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Technological Perception and Revisit Intentions: Value Co-Creation's Moderating Role in Smart Tourism

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Abstract

Objectives: This study investigates how technology applications in smart tourism environments effectively lead to enhanced tourist revisit intention, addressing a key theoretical and practical gap in understanding tourist decision-making mechanisms in digital tourism contexts. *Methods/Analysis:* Utilizing the Technology Acceptance Model (TAM) and value co-creation theory, a comprehensive research framework was developed to analyze the influence of perceived usefulness (PU) and perceived ease of use (PEOU) on revisit intention (RI), alongside the moderating effects of value co-creation experience (VCE). Data were collected through questionnaires and 486 valid responses were analyzed using SmartPLS 3.0. *Findings:* Results indicate that both PU and PEOU positively influence RI, while VCE significantly enhances the positive impact of PU on RI and strengthens the relationship between PEOU and RI. *Novelty/Improvement:* Overcoming the limitations of traditional TAM models that view tourists as passive technology recipients, this research demonstrates the moderating impact of tourists' active participation in the link between technological perception and behavioral intentions. The study extends the integrated application of TAM and value co-creation theory, deepens understanding of tourist behavior in digital environments, and provides practical guidance for optimizing technology applications and tourist participation mechanisms in smart tourism destinations.

Keywords: Smart Tourism; TAM; Value Co-Creation Experience (VCE); Revisit Intentions; Tourists.

1. Introduction

With the rapid development of information and communication technologies, smart tourism has emerged as a fundamental catalyst for the global tourism industry [1]. The deep integration of technology and tourism is reshaping the tourist experiences through applications such as mobile guides [2], augmented reality experiences [3], and personalized recommendations [4]. Globally, major tourist destinations are launching digital strategies [5], utilizing Internet of Things [6], cloud computing [7], big data [8], and other technologies to enhance service efficiency and visitor experiences [9]. In China, the execution of the "Internet+" tourist policy and the coordinated advancement of digital culture and tourism have attained national strategic significance, with innovative practices such as scenic area digitalization [10], virtual displays [11], and intelligent services flourishing [12]. However, despite these investments,

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a critical challenge remains: ensuring technologies create genuine value and promote revisit intentions, an issue unresolved for academics and practitioners [13, 14].

This challenge underscores the need to investigate how tourists' perceptions of smart tourism technologies influence their revisit intentions. While the Technology Acceptance Model (TAM) has provided valuable insights into technology adoption behaviors [15], existing tourism research has predominantly focused on tourists' intentions to use specific technological tools rather than their destination revisit decisions [16, 17]. Previous studies have established that perceived usefulness (PU) and perceived ease of use (PEOU) significantly influence technology usage intentions in tourism contexts [18, 19]. However, the direct relationship between these technological perceptions and tourists' willingness to revisit smart tourism destinations remains underexplored. This gap is particularly problematic because revisit intention represents a critical indicator of destination sustainability and competitiveness [20, 21], yet traditional behavioral models such as the Theory of Planned Behavior (TPB) [22] and Expectation-Confirmation Theory(ECT) [23] fail to adequately capture the unique dynamics of technology-facilitated tourism experiences.

Building on this foundation, this study introduces value co-creation experience (VCE) as a crucial moderating variable that may alter the relationship between technological perceptions and revisit intentions. Drawing from Service-Dominant Logic and value co-creation theory [24], VCE represents tourists' active participation in creating their tourism experiences through behaviors such as information sharing, feedback provision, and personalized customization [25]. The theoretical rationale for this moderation effect lies in the transformative nature of co-creation activities: when tourists actively engage in value creation, they develop deeper connections with the destination and its technological offerings, potentially amplifying the impact of their technology perceptions on behavioral intentions [26, 27]. The innovation of this research lies in recognizing that tourists in smart tourism destinations are not merely passive technology users but active co-creators whose engagement levels may fundamentally alter how technological perceptions translate into revisit intentions, extending beyond prior integrations of TAM and co-creation that often remain at a conceptual level [28].

Despite growing interest in both technology acceptance and value co-creation in tourism, existing literature has largely treated these streams of research as separate domains. While some studies have examined technology's role in facilitating tourist experiences [18, 29], and others have explored value co-creation's impact on tourist satisfaction and loyalty [30, 31], the integration of these perspectives remains notably absent. Recent systematic reviews have highlighted this fragmentation, calling for more holistic approaches that integrate TAM with value co-creation theory, thereby considering tourists as both technology users and experience co-creators [28, 32]. Furthermore, prior studies such as Torabi et al. [33] which employ the TPB to associate smart tourism technologies with memorable experiences and satisfaction as intermediaries for revisit intentions, and Zhang & Hwang [19] which merges TAM, UTAUT, and AIDA to predict usage intentions in virtual tourism with a focus on intimacy, link technology features to behavioral outcomes through mediating factors like satisfaction or perceived value. However, these works do not incorporate value co-creation as a moderating mechanism or fully integrate TAM with co-creation theory in smart tourism destinations—gaps that this study addresses via empirical testing of a moderated model. Moreover, the moderating role of value co-creation in technology acceptance processes remains underexplored, creating a key theoretical void in how tourist participation might amplify or weaken technological perceptions' effects on revisit intentions.

To address these research gaps, this study develops and empirically tests an integrated theoretical framework that combines TAM with value co-creation theory in the context of smart tourism destinations. Employing a quantitative research approach, we collected data from 486 tourists who had visited smart tourism destinations in China's Yangtze River Delta region—one of the most technologically advanced tourism markets globally. The research utilizes structural equation modeling to examine both the direct effects of PU and PEOU on revisit intentions and the moderating role of VCE. This methodological approach allows us to capture the complex interplay between technological perceptions and tourist engagement, providing nuanced insights into how smart tourism technologies influence destination loyalty through participatory mechanisms.

