

Examining Smart Tourism Technology Effects on Usefulness, Service Experience, and Business Performance

检验智慧旅游技术对感知有用性、服务体验与企业绩效的影响

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Abstract. Hotel employees play a crucial role in enhancing service experience and business performance through the adoption of smart tourism technology (STT). This study examines the relationships between STT attributes namely informativeness, accessibility, interactivity, personalization, and functionality and perceived usefulness, service experience evaluation, and business performance from the perspective of hotel employees. Using data collected from 274 hotel employees in Hong Kong, this study employs an empirical approach to analyze both direct and mediating effects within the proposed framework. The results reveal that personalization and functionality significantly enhance perceived usefulness, which in turn positively influences service experience evaluation and business performance. Moreover, perceived usefulness serves as a key mediating mechanism, particularly in linking personalization and functionality with service experience evaluation. These findings extend the Technology Acceptance Model (TAM) by incorporating STT attributes in the hospitality context. Practically, the study provides insights for hotel managers in leveraging smart tourism technologies to improve service quality and organizational performance.

Keywords: Smart tourism technology (STT); perceived usefulness; service experience evaluation; business performance; hotel employees

摘要：酒店员工在通过采用智慧旅游技术（STT）提升服务体验与企业绩效方面发挥着关键作用。本研究从酒店员工视角出发，探讨STT属性 即信息性、可达性、互动性、个性化和功能性 与感知有用性、服务体验评价及企业绩效之间的关系。基于来自香港274名酒店员工的数据，本文采用实证方法，对所提出框架中的直接效应与中介效应进行分析。研究结果表明，个性化与功能性显著提升感知有用性，而感知有用性进一步对服务体验评价和企业绩效产生正向影响。此外，感知有用性作为关键中介机制，在个性化与功能性影响服务体验评价的过程中发挥重要作用。本研究通过在酒店情境中引入智慧旅游技术属性，对技术接受模型（TAM）进行了拓展。在实践层面，本研究为酒店管理者提供了有价值的启示，即应有效利用智慧旅游技术以提升服务质量与组织绩效。

关键词：智慧旅游技术（STT）；感知有用性；服务体验评价；企业绩效；酒店员工

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1. Introduction

The concept of smart tourism technology (STT) has gained increasing attention among hospitality stakeholders, particularly in response to evolving tourist behaviors and the need for business recovery and competitiveness. Hotels are increasingly investing in advanced technologies to enhance customer service, improve satisfaction, and support employee productivity. Common STT applications include free Wi-Fi, self-check-in/out kiosks, mobile applications, e-concierge systems, motion sensor thermostats, charging stations, and chatbots (Ahmad & Scott, 2019; Bilgihan et al., 2016; Kaushik et al., 2015; Shin & Jeong, 2020). The effective implementation of these technologies is expected to optimize service delivery, create value, and improve both guest satisfaction and organizational performance (Howard & Rose, 2019; Li et al., 2021; Shin et al., 2019; Zhang et al., 2022). Conversely, hotels that lag behind technological developments risk customer dissatisfaction and declining loyalty (Bilgihan et al., 2016), highlighting the strategic importance of adopting appropriate STT attributes (Beldona et al., 2018).

From the perspective of hotel employees, STT plays a critical role in facilitating access to information, enhancing service efficiency, and improving interaction quality with guests. Previous studies suggest that advanced technologies can enhance employees' confidence and knowledge, reduce service errors, increase flexibility, and allow more time for customer engagement (Shin et al., 2019). Moreover, effective utilization of information technology contributes to competitive advantage and improved organizational performance (Lee et al., 2010). In this context, employees' perceived usefulness of STT becomes a crucial determinant of service experience evaluation and business performance outcomes.

Despite the growing body of literature on STT, several research gaps remain. First, prior studies have primarily focused on specific technology applications rather than examining STT attributes comprehensively, limiting theoretical development (Jeong & Shin, 2020; Pai et al., 2020; Wang et al., 2016). Second, most studies adopt a demand-side perspective by focusing on tourists, while limited attention has been given to frontline employees who directly implement and interact with these technologies (Jung et al., 2014). Third, the role of perceived usefulness as a mediating mechanism between STT attributes and service outcomes remains underexplored. Additionally, the increasing use of technology-based services with reduced human interaction poses challenges in evaluating service experience outcomes (Sandström et al., 2008).

