
Beyond utility and enjoyment: the impact of environmental value on continuance intention of theme park apps

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Beyond Utility and Enjoyment: The Impact of Environmental Value on Continuance Intention of Theme Park Apps

Abstract:

Theme park apps have emerged as digital solutions to address environmental issues within parks. Yet, few studies have explored their influence on user satisfaction and continuance intention from an individual user's perspective. This study investigates the motivators of satisfaction and continuance intention for a theme park app through the lens of perceived value. Specifically, it posits that environmental value (operationalized as perceived environmental friendliness), along with the traditionally studied functional (measured by perceived usefulness), hedonic (captured by perceived enjoyment), and social values (reflected by perceived social interaction), jointly shape user satisfaction and continuance intention. The Partial Least Squares Structural Equation Modeling (PLS-SEM) method was applied to analyse survey data collected from users in China and Europe (N = 646). The results indicate that perceived environmental friendliness significantly influences continuance intention but has no significant effect on satisfaction. Perceived usefulness and enjoyment positively impact both satisfaction and continuance intention, while perceived social interaction does not significantly affect either. By incorporating environmental value into the perceived value framework, this study provides a more comprehensive understanding of the factors driving satisfaction and continuance intention in theme park app usage.

Keywords: perceived value; theme park apps; satisfaction; continuance intention; cultural difference

1. Introduction

As environmental awareness continues to rise globally, environmental sustainability is becoming a central consideration in people's decision-making, even in leisure activities such as visiting theme parks (Kim & Lee, 2023; Maduku, 2024). Theme parks, traditionally associated with high levels of resource consumption and waste generation, are now under increasing scrutiny for their environmental impact. One of the most noticeable sources of waste in theme parks is paper-based materials, including printed tickets, receipts, maps, and promotional brochures, which collectively contribute to substantial amounts of paper waste each year (Abbott, 2023). In response to growing concerns about environmental sustainability, many theme parks are adopting digital solutions to minimize their environmental footprint (Pencarelli, 2020). One such approach is the integration of theme park apps designed to replace traditional paper-based materials, thus promoting a "paperless" experience (Sunio & Schmöcker, 2017; Thompson, 2021). For instance, Disney's *My Disney Experience* app encourages visitors to access digital tickets, maps, and itineraries, thereby reducing the reliance on printed materials and supporting environmental goals (Resort & World, 2023).

This growing emphasis on environmental sustainability not only reflects broader societal values but also signals a shift in how people assess digital technologies. As such, it has become increasingly important for theme park operators to understand the role of environment-related factors in shaping users' decision-making, such as user continuance intention and satisfaction with theme park apps. Both continuance intention and satisfaction have been demonstrated to be essential not only to help achieve environmental goals but also to ensure the long-term success of implementing the apps (Bhattacharjee, 2001; Cao et al., 2018), as they can help IS operators to decrease cost and increase profitability (Anderson & Srinivasan, 2003; Bhattacharjee, 2001; Cao et al., 2018).

Prior studies have identified various drivers of user satisfaction and continuance intention of an IS, such as perceived usefulness (e.g., Bhattacharjee, 2001) and enjoyment (e.g., Wu & Lu, 2013). However, as the digital service context evolves, traditional models may no longer fully capture the breadth of motivators. Recent research calls for a shift from human-centric models to more interdisciplinary approaches grounded in quantum theory to address global challenges such as environmental sustainability (Vuong & Nguyen, 2024). Within this interdisciplinary framework, Mindsponge Theory (Nguyen et al., 2022; Vuong & Nguyen, 2024) posits value formation as a dynamic process driven by interactions among information particles. In this view, values are not static preferences but are continuously shaped through the absorption, rejection, or internalization of external information and filtered through an individual's cognitive system based on subjective cost-benefit assessments (Nguyen et al., 2022). According to this theory, this study argues that perceived environmental friendliness can be seen as an emergent value, formed through users' evaluation of how theme park apps align with their environmental beliefs and the broader sustainability concerns. Specifically, perceived environmental friendliness refers to the extent to which a user believes that using an app can help reduce waste and protect the environment related to the park (Chen et al., 2015). As environmental issues gain prominence, such values may become increasingly salient and influential in shaping user satisfaction and continuance intention. Yet, despite its growing relevance, the influence of perceived environmental friendliness on user satisfaction and their willingness to continue using such apps remains underexplored.