This research makes three significant contributions to the tourism literature. First, it extends TAM theory by demonstrating its applicability to destination revisit intentions rather than merely technology adoption intentions, thereby broadening the theoretical scope of technology acceptance research in tourism. Second, it pioneers the integration of value co-creation as a boundary condition in the technology-behavior relationship, revealing how tourist engagement levels can strengthen or weaken the impact of technological perceptions. Third, it provides empirical evidence from an emerging smart tourism market, offering insights into how destinations can leverage both technological innovations and participatory mechanisms to enhance tourist loyalty. These contributions are particularly timely as destinations worldwide struggle with optimizing their technological investments while fostering meaningful tourist engagement.

The remainder of this paper proceeds as follows. Section 2 provides a literature review on the theoretical foundations of TAM, value co-creation in tourism, along with hypothesis development. Section 3 describes the methodology, including study context, data collection, and analytical methods. Section 4 presents the empirical results, with measurement validation and hypothesis testing. Section 5 offers a discussion of the findings. Finally, Section 6 provides the conclusion, summarizing key findings, discussing theoretical and practical implications, noting limitations, and suggesting directions for future research.

2. Theoretical Background

2.1. TAM in Travel Contexts

With the rapid development of the smart tourism ecosystem, research on the TAM has evolved from predicting adoption of single technologies to a more complex and integrated research paradigm [34]. Current studies are no longer limited to examining the impact of PU and PEOU on the adoption of a single technology but instead focus on how technology acceptance interacts with tourism experiences [35, 36], value creation [37], and tourists' decision-making. Meanwhile, researchers are increasingly interested in the acceptance mechanisms of emerging technologies such as the metaverse [36, 38] and artificial intelligence (AI) in tourism contexts [39]. This reflects the accelerating digital transformation of tourism experiences. Notably, academia has begun to emphasize experiential value in the technology acceptance process, investigating how technology reshapes the entire tourism experience [40]. This integrated perspective makes TAM applications in tourism research more aligned with industry practices.

Despite the considerable advancements in TAM in the field of tourism studies, some constraints still persist. First, the majority of studies concentrate on tourists' willingness to accept technology itself [41, 42], with relatively little exploration of how technology acceptance influences destination-level decisions, particularly revisit intention [16]. Although some recent studies have begun exploring the connection between intelligent technologies and visitor loyalty [33, 43], they lack in-depth exploration of the underlying mechanisms. Second, current research overlooks the proactive involvement of tourists in the co-creation of technological experience benefits [44]. While the value co-creation perspective is gaining traction in tourism research, efforts to systematically integrate it with TAM are still in their early stages [26]. This theoretical gap restricts a thorough understanding of the processes influencing tourist behavior in the digital age and offers significant opportunities for future research advancement.

2.2. Value Co-Creation Experience (VCE)

The theory of value co-creation challenges the traditional value transmission model in which enterprises create and customers consume, and it emphasizes that tourists are active participants in value creation [25, 45]. In the tourism context, value co-creation is manifested in tourists engaging in service design and experience shaping through activities such as information sharing [46], feedback provision [47], and personalized customization [48, 49]. As digital technologies continue to evolve, tourist value co-creation activities are progressively facilitated by online platforms like mobile apps and social networks [50], offering a novel viewpoint for examining co-creation behaviors in intelligent tourism settings [51, 52]. Previous investigations have demonstrated how tourists' engagement with VCE efforts can markedly boost their satisfaction with the journey and loyalty to the destination [53], establishing a basis for examining how value co-creation might influence the technology acceptance process as a contextual modifier [54].

Although VCE has been demonstrated to exert a significantly influence on tourist contentment and allegiance, its moderating mechanism in the technology acceptance process has yet to be systematically explored [28]. Cui and Meng [55] confirmed that customers' proactive involvement serves as a moderator within the hospitality sector, whereas Ahmad et al. [56] discovered that collaborative value creation strengthens the favorable influence of digital consumer interactions on engagement levels. However, research on the interaction between VCE and TAM constructs remains at the conceptual stage [28]. A noticeable deficiency remains in current literature concerning the influence of tourists' active involvement on the link between perceived technological features and behavioral intentions, as well as how to effectively integrate the value co-creation perspective with the technology acceptance model [57]. This research void not only hinders a thorough insight into tourist behavior within digital tourism settings, but also obstructs the seamless convergence of technology acceptance and value co-creation theories, underscoring the necessity of developing an innovative framework that combines these two theories.

2.3. Integrated Theoretical Approach

The theoretical approach of this study integrates the Technology Acceptance Model (TAM) with value co-creation theory to provide a comprehensive framework for understanding tourist behavior in smart tourism destinations. Building on Davis's classic TAM [15], which emphasizes perceived ease of use (PEOU) and perceived usefulness (PU) as predictors of behavioral intentions, we extend the model by applying it to revisit intentions (RI) rather than merely technology adoption. This extension addresses limitations in traditional TAM applications, such as its sequential path (PEOU → PU → BI), by examining potential direct effects in tourism contexts where experiential factors play a key role [58]. Furthermore, we incorporate value co-creation experience (VCE) as a moderating variable, drawing from Service-Dominant Logic [24, 59], to capture tourists' active roles in value generation. This integrated approach fills gaps in prior research [28, 32] by quantitatively testing how VCE amplifies the relationships between technological perceptions and RI, offering a dynamic, interactive model that bridges technology acceptance and participatory behaviors in smart tourism. Unlike prior works such as Torabi et al. [33] and Zhang & Hwang [19], which emphasize mediation in TPB or hybrid models without exploring moderation, our framework empirically tests VCE's amplifying role in physical smart destinations, advancing beyond conceptual or virtual-focused studies.