To address these gaps, this study integrates the Technology Acceptance Model (TAM) with STT attributes by incorporating functionality as an additional dimension and examining its influence on perceived usefulness, service experience evaluation, and business performance from the perspective of hotel employees. Specifically, this study aims to (1) explore current STT applications in hotel organizations, (2) examine the effects of STT attributes on perceived usefulness, service experience evaluation, and business performance, and (3) analyze the mediating role of perceived usefulness. By doing so, this study contributes to the theoretical development of STT and TAM, while also providing practical insights for hotel managers in optimizing technology adoption to enhance service quality and organizational performance.

2. Materials and Methods

Smart tourism technology (STT) has been widely discussed in the tourism and hospitality literature as an important driver of service innovation and business performance. Huang et al. (2017, p. 758) defined STT as "all forms of online tourism applications and information sources such as online travel agents, personal blogs, public websites, company websites, social media, smartphone apps, and so on." Meanwhile, Neuhofer et al. (2015) described STT as a set of technologies that enhance tourists' experiences and generate additional value. In hotel contexts, STT encompasses various applications such as the Internet of Things (IoT), cloud computing, artificial intelligence (AI), social media platforms, self-service kiosks, mobile commerce systems, robot concierge services, and other digital interfaces (Ahmad & Scott, 2019; Bilgihan et al., 2016; Kaushik et al., 2015; Shin & Jeong, 2020; Zhang et al., 2022). These technologies support data processing, operational efficiency, and decision-making processes while enabling real-time interaction and

information exchange between hotels and guests (Ghosh et al., 2015; Ivars-Baidal et al., 2019; Li et al., 2021; Liberato et al., 2018).

Previous studies have identified several key attributes of STT that influence user experience. No and Kim (2015) highlighted accessibility, security, information trust, interactivity, and personalization as essential dimensions. Huang et al. (2017) further categorized STT attributes into informativeness, accessibility, interactivity, and personalization, which have been shown to significantly affect tourists' satisfaction and experience (Zhang et al., 2022). Building on this framework, the present study extends the conceptualization of STT by incorporating functionality as an additional attribute, resulting in five key dimensions: informativeness, accessibility, interactivity, personalization, and function. Informativeness refers to the quality and reliability of information, including its accuracy, relevance, and completeness, which support decision-making and enhance travel experiences (Ho & Lee, 2007; Ng et al., 2023; Orden Mejia & Huertas, 2022). Accessibility reflects the ease of obtaining information and interacting with technology, which improves perceived usefulness and satisfaction (Azis et al., 2020; Zhang et al., 2022), although some studies report mixed findings from the employee perspective (Lam et al., 2007). Interactivity represents the level of real-time communication and responsiveness, which enhances engagement and user experience (Berthon et al., 1996; Ischen et al., 2020; Liu & Hung, 2020; Zhang et al., 2022). Personalization allows services to be tailored to individual customer needs, improving satisfaction and service relevance (Jeong & Shin, 2020; Piccoli et al., 2017), although limitations in flexibility may reduce its effectiveness in certain contexts (Liu & Hung, 2020). Functionality, as an additional attribute, refers to the ability of technology to deliver optimal performance and support operational effectiveness, influencing employees' perceptions and job performance (Lee et al., 2018; Diaz et al., 2023).

Perceived usefulness, defined as the degree to which an individual believes that using a technology enhances job performance (Davis, 1989), is a central construct in the Technology Acceptance Model (TAM). It has been widely applied to explain technology adoption behavior in tourism and hospitality contexts (Kim & Hall, 2019). Prior studies have shown that STT attributes positively influence perceived usefulness by improving efficiency, accessibility, and service quality (Huang et al., 2017; Wu & Cheng, 2018). However, most existing research focuses on customers, while limited attention has been given to hotel employees who directly implement these technologies in service delivery. In addition, the role of functionality as an STT attribute in shaping perceived usefulness remains underexplored. Based on this reasoning, it is proposed that STT attributes namely informativeness, accessibility, interactivity, personalization, and function—positively influence hotel employees' perceived usefulness.

