals into tourist-centric outcomes.

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