2.4. Hypothesis

2.4.1. Perceived Ease of Use (PEOU) and Perceived Usefulness (PU)

The TAM, as a classical theoretical framework for explaining technology adoption, proposes that PEOU is a key antecedent of PU [15]. The model posits that once individuals view a technological platform as user-friendly, they tend to acknowledge its functional benefits and usefulness. This linkage has been substantiated across multiple sectors, such as e-commerce [60], mobile payments [61], and digital education [62]. Within the realm of tourism, travelers' perception regarding the user-friendliness of intelligent travel applications shapes their acknowledgment of the technology's worth. Although investigations into the influence of PEOU on PU within smart travel are relatively limited, some academics have verified a notable association between the two in other tourism-related fields. For example, Fotiadis & Stylos [63] proposed that in the context of online purchasing of theme park services, visitors' PEOU significantly influences their PU. Yersüren & Özel [14] contended that within virtual reality (VR) travel experiences, the caliber of VR interactions shapes users' perceptions and intentions, where PEOU significantly influences PU. Alma Çallı et al. [64] stated that in the hotel industry, consumers' PEOU of different types of robotic services enhances their PU, thereby influencing their acceptance of robot-operated hotels. Drawing from the preceding analysis, the ensuing hypothesis is formulated:

H1: PEOU exerts a markedly positive influence on PU.

2.4.2. PU and Revisit intention (RI), PEOU and RI

In today's digital era, RI has become a key indicator for measuring the quality of tourist destinations and services [65]. Broadened investigations into the TAM suggest that PU and PEOU not only affect users' attitudes but also directly or indirectly influence their behavioral intentions [66]. Applying this theoretical framework within smart tourism studies facilitates a deeper insight into tourists' decision-making mechanisms. Although limited literature directly examines the impact of PU and PEOU on RI in the tourism context, existing studies have confirmed their significant effects on tourists' willingness to visit. For example, Albayrak et al. [18] proposed that in the context of travelers booking via mobile applications, mobile application quality influences PEOU and PU, thereby strengthening their willingness to adopt. Zhang & Hwang [19] found that in the context of mobile travel booking, the quality of mobile applications enhances users' PEOU and PU, thereby increasing their intention to use. Hasni et al. [58] demonstrated that within Pakistan's tourism sector, the PU and PEOU of social media platforms notably affect users' behavioral intentions. Building upon this theoretical basis, the ensuing hypotheses are formulated:

H2: PU exerts a significant positive effect on RI.

H3: PEOU exerts a significant positive effect on RI.

2.4.3. Value Co-Creation Experience (VCE) as Moderator

Despite the swift advancement of smart tourism, a notable gap persists within the current body of literature concerning the function of VCE as a moderating factor [26]. Although the TAM offers a conceptual basis for understanding tourists' adoption and utilization of smart tourism platforms, the moderating mechanism of VCE in the influence paths of PU and PEOU has not been fully explored [28]. Previous research has predominantly concentrated on the immediate outcomes of value co-creation [67], with limited attention given to its moderating role. The Service-Dominant Logic (SDL) framework offers a conceptual basis for examining the moderating role of value co-creation. According to Vargo and Lusch [59], value is not solely created by service providers but is instead generated through the joint participation and interaction between providers and users. In the development of smart tourism, as tourists proactively participate in collaborative activities like content creation, opinion sharing, and the depth of their interaction with the platform increases significantly [68]. Building upon these previous theoretical insights, this research presents the following hypotheses:

H4: VCE positively moderates the impact of PU on RI.

H5: VCE positively moderates the impact of PEOU on RI.

3. Study Design

3.1. Research Design and Data Sources

As a representative region of smart tourism development in China, the Yangtze River Delta stands out for its leading position in the implementation of intelligent tourism innovations and digital services, providing a rich empirical foundation for this research. A small-scale test was conducted in July 2023, and appropriate adjustments were made to the questionnaire content based on the test results. The original questionnaire underwent a rigorous back-translation process performed by experts, ensuring the cross-cultural applicability of the survey questionnaire.

The study employed a non-random sampling technique, with data gathering carried out from September to November 2023. Online survey questionnaires were distributed primarily through widely used social media and communication platforms in China, such as WeChat and QQ. Altogether, 553 questionnaires were initially gathered. Following data screening, which involved eliminating incomplete submissions and entries from individuals who had not visited smart tourism destinations in the Yangtze River Delta, 486 usable samples were preserved, yielding a valid return rate of 88%.

To enhance the clarity of the methodological process, Figure 1 provides a flowchart summarizing the key workflow steps of this study. This visual representation outlines the progression from literature review and hypothesis development, through questionnaire design and data collection, to analysis and interpretation, ensuring a comprehensive overview of the research methodology.