Service experience evaluation refers to individuals' cognitive and emotional assessment of service encounters (Sandström et al., 2008; Vargo & Lusch, 2004). It encompasses both functional aspects, such as service delivery and environment, and emotional responses, such as satisfaction and perceived value. Previous studies indicate that perceived usefulness plays a crucial role in shaping service experience evaluation, as users derive greater value from efficient and effective service processes (Horst et al., 2007; Li et al., 2021). Employees also contribute significantly to service experience outcomes through their interaction with customers and technology. Therefore, it is proposed that perceived usefulness positively influences service experience evaluation.

Business performance in the hospitality sector can be evaluated through financial and non-financial indicators, including productivity, service quality, customer satisfaction, and profitability (Sainaghi & Baloglu, 2010; Kitsios & Grigoroudis, 2020). The adoption of technology has been shown to improve organizational performance by enhancing efficiency, reducing operational costs, and improving service delivery (Ahmad & Scott, 2019; DiPietro et al., 2010). Moreover, perceived usefulness has been linked to improved customer satisfaction and loyalty, which ultimately contribute to better business performance (Bhattacharjee, 2001; Wu & Cheng, 2018). In addition, service experience evaluation has been identified as a key determinant of business outcomes, as positive service experiences lead to increased customer retention and competitive advantage. Based on this, it is proposed that perceived usefulness positively influences business performance, and service experience evaluation also positively affects business performance.

Furthermore, perceived usefulness is expected to act as a mediating variable in the relationship between STT attributes and service outcomes. STT attributes enhance perceived usefulness, which subsequently influences service experience evaluation and business performance. Although prior studies have examined similar relationships from a customer perspective, limited research has explored the mediating role of perceived usefulness from the viewpoint of hotel employees. Given that employees directly utilize STT in service delivery, their perceptions are critical in determining service effectiveness and organizational outcomes. Therefore, it is proposed that perceived usefulness mediates the relationship between STT attributes (informativeness, accessibility, interactivity, personalization, and function) and service experience evaluation.

This study adopts a cross-sectional research design to examine the relationships among smart tourism technology (STT) attributes, perceived usefulness, service experience evaluation, and business performance within a specific period of investigation. The target population consists of hotel employees in Hong Kong, a destination that actively promotes itself as a smart tourism hub aimed at enhancing tourist experiences through advanced digital technologies (Innovation, Technology and Industry Bureau, 2022). In this context, employees' competencies in technology utilization and information and communication technology (ICT) applications are essential for delivering high-quality services and improving organizational performance and competitiveness. A convenience sampling technique was employed to recruit respondents, focusing on hotel industry practitioners affiliated with a higher education institution offering undergraduate programs in hospitality and tourism management. Graduates and alumni currently working in the hotel sector were invited to participate in the study.

The survey instrument was developed to measure the constructs aligned with the research objectives. It consisted of four sections. The first section identified the current applications of STT within hotel organizations. The second section included twenty measurement items capturing STT attributes, adapted from prior studies (Huang et al., 2017; Jeong & Shin, 2020; Lee et al., 2018). The third section measured perceived usefulness using three items (Kim, 2016), business performance using eleven items (Sainaghi & Baloglu, 2010), and service experience evaluation using three items (Li et al., 2021). Respondents were asked to indicate their level of agreement with each statement using a five-point Likert scale ranging from 1 ("strongly disagree") to 5 ("strongly agree"). The final section collected demographic information, including age, gender, job position, and organizational characteristics, using close-ended questions. The questionnaire was initially developed in English and subsequently translated into Chinese using the back-translation method to ensure semantic equivalence (Craig & Douglas, 2005). Prior to the main data collection, the instrument was validated and pilot-tested with 50 respondents, following the recommendation of Cooper and Schindler (2014), and the reliability results indicated acceptable levels for all constructs.