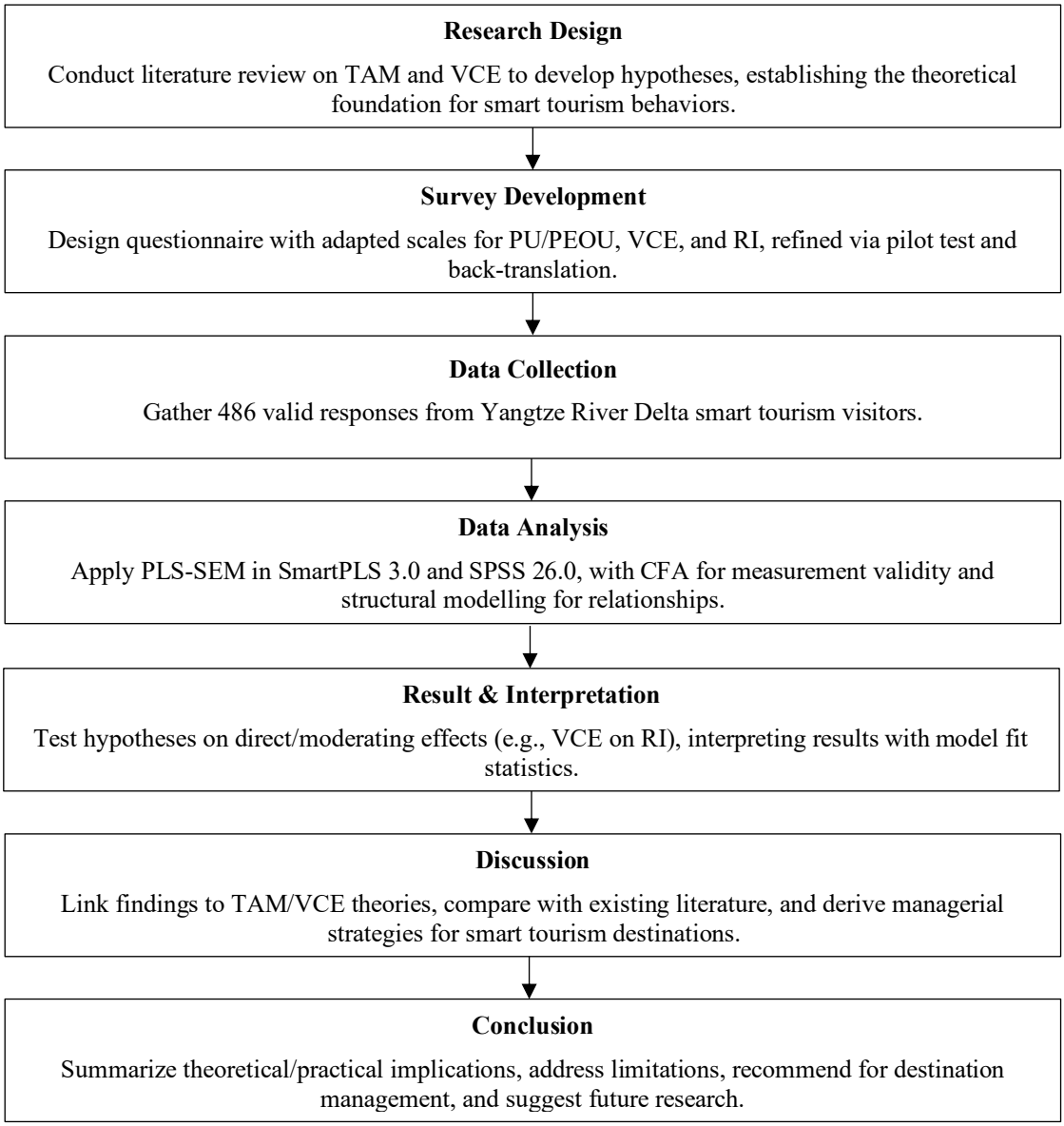

Figure 1. Flowchart of the Research Methodology

3.2. Questionnaire Formulation

The survey instrument consists mainly of two sections: measurement items for the research variables and demographic information of the respondents. The research variables include PU, PEOU, revisit intention (RI), and value co-creation experience (VCE). All measurement indicators were derived from validated instruments in previous studies. PU and PEOU were measured using a five-item scale from Davis [15]. VCE was assessed based on a four-question scale adapted from Lam et al. [69]. RI was evaluated with a three-item scale from Torabi et al. [33]. Each statement was evaluated using a 7-point Likert scale, with 1 representing “strongly disagree” and 7 indicating “strongly agree”. The second part gathered participants’ basic profile information, covering aspects such as age, sex, academic background, and occupation.

3.3. Data Evaluation Methods

This research adopted a quantitative methodology, with data processing carried out using SmartPLS 3.0 and SPSS 26.0 software, following the two-step method proposed by Anderson & Gerbing [70]. First, CFA was used to assess the validity and reliability of the measurement model. Second, the structural model was tested to verify the hypothesized relationships. SmartPLS 3.0 was used for Partial Least Squares (PLS) path modeling, which is especially appropriate for research involving limited sample sizes or intricate models, whereas SPSS 26.0 supported descriptive statistical evaluation.

4. Findings

4.1. Demographic Characteristics

Regarding respondents' demographic attributes, the gender distribution shows that males accounted for 49.4%, slightly lower than females (50.6%). In terms of age composition, the majority were between 26–35 years old (32.7%), followed by those aged 36–45 years (23.3%), 18–25 years (23.5%), and 46–55 years (13.6%). Respondents aged over 55 and under 18 accounted for only 7% and 6.6% respectively, which aligns with the main target demographics of smart tourism destinations in China. With respect to educational background, most participants possessed a university degree (46.9%), followed by individuals with a high school level or lower (42.4%), and those holding a postgraduate degree (10.7%). Occupations were diverse, with private business owners making up the largest proportion (24.7%), followed by freelancers (21.6%), students (18.9%), company employees (15.6%), government or public institution staff (12.1%), and retirees (7%).

4.2. Evaluation of the Measurement Structure

Following the guidelines of Hair et al. [71], this research performed a CFA to verify the internal consistency and convergent validity of the latent variables. The model was assessed using standardized factor loadings, Cronbach's Alpha, composite reliability (CR), and average variance extracted (AVE). The results in Table 1 indicate that each loading surpassed the suggested 0.70 benchmark, ranging from 0.783 to 0.875, indicating strong indicator reliability. The internal consistency of each construct was assessed through Cronbach's Alpha and CR. All constructs reported Cronbach's Alpha values above 0.80, demonstrating high internal consistency. Additionally, the CR values of all constructs exceeded the recommended 0.70 standard, further supporting construct reliability. Regarding convergent validity, each construct's AVE value surpassed the suggested benchmark of 0.50. For discriminant validity, the Fornell-Larcker criterion [72] was applied. As presented in Table 2, the square root of AVE for each dimension exceeded its correlations with other variables, demonstrating satisfactory discriminant validity.

Table 1. Reliability and convergent validity measures

	Item	Factor loading	Cronbach's Alpha	CR	AVE
PEOU	PEOU1	0.824	0.873	0.908	0.664
	PEOU2	0.806			
	PEOU3	0.783			
	PEOU4	0.833			
	PEOU5	0.826			
PU	PU1	0.875	0.880	0.913	0.676
	PU2	0.801			
	PU3	0.809			
	PU4	0.812			
	PU5	0.812			
VCE	VCE1	0.845	0.867	0.909	0.714
	VCE2	0.860			
	VCE3	0.844			
	VCE4	0.831			
RI	RI1	0.845	0.805	0.885	0.719
	RI2	0.857			
	RI3	0.842			

Note: perceived usefulness (PU), perceived ease of use (PEOU), value co-creatin experience (VCE), revisit intention (RI)

Table 2. Discriminant validity

Fornell-Larcker Criterion (1981)				
	VCE	**PEOU**	**PU**	**RI**
VCE	0.845			
PEOU	0.235	0.815		
PU	0.171	0.620	0.822	
RI	0.330	0.554	0.566	0.848

Note: perceived usefulness (PU), perceived ease of use (PEOU), value co-creatin experience (VCE), revisit intention (RI)

4.3. Structural Model

To assess the potential issue of common method bias (CMB), this study employed the full collinearity assessment approach recommended by Kock [73]. All variance inflation factor (VIF) values for the latent constructs were below the commonly accepted threshold of 3.3, suggesting that common method bias (CMB) was unlikely to affect this study significantly.

To evaluate the causal links between the constructs and examine the formulated hypotheses, the findings displayed in Table 3 revealed that every path coefficient within the structural framework reached statistical significance and was consistent with theoretical assumptions. Specifically, PEOU exerted a notable positive influence on PU (H1: $\beta = 0.620$, $p < 0.001$), thereby validating Hypothesis H1. Furthermore, the influence of PU on RI is also significant (H2: $\beta = 0.386$, $p < 0.001$), offering empirical confirmation of Hypothesis H2. In addition, PEOU directly affected RI (H3: $\beta = 0.322$, $p < 0.001$), confirming Hypothesis H3. Concerning the model's explanatory power, the R^2 statistic for PU was 0.384, demonstrating that PEOU accounts for 38.4% of the variance in PU. The R^2 value for RI was 0.534, implying that the framework explained a considerable share of the variance in tourists' revisit intentions. The predictive relevance (Q^2) values were also satisfactory, with $Q^2 = 0.257$ for PU and $Q^2 = 0.374$ for RI, both exceeding the threshold of zero, thereby confirming the model's predictive capability. Moreover, the SRMR index for the structural framework stood at 0.05, suggesting an acceptable fit since it fell under the advised cutoff of 0.08 [74]. These findings demonstrated the robustness of the proposed model. Notably, the relatively high path coefficients (e.g., β=0.620 for H1) indicated strong relationships, suggesting that in smart tourism settings, ease of use played a pivotal role in shaping usefulness perceptions, which in turn drove revisit intentions; aligning with TAM extensions while highlighting the model's explanatory power for behavioral outcomes.

Table 3. Hypothesis testing

	β	**T Statistics**	**R^2**	**Q^2**	**Remarks**
H1: PEOU → PU	0.620***	21.219	0.384	0.257	Supported
H2: PU → RI	0.386***	9.526	0.534	0.374	Supported
H3: PEOU → RI	0.322***	7.777			Supported

Note: *** is P<0.001.

4.4. Moderating Effects

Regarding the moderating effects, as shown in Table 4 and Figure 2, the interaction term between value co-creation and PU exhibited a significant positive impact on RI ($\beta = 0.231$, $p < 0.001$), supporting Hypothesis H4. Similarly, the interaction between value co-creation and PEOU also had a significant positive effect on RI ($\beta = 0.181$, $p < 0.001$), thereby supporting Hypothesis H5. These results implied that VCE amplified the effects of technological perceptions on revisit intentions, with stronger moderation on the PU-RI relationship (β=0.231) than on the PEOU-RI relationship (β=0.181), underscoring the role of participatory experiences in enhancing technology-driven loyalty in smart tourism destinations.