Data collection was conducted using an online questionnaire distributed via Google Forms. Invitation emails containing the survey link were sent to industry partners and academic networks, as well as to alumni working in hotel organizations. The data collection process took place between July and September 2022. To improve response rates, a small incentive in the form of an e-gift certificate was provided to participants who completed the survey. A total of 274 valid responses were obtained for analysis. Several statistical techniques were employed to test the research hypotheses. First, descriptive analysis using SPSS 26 was conducted to perform data screening, including the detection of outliers and multicollinearity issues (Groebner et al., 2005). Second, confirmatory factor analysis (CFA) was used to evaluate the measurement model in terms of reliability and validity. Finally, structural equation modeling (SEM) based on partial least squares (PLS) was applied to examine both the direct and mediating effects of perceived usefulness on the relationships between STT attributes, service experience evaluation, and business performance, as SEM-PLS is considered more appropriate for complex models involving mediation analysis.

3. Result

Table 1 presents the demographic characteristics of respondents and the profiles of hotel organizations. Of the 274 respondents, 32.85% ($n = 90$) were male, while 67.15% ($n = 184$) were female, indicating a higher

representation of female employees in the sample. In terms of age distribution, the majority of respondents were between 30–39 years old (31.75%, $n = 87$), followed by those aged 18–23 years (27.38%, $n = 75$) and 24–29 years (18.61%, $n = 51$). Smaller proportions were observed in the 40–49 age group (18.25%, $n = 50$) and above 50 years (4.01%, $n = 11$).

Table 1. Characteristics of Respondents and Hotels

Item	Category	n	%
Gender	Male	90	32.85
	Female	184	67.15
Age	18–23	75	27.38
	24–29	51	18.61
	30–39	87	31.75
	40–49	50	18.25
	50–59	11	4.01
Education	High school or below	39	14.23
	Associate degree/Higher diploma	75	27.38
	Bachelor degree	135	49.27
	Master/Doctoral degree	25	9.12
Current Position	Junior staff	165	60.89
	Supervisor/Assistant Manager	65	23.99
	Manager	34	12.55
	Director/Executive	5	1.85
	Resident Manager/General Manager	2	0.74
Department	Rooms/Concierge/Housekeeping	131	48.52
	Food and Beverage	55	20.37
	Sales and Marketing	57	21.11
	Human Resources	27	10.00
Hotel Affiliation	Chain	139	51.10
	Independent	133	48.90
Number of Guestrooms	1–100	50	18.25
	101–300	84	30.65
	301–600	80	29.20
	More than 600	60	21.90

Regarding educational background, most respondents held a bachelor's degree (49.27%, $n = 135$), followed by associate degree or higher diploma holders (27.38%, $n = 75$), high school graduates (14.23%, $n = 39$), and those with a master's or doctoral degree (9.12%, $n = 25$). In terms of job positions, the majority were junior staff (60.89%, $n = 165$), followed by supervisors or assistant managers (23.99%, $n = 65$), managers (12.55%, $n = 34$), and directors or executives (1.85%, $n = 5$), indicating that frontline employees dominated the sample.

From a departmental perspective, respondents were mainly from rooms/concierge/housekeeping (48.52%, $n = 131$), followed by sales and marketing (21.11%, $n = 57$), food and beverage (20.37%, $n = 55$), and human resources (10.00%, $n = 27$).

With respect to organizational characteristics, slightly more than half of the respondents worked in chain hotels (51.10%, $n = 139$), while the remaining were employed in independent hotels (48.90%, $n = 133$). In terms of hotel size, most establishments had between 101–300 guestrooms (30.65%, $n = 84$), followed by 301–600 guestrooms (29.20%, $n = 80$), more than 600 guestrooms (21.90%, $n = 60$), and 1–100 guestrooms (18.25%, $n = 50$).

Overall, the sample reflects a diverse representation of hotel employees across different demographic backgrounds, job positions, and organizational characteristics, providing a reliable basis for subsequent empirical analysis.