Table 4. Moderation effect

	β	**T Statistics**	**Remarks**
H4: PU*VCE → RI	0.231***	5.915	Supported
H5: PEOU*VCE → RI	0.181***	4.735	Supported

Note: *** is P<0.001

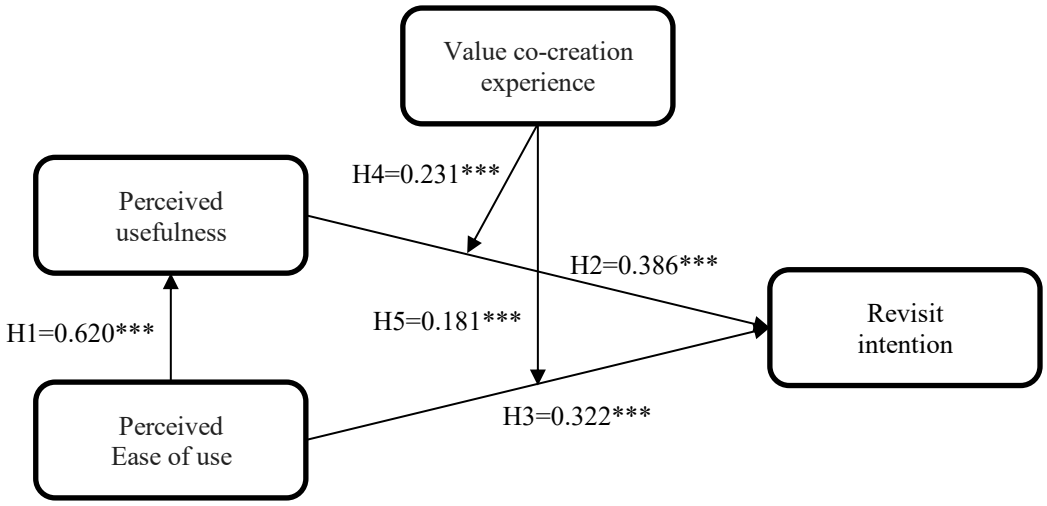

Figure 2. Result of Hypothesis assessment. *** p < 0.001

5. Discussion

Rooted in the TAM framework and the concept of value co-creation, this research explores the underlying mechanisms shaping tourists' behavioral intentions regarding smart tourism technologies within smart tourism destinations. The results fully support all proposed hypotheses, providing empirical evidence that extends traditional models in meaningful ways and fills underexplored gaps in linking technology acceptance to destination-level decisions.

First, the findings revealed that PEOU exerted a notable positive influence on PU (H1), aligning with the fundamental theoretical propositions of the TAM [15]. Within the realm of smart tourism, this outcome suggests that when visitors perceive smart tourism technologies as user-friendly, they are more inclined to appreciate the practical benefits offered by these innovations. The confirmation of this relationship further reinforces the applicability of the TAM in the smart tourism field and echoes previous findings in related studies on theme park services [63], VR tourism experiences [14], and smart hotels [64]. For instance, compared to Fotiadis & Stylos [63], where PEOU's effect on PU was moderate in online purchasing contexts, this study shows a stronger path coefficient, likely due to the dynamic, on-site nature of smart tourism interactions, which amplifies ease-of-use perceptions into tangible usefulness [14, 63, 64]. This interpretation highlights how user-friendly designs can bridge cognitive gaps in technology adoption, offering deeper insights into why PEOU serves as a foundational driver in experiential tourism settings.

Secondly, the research findings indicated that both PU and PEOU had significant positive impacts on RI (H2 and H3). This result aligns with the theoretical expectations of the TAM and provides new empirical evidence for understanding tourists' behavioral decision-making mechanisms in the context of smart tourism, extending beyond prior emphases on technology adoption to include destination revisit decisions [16, 17]. Previous studies, such as Albayrak et al. [18] and Zhang & Hwang [19], have verified the promoting role of perceived technological attributes in influencing users' intention to adopt mobile travel booking services, while Hasni et al. [58] extended this to behavioral intentions in Pakistan's tourism sector. This study builds on these by directly linking PU and PEOU to revisit intention, addressing a deficiency in current research where focus has been more on initial adoption than sustained behaviors like RI, which is crucial for destination sustainability [18-21, 58]. Unlike Zhang & Hwang [19] and Torabi et al. [33], which rely on mediators (e.g., intimacy or satisfaction) in virtual or TPB frameworks, our findings highlight stronger direct effects of PU and PEOU on RI, extending to real-world smart destinations without mediation. The positive influence of PU on revisit intention indicates that when smart tourism technologies successfully elevate the quality of tourists' experiences, optimize time efficiency, or enhance convenience, travelers tend to return to the same destination. This finding aligns with Papakostas et al. [66], who emphasized how perceived technological benefits translate into behavioral tendencies, but these results showed a stronger direct effect, possibly attributable to the integrated smart ecosystem in the Yangtze River Delta, which fosters long-term loyalty.

Additionally, the immediate influence of PEOU on RI challenges the conventional TAM premise that ease of use affects behavioral outcomes solely via PU [15]. In the tourism setting, the straightforward operation of technologies independently motivates tourists' intentions to revisit, as it reduces cognitive load during immersive experiences. This direct path questions the classic TAM's sequential structure (PEOU→PU→BI) [15] and indeed reflects the experiential nature of tourism, where ease of use itself is enjoyable, providing immediate hedonic value such as the pleasure derived from seamless, intuitive interactions that enhance immersion and fun, rather than merely leading to

perceptions of usefulness. In experiential settings like smart tourism, PEOU can directly drive revisit intention—not purely through PU—but by reducing cognitive load during immersive interactions, making the system feel effortless and natural. For example, in smart tourism apps, effortless navigation can create a feeling of delight and smooth flow, directly encouraging people to want to revisit without depending on practical benefits. This means that just having an easy-to-use system, even without thinking about its usefulness, can inspire revisit intentions. Thus, while focusing on the functional development of smart technologies, equal attention should be given to user-friendly interface design and ease of operation, in order to comprehensively enhance tourists' intention to revisit. This interpretation extends TAM's boundary and provides actionable insights for destination managers by highlighting the importance of direct experiential links over mediated paths.