Table 2. Smart Tourism Technology Applications

Item	n	%
Mobile App	165	14.73
Public free Wi-Fi	207	18.48
Payment through smartphone	169	15.09
Motion sensor thermostat	102	9.11
E-concierge	80	7.14
Video guides	65	5.80
E-Taxi/E-Uber	61	5.45
Charging station	61	5.45
Smart room	54	4.82
Interactive freestanding kiosks	47	4.20
Translating words	39	3.48
Chatbots	36	3.21
Robotic services	19	1.70
Interactive voice response systems	15	1.34
Total	1120	100

Table 2 presents the current applications of smart tourism technology (STT) in hotel organizations. Among the 14 identified STT applications, the most widely adopted technology was public free Wi-Fi ($n = 207$, 18.48%), followed by smartphone-based payment systems ($n = 169$, 15.09%), mobile applications ($n = 165$, 14.73%), and motion sensor thermostats ($n = 102$, 9.11%). These findings indicate that fundamental digital infrastructure and customer-oriented convenience technologies remain the dominant forms of STT implementation in hotel operations.

Several applications, including e-concierge services, video guides, e-taxi systems, and charging stations, were observed at a moderate level of adoption, reflecting a transitional phase toward more advanced digital service integration.

In contrast, the least frequently implemented technologies were chatbots ($n = 36$, 3.21%), robotic services ($n = 19$, 1.70%), and interactive voice response systems ($n = 15$, 1.34%). The relatively low adoption of these advanced and automation-based technologies suggests that hotels may still face challenges related to cost, technological readiness, or user acceptance in implementing fully automated service solutions.

Overall, the distribution of STT applications highlights that hotels tend to prioritize widely accessible and cost-effective technologies, while more sophisticated and AI-driven innovations remain less prevalent within current operational practices.

Table 3. Confirmatory Factor Analysis of Key Constructs

Construct	Item	Factor Loading	Cronbach's Alpha	AVE	CR
Informativeness (I)	I1	0.828	0.885	0.887	0.921
	I2	0.903			
	I3	0.884			
	I4	0.832			
Accessibility (A)	A1	0.835	0.854	0.855	0.901

Construct	Item	Factor Loading	Cronbach's Alpha	AVE	CR
Interactivity (N)	A2	0.833	0.878	0.880	0.916
	A3	0.845			
	A4	0.834			
	N1	0.860			
	N2	0.844			
	N3	0.847			
Personalization (P)	N4	0.807	0.880	0.883	0.917
	P1	0.830			
	P2	0.854			
	P3	0.839			
Function (F)	P4	0.873	0.870	0.877	0.915
	F1	0.868			
	F2	0.849			
	F3	0.848			
Perceived Usefulness (PU)	F4	0.850	0.824	0.825	0.895
	PU1	0.873			
	PU2	0.864			
Service Experience Evaluation (SE)	PU3	0.841	0.864	0.860	0.917
	SE1	0.857			
	SE2	0.887			
Business Performance (BP)	SE3	0.915	0.927	0.940	0.939
	BP1	0.748			
	BP2	0.847			
	BP3	0.786			
	BP4	0.764			
	BP5	0.779			
	BP6	0.741			
	BP7	0.836			
	BP8	0.792			
	BP9	0.838			

Note: AVE = Average Variance Extracted; CR = Composite Reliability

Following the guidelines of Joseph F. Hair Jr. et al. (2017), the reliability and validity of all reflective constructs were evaluated, as presented in Table 3. During the assessment, two indicators of business performance—reducing cost and net income—were removed due to low factor loadings (below 0.40), ensuring the robustness of the measurement model. After refinement, all remaining indicators demonstrated satisfactory factor loadings exceeding the recommended threshold of 0.70, indicating strong indicator reliability.