Finally, the findings validated the notable positive moderating influence of VCE on the associations linking PU with RI (H4), as well as PEOU with RI (H5). This finding addresses the theoretical gap identified by Carvalho & Alves [26] concerning the function of value co-creation as a moderating factor, and introduces a fresh viewpoint on the process of technology acceptance within smart tourism environments, emphasizing VCE as a transformative moderator that bridges technology perceptions and participatory behaviors [25-27]. When travelers actively engage in value co-creation activities like content sharing and providing feedback, they develop deep interactive relationships within the platform ecosystem, as described by Casais et al. [68]. This interactive connection significantly amplifies the impact of technological perceptions on intent to act. In fact, the moderating effect suggests that value co-creation is not only an outcome of technology acceptance but also a catalyst: by engaging in the development and improvement of smart tourism platforms, tourists experience a greater conversion efficiency between their cognitive evaluations of technology (ease of use and usefulness) and their behavioral intention (revisit intention).

Compared to prior work that employed value co-creation as a moderator in different relationships, such as Cui & Meng [55] in hospitality contexts and Ahmad et al. [56] on digital engagement, the study revealed a notable moderating effect on the PU and PEOU paths to RI, attributable to the participatory nature of smart tourism platforms, which integrate real-time feedback loops, extend beyond the more traditional service contexts explored in prior studies [55, 56]. This complete analysis underscores VCE's role in transforming passive technology use into active co-creation, addressing a key theoretical gap in integrating TAM with value co-creation theory. It also offers a nuanced understanding of how moderation enhances model predictive power in smart tourism, thus extending prior conceptual integrations of TAM and co-creation to an empirical level by demonstrating how engagement levels fundamentally alter the translation of technological perceptions into revisit intentions [28, 32].

6. Conclusion

This study significantly advances smart tourism research by integrating the Technology Acceptance Model (TAM) with value co-creation theory, offering empirical insights into the mechanisms driving tourists' behavioral intentions in smart destinations. The findings fully supported all hypotheses: Perceived Ease of Use (PEOU) positively influenced Perceived Usefulness (PU) (H1), while both PU and PEOU directly enhanced Revisit Intentions (RI) (H2 and H3), extending TAM's scope from initial adoption to sustained destination behaviors. Notably, Value Co-creation Experience (VCE) provided a positive moderating effect on the PU-RI and PEOU-RI paths (H4 and H5), transforming passive technology use into active co-creation and amplifying the impact of technological perceptions on intentions. This addresses theoretical gaps, such as the underexplored moderating role of value co-creation [26], and empirically extends prior conceptual integrations [28] by illustrating how engagement levels fundamentally alter the translation of perception-to-intention in participatory ecosystems [25-27, 32]. In comparison to studies in hospitality and digital contexts [55, 56], the results highlighted stronger moderating effects due to smart tourism's real-time feedback mechanisms, bridging fragmented literature and enhancing model predictive power for sustainable tourism. Overall, these insights underscore tourists' evolution from passive users to active co-creators, emphasizing the need for holistic approaches that leverage technology and participation to foster long-term loyalty and destination resilience in an increasingly digital world.

6.1. Theoretical Implications

By combining the TAM with the concept of value co-creation, this study thoroughly examined the connections among PEOU, PU, RI, and VCE in the setting of smart tourism destinations. It provided valuable extensions and supplements to existing theories, as reflected in the following aspects:

This research broadened the relevance of the TAM in the realm of smart tourism by empirically confirming the direct impacts of PEOU on PU, along with the direct effects of both PU and PEOU on RI, thereby enriching the classical TAM framework proposed by Davis [15]. This finding addresses the limitations identified by Liang & Elliot [75] regarding the inadequacy of traditional tourism theories in explaining the impact of technology in digital environments. The results indicated that PEOU serves as a key driver in enhancing tourists' perception of the practical

value of technology, while PU directly reflects the actual value that technology brings to tourists. Together, these factors stimulate revisit intention by reducing cognitive load and improving the efficiency of the tourism experience. This outcome aligns with Liu & Park [36] theoretical discussion on how technological characteristics are transformed into user behavior, offering a new perspective for applying the TAM model in complex technological contexts.

This research revealed the moderating mechanism of VCE within the technology acceptance process, filling the research gap emphasized by Ribeiro et al. [28] concerning the moderating function of VCE. Unlike other studies focused on the direct effects of value co-creation [30, 31], this study quantitatively verified that tourist involvement in VCE notably amplifies the effects of PU and PEOU on revisit intention. This finding echoes the theoretical perspectives of viewing tourists as active participants in value generation [76], and provides empirical support for the integration of value co-creation with the TAM, as proposed by John and Supramaniam [32].

This study enriched the research framework of technology acceptance behavior in the context of smart tourism by integrating PU, PEOU, and VCE into a dynamic and highly interactive theoretical model. This model not only continues the academic discussion on how technology shapes tourist experiences [29, 77], but also innovatively incorporates the value co-creation mechanism into the technology acceptance process. The proposed framework overcomes the limitations of traditional research, which has often failed to sufficiently explore the connection between technology usage intention and destination revisit decisions [16, 17].Additionally, it responds to the theoretical concern regarding tourists' active roles in the realization of technological value [44], thus providing systematic theoretical support for understanding the interaction between smart tourism technologies and tourist behavior.

6.2. Practical Implications

Drawing from the research results, this study offers several practical recommendations to offer guidance for smart tourism destination managers and technology developers.

First, since PEOU not only influences PU but also directly promotes RI, developers should simplify user interfaces, reduce operational steps, and provide intuitive navigation functions. In particular, interface options and operational guides should be tailored to different age groups and levels of technological familiarity to ensure that all types of tourists can easily engage with the system. Regular user experience testing should be conducted to identify and eliminate potential usability barriers, thereby continually optimizing system convenience.