Internal consistency reliability was confirmed as Cronbach's Alpha values ranged from 0.824 to 0.927, while composite reliability (CR) values ranged from 0.895 to 0.939, both exceeding the recommended minimum threshold of 0.70 (Hair et al., 2017). Furthermore, convergent validity was established, as the average variance extracted (AVE) values ranged from 0.825 to 0.940, surpassing the acceptable threshold of 0.50, consistent with the criteria proposed by Claes Fornell and David F. Larcker (1981). These results indicate that the constructs adequately capture the variance of their respective indicators.

Table 4. Fornell and Larcker Criterion

Construct	I	A	N	P	F	PU	BP	SE
I	0.887							
A	0.750	0.901						
N	0.758	0.840	0.880					
P	0.744	0.740	0.869	0.883				
F	0.735	0.636	0.854	0.843	0.877			
PU	0.681	0.793	0.761	0.760	0.804	0.825		
BP	0.276	0.253	0.256	0.302	0.264	0.354	0.940	
SE	0.683	0.690	0.798	0.761	0.795	0.817	0.371	0.860

To assess discriminant validity, the Fornell–Larcker criterion was applied. As shown in Table 4, the square root of AVE for each construct (diagonal values) exceeded the inter-construct correlations, confirming that each construct is empirically distinct from the others. For example, the square root of AVE for service experience evaluation (0.887) was higher than its correlations with other constructs, which ranged from 0.371 (with business performance) to 0.798 (with interactivity). This finding confirms that the discriminant validity requirement is satisfied.

Overall, the measurement model demonstrates adequate reliability, convergent validity, and discriminant validity. Therefore, the structural model can be further evaluated to examine its explanatory power and to test the proposed hypotheses.

Table 5. Structural Equation Model Results

Path Analysis	Coefficient (t-value)	Hypothesis
Informativeness → PU	0.073 (0.936)	H1a: Not supported
Accessibility → PU	0.114 (1.829)	H1b: Not supported
Interactivity → PU	0.053 (0.527)	H1c: Not supported
Personalization → PU	0.207 (2.155)**	H1d: Supported
Function → PU	0.444 (6.046)**	H1e: Supported
PU → SE	0.815 (4.331)**	H2: Supported
PU → BP	0.153 (1.406)	H3: Not supported
SE → BP	0.246 (1.970)*	H4: Supported
Informativeness → PU → SE	0.060 (0.923)	H5a: Not supported
Accessibility → PU → SE	0.093 (1.285)	H5b: Not supported
Interactivity → PU → SE	0.045 (0.531)	H5c: Not supported
Personalization → PU → SE	0.169 (2.156)*	H5d: Supported
Function → PU → SE	0.363 (4.922)**	H5e: Supported
Model Fit Value		
R ² (PU)	0.686	
R ² (SE)	0.668	
R ² (BP)	0.145	
SRMR	0.068	

Note: *p < 0.05, **p < 0.01

The structural model was evaluated using SEM-PLS, with the results presented in Table 5. The significance of the path coefficients was assessed the bootstrapping procedure with 5,000 subsamples. The standardized root mean square residual (SRMR) value was 0.068, which is below the recommended

threshold of 0.08, indicating a good model fit and confirming the adequacy of the proposed structural model (Henseler et al., 2016).

The results show that personalization ($\beta = 0.207$, $t = 2.155$, $p < 0.05$) and function ($\beta = 0.444$, $t = 5.014$, $p < 0.01$) have significant positive effects on perceived usefulness. These findings support hypotheses H1d and H1e, suggesting that tailored features and functional performance of STT play a critical role in enhancing employees' perceptions of usefulness. In contrast, informativeness ($\beta = 0.073$, $t = 0.936$, $p > 0.05$), accessibility ($\beta = 0.114$, $t = 1.289$, $p > 0.05$), and interactivity ($\beta = 0.055$, $t = 0.527$, $p > 0.05$) do not significantly influence perceived usefulness, leading to the rejection of H1a, H1b, and H1c.

Furthermore, perceived usefulness has a strong and significant positive effect on service experience evaluation ($\beta = 0.817$, $t = 34.638$, $p < 0.01$), thereby supporting H2. This indicates that employees who perceive STT as useful are more likely to deliver enhanced service experiences. In addition, service experience evaluation significantly influences business performance ($\beta = 0.246$, $t = 1.970$, $p < 0.05$), supporting H4 and highlighting the importance of service quality as a driver of organizational outcomes. However, the direct effect of perceived usefulness on business performance is not significant ($\beta = 0.153$, $t = 1.406$, $p > 0.05$), resulting in the rejection of H3. This suggests that perceived usefulness contributes to performance indirectly rather than directly. Regarding the mediation analysis, perceived usefulness significantly mediates the relationships between personalization and service experience evaluation ($\beta = 0.169$, $t = 2.190$, $p < 0.05$), as well as between function and service experience evaluation ($\beta = 0.363$, $t = 4.925$, $p < 0.01$). Therefore, hypotheses H5d and H5e are supported. However, no mediating effects are found for informativeness, accessibility, and interactivity, leading to the rejection of H5a–H5c.

In terms of explanatory power, the R^2 values indicate that informativeness, accessibility, interactivity, personalization, and function jointly explain 68.6% of the variance in perceived usefulness. Furthermore, perceived usefulness explains 66.8% of the variance in service experience evaluation, while service experience evaluation accounts for 14.5% of the variance in business performance. These results suggest that the model demonstrates strong explanatory power for perceived usefulness and service experience evaluation, but relatively moderate explanatory power for business performance (Henseler & Sarstedt, 2013). Overall, the structural model provides robust empirical support for the key relationships, particularly highlighting the central role of personalization and functional attributes of STT, as well as the mediating mechanism of perceived usefulness in enhancing service experience outcomes.

4. Discussion

The effectiveness of smart tourism technology (STT), as perceived by employees, represents a critical determinant of organizational success in the hospitality industry. Drawing on the Technology Acceptance Model (TAM), this study examines the relationships among STT attributes, perceived usefulness, service experience evaluation, and business performance from the perspective of hotel employees, while also investigating the mediating role of perceived usefulness. The findings provide several important theoretical and practical insights.

First, the results reveal that commonly implemented STT applications in Hong Kong hotels include public free Wi-Fi, smartphone-based payment systems, mobile applications, and motion sensor thermostats. This pattern reflects the dominance of foundational digital infrastructure and customer-oriented convenience technologies, consistent with prior findings (Kim et al., 2014). As a smart city, Hong Kong benefits from integrated digital networks, enabling seamless connectivity across tourism destinations and hospitality services. Free Wi-Fi has become a basic expectation rather than a competitive advantage, while mobile payment systems such as WeChat Pay, Alipay, and credit card integrations enhance transaction efficiency and service convenience. However, advanced technologies such as robotic services and interactive voice response systems remain underutilized. This suggests that despite ongoing digital transformation, hotel

services continue to rely heavily on human interaction, as hospitality remains fundamentally human-centered. The limited adoption of automation-based technologies may also reflect concerns related to user readiness, perceived complexity, and guest preferences (Nam et al., 2021).

Second, among the STT attributes, function and personalization emerge as the key determinants of perceived usefulness. These findings align with previous studies (Huang et al., 2017; Lee et al., 2018; Wu & Cheng, 2018), emphasizing that employees value technologies that enhance task efficiency and enable customized service delivery. Personalization allows employees to better address guests' individual needs, improve communication, and enrich customer experiences. Meanwhile, the functional capability of STT facilitates faster access to information and supports operational efficiency, enabling employees to deliver services more effectively. The introduction of "function" as an additional STT attribute represents a notable theoretical contribution, highlighting the importance of technological performance and usability in shaping employee perceptions.

In contrast, informativeness, accessibility, and interactivity do not significantly influence perceived usefulness, which diverges from some prior studies but is consistent with others (Jeong & Shin, 2020). One possible explanation is that these attributes have become standardized or taken for granted within the hotel context. For instance, high-speed internet and information availability are already well-established, reducing their perceived incremental value. Additionally, some guests may lack confidence in independently using technology, continuing to rely on employees for assistance. This reinforces the notion that technology adoption in hospitality is not solely dependent on system features but also on user readiness and service context. Furthermore, the limited strategic integration of advanced STT applications may reduce employees' awareness of the potential benefits of interactivity and digital engagement.