Second, smart tourism technology development should be oriented toward practical value. The significant effect of PU on RI indicates that tourists are primarily concerned with the actual value that technology adds to their travel experience. Destination managers should ensure that smart tourism technologies address real problems encountered by tourists, such as providing real-time congestion information, personalized route recommendations, and intelligent tour guide explanations. Technological updates should aim to enhance the quality of the tourist experience, save travel time, and improve convenience rather than pursuing innovation for its own sake.

Third, destinations should establish multi-level value co-creation mechanisms. The research validated the moderating influence of VCE on the link between technology adoption and RI, suggesting that tourist engagement can significantly amplify the effect of technology on intentions for behavior. Destinations can set up feedback systems to encourage tourists to provide suggestions, develop interactive content such as user-generated guides, photo sharing, and review platforms, and organize both online and offline co-creation activities, such as recruiting smart tourism experience ambassadors and hosting technology optimization workshops. To operationalize these mechanisms more effectively, destinations could incorporate gamification elements, such as awarding points, badges, or leaderboards for users who contribute reviews or suggestions, motivating sustained participation through fun, competitive incentives. Additionally, co-design workshops could be organized, inviting tourists to collaborate with developers in sessions where they prototype new mobile app features or customize destination experiences, fostering a sense of ownership. Furthermore, digital storytelling tools could be integrated, allowing visitors to create and share personalized narratives (e.g., virtual tour videos or augmented reality stories) that enrich the platform's content and inspire community-driven improvements. These specific approaches not only improve the technology itself but also enhance tourists' sense of participation, thereby increasing loyalty to the destination.

Finally, an integrated smart tourism ecosystem should be established. The research showed that the synergy between technological features and tourist participation can effectively promote revisit intention. Destination managers should move beyond a traditional technology supply-driven mindset and instead build a tourist-centered smart tourism ecosystem that organically integrates smart technologies, visitor experiences, and collaborative value generation. This involves incorporating digital services throughout the travel journey such as booking, transportation, guiding, consumption, and sharing, ensuring seamless connectivity between systems and creating multiple touchpoints for tourist engagement, thereby maximizing the value of technology and the quality of the tourist experience.

6.3. Limitations and Future Prospects

This study focuses on smart tourism destinations within a single cultural context, lacking a cross-cultural comparative perspective. While this focus on the Yangtze River Delta in China is justified, it remains unclear how cultural or regional factors might influence the results, such as whether the relationships between perceived usefulness (PU), perceived ease of use (PEOU), and revisit intention (RI) differ in Western tourism contexts. Future research could expand to include cross-cultural comparisons to explore how cultural factors may moderate the conceptual model proposed in this study, thereby enhancing the model's generalizability. Additionally, this study does not examine the potential influence of tourists' individual characteristics. The technology acceptance process may be affected by personal factors such as age, education level, and technological familiarity. To address this, future research could incorporate these demographic and psychological variables into the model—including testing measurement invariance across subgroups (e.g., by age or nationality) to assess the model's stability and robustness across diverse populations—and explore their roles as antecedents or moderators, thus building a more comprehensive theoretical framework.

7. Declarations

7.1. Author Contributions

Conceptualization, X.E., P.P., and S.P.; methodology, X.E., P.P., and S.P.; software, X.E.; formal analysis, X.E., P.P., and S.P.; data curation, P.P. and S.P.; writing—original draft preparation, X.E., P.P., and S.P.; writing—review and editing, P.P., S.P., Y.N., W.M., and H.Y. All authors have read and agreed to the published version of the manuscript.

7.2. Data Availability Statement

The data presented in this study are available in the article.

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7.5. Institutional Review Board Statement

Not applicable.

7.6. Informed Consent Statement

Informed consent was obtained from all subjects involved in the study.

7.7. Declaration of Competing Interest

The authors declare that there are no conflicts of interest concerning the publication of this manuscript. Furthermore, all ethical considerations, including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, and redundancies have been completely observed by the authors.

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Appendix I

Table A1. Measurement scales

Constructs	Measurement	References
Perceived ease of use (PEOU)	PEOU1: Learning to deal with the smart tourism service platform seems easy to.	Davis (1989) [15]
	PEOU2: Easy to get the smart tourism service platform to do what I want.	
	PEOU3: Interaction the smart tourism service platform is clear.	
	PEOU4: The smart tourism service platform is flexible and skillful to deal with.	
	PEOU5: Overall, using the platform is easy to me.	
Perceived usefulness (PU)	PU1: Using the smart tourism service platform allow me to do things faster.	Davis (1989) [15]
	PU2: Using the smart tourism service platform allow me to do things better.	
	PU3: Using the smart tourism service platform would get what I need.	
	PU4: Using the smart tourism service platform would make it easier in travel.	
	PU5: Overall, using the platform is beneficial to me.	
Value co-creation experience (VCE)	VCE1: I can obtain a good online co-creation experience from smart tourism service platform.	Lam et al. (2020) [69]
	VCE2: I can customize my travel plans in smart tourism service platform.	
	VCE3: I can get a genuine tourist experience that other platforms cannot provide.	
	VCE4: The smart tourism service platform saves my time in designing travel itineraries.	
Revisit intention (RI)	RI1: In future, I will travel to destinations that offer unique experiences via smart tourism service platform.	Torabi et al. (2022) [33]
	RI2: I recommend destinations that use unique smart tourism service platform to my family and friends.	
	RI3: I share my memorable experiences gained via smart tourism service platform with others.	