Third, the study confirms that perceived usefulness significantly enhances service experience evaluation, indicating that employees who perceive STT as beneficial are more capable of delivering superior service experiences. This finding is consistent with prior research (Li et al., 2021) and reinforces the central role of perceived usefulness within the TAM framework. However, perceived usefulness does not directly influence business performance, suggesting that its impact is indirect and mediated through service experience evaluation. This highlights the importance of service quality as an intermediate mechanism linking technology adoption to organizational outcomes. In other words, the benefits of STT are realized through improved service delivery rather than direct performance gains.

Moreover, service experience evaluation is found to significantly influence business performance, supporting the argument that customer experience remains a key driver of organizational success in the hospitality sector (Jeong & Shin, 2020). From the employees' perspective, improved service experience contributes to both financial outcomes (e.g., sales growth and market share) and non-financial outcomes (e.g., customer satisfaction, loyalty, and employee productivity), as well as operational performance (e.g., occupancy rates). This finding underscores the strategic importance of aligning technology implementation with service quality enhancement.

The mediation analysis further demonstrates that perceived usefulness mediates the relationships between personalization and service experience evaluation, as well as between function and service experience evaluation. This finding extends the existing literature by highlighting the indirect pathways through which STT attributes influence service outcomes. It confirms that employees' perceptions of technology usefulness serve as a critical mechanism that transforms technological capabilities into improved service experiences.

From a theoretical perspective, this study contributes to the development of TAM by incorporating the "function" attribute and by shifting the analytical focus from customers to employees. While prior studies have primarily examined STT from the demand-side perspective, this study emphasizes the supply-side perspective, recognizing employees as key actors in technology adoption and service delivery. The findings demonstrate that employees and customers may perceive the value of STT differently, highlighting the need for a more integrated understanding of technology adoption in hospitality contexts.

From a managerial perspective, the findings suggest that hotel managers should prioritize STT investments that enhance functionality and personalization rather than merely expanding technological

features. Emphasis should be placed on technologies that directly support employees' tasks, improve efficiency, and enable customized service delivery. In addition, training programs should be implemented to enhance employees' digital competencies and increase their awareness of the benefits of advanced STT applications. Hotels should also develop more strategic approaches to technology adoption, ensuring that digital tools are effectively integrated into service processes rather than used as standalone features.

Overall, this study highlights that the success of smart tourism technologies depends not only on their availability but also on how they are perceived and utilized by employees. By emphasizing the role of perceived usefulness and service experience evaluation, the findings provide a comprehensive understanding of how STT contributes to business performance in the hospitality industry.

5. Conclusions and Implications

This study demonstrates that smart tourism technology (STT) plays a significant role in enhancing hotel performance through indirect mechanisms driven by employees' perceptions. Empirical findings reveal that personalization and function are the most influential STT attributes in shaping perceived usefulness, while informativeness, accessibility, and interactivity show no significant effects. Furthermore, perceived usefulness strongly enhances service experience evaluation, which in turn positively impacts business performance. However, perceived usefulness does not directly influence business performance, indicating that service experience acts as a key mediating pathway. These results confirm the relevance of the Technology Acceptance Model (TAM) in hospitality contexts while extending it by emphasizing employees' perspectives and introducing function as a critical technological attribute.

From a practical standpoint, the findings suggest that hotel managers should prioritize STT investments that enhance functional performance and personalization capabilities, as these attributes directly support employees' efficiency and service delivery. Organizations should also strengthen employee training in digital competencies to maximize the benefits of technology adoption. In addition, rather than focusing solely on adopting advanced technologies, hotels should ensure that STT is strategically integrated into service processes to improve customer experience. Policymakers and industry stakeholders are encouraged to support the development of user-friendly and service-oriented technologies that align with operational needs. Overall, improving employees' perceived usefulness of STT is essential for translating technological investments into enhanced service experiences and sustainable business performance.

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