Moreover, inconsistencies in the literature on travel apps call for further contextual reassessments. For instance, some studies report that perceived usefulness significantly affects continuance intention (Malik & Rao, 2019; Zhou et al., 2022), while some found it does not influence continuance intention (Foroughi et al., 2024). These differing results may stem from differences in app types and tourism contexts. Unlike other travel apps, such as Airbnb, a theme park app is designed to primarily resolve in-park pain points, such as overcrowding and long wait times, by leveraging real-time information and location-based services (Fang et al., 2017; Li, 2021; Shang et al., 2023). Therefore, it is crucial to re-examine whether and how the motivators identified in previous studies, such as functional, hedonic, and social values, still influence satisfaction and continuance intention within the specific context of theme park apps.

Furthermore, although cultural differences have been found to affect individuals' IS usage behavior, such as the technology acceptance (McCoy et al., 2007), few studies have tested how cultural differences shape the way users from different countries perceive and prioritize different dimensions of value regarding theme park apps. Yet, the impact of perceived value dimensions on user satisfaction and continuance intention may vary significantly across cultures. According to Hofstede's cultural framework (Hofstede, 2001), culture comprises several key dimensions: power distance, individualism/collectivism, masculinity/femininity, uncertainty avoidance, long-term vs. short-term orientation, and indulgence vs. restraint. Among these, individualism/collectivism and uncertainty avoidance are the most influential dimensions in shaping technology acceptance (Coves-Martinez et al., 2023). The individualism/collectivism dimension reflects the relationship between the individual and the group, with individualistic cultures emphasizing personal autonomy and collectivist cultures prioritizing group cohesion and shared values (Hofstede, 2001). Uncertainty avoidance refers to the extent to which individuals seek to avoid ambiguous or unpredictable situations, often favoring structure, rules, and reliability (Hofstede, 2001). These cultural dimensions can significantly affect how users assign importance to different app features.

For example, users in individualistic cultures may emphasize hedonic value and personal enjoyment more, while users in collectivist cultures might prioritize social value (Chu et al., 2019; Coves-Martínez et al., 2023). These differences can lead to varying levels of satisfaction and differing motivations for continuance intention of theme park apps. Thus, there is a need for more cross-cultural research to explore how perceived value of theme park apps is evaluated differently across diverse cultural contexts.

To address the above research gaps, this study examines the motivators of satisfaction and continuance intention of a theme park app from the perspective of perceived value. This study assumes that environmental value (represented by perceived environmental friendliness), alongside the traditionally studied functional, hedonic, and social values, play significant roles in shaping user satisfaction and continuance intention. Additionally, this study tests users' cultural background as a moderator. By integrating environmental value into the perceived value framework, this study seeks to provide a comprehensive understanding of the factors driving theme park app satisfaction and continuance intention.

The paper is organized as follows: The next section reviews the literature on mobile apps in tourism and perceived value. Section 3 then proposes a research model and hypotheses. Section 4 outlines the methodology used to collect and analyze data. The subsequent sections present the results, discuss the findings, and highlight the implications for theory and practice. Finally, the last section concludes with research limitations and suggestions for future research.

2. Literature review

2.1 Mobile apps in tourism

Mobile apps have been widely used in the tourism industry, and many studies have employed various theories to examine what motivates user satisfaction and continuance intention (see Table 1). In summary, prior studies on satisfaction and continuance intention of travel mobile apps have primarily focused on general travel apps, and few studies have examined a specific theme park app. Theme park apps differ from general travel apps due to their specialized focus and design. While general travel apps offer a broad range of features suitable for various travel activities like booking flights, hotels, or exploring multiple destinations, theme park apps are specifically created to enhance the in-park experience. Their primary focus is addressing the particular challenges of theme park visits, like reducing wait times, managing crowd flow, and improving overall visitor convenience. In contrast, general travel apps cater to a wider range of tourism contexts—like museums, natural landscapes, or urban exploration—without the specialized tools needed to navigate a theme park's intense, fast-paced environment. The influence of identified motivators in general travel apps may vary when applied to the specific context of theme park apps. For example, while Akdim et al. (2022) and Liu et al. (2023) demonstrated a positive relationship between perceived usefulness and continuance intention with general travel apps, Foroughi et al. (2024) found no such effect in travel-related apps with Thai travelers. Thus, more examinations are required.

Table 1. The summary of recent studies on continuance intention of mobile travel apps

Research	Type of travel app	Theory	Method	Predictors of continuance intention	of	Predictors of satisfaction	of app
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S. H. Kim et al. (2019)	Accommodation apps	Value-Based Adoption Model; ECM	Survey (N = 410)	Satisfaction (+) Perceived value (+)	Perceived value (/) Perceived usefulness (+) Perceived enjoyment (+) Confirmation (+)
Choi et al. (2019)	A searching app for travel-related information, a booking app for accommodation, and a booking app for flights	Perceived value theory	Interview (N = 22)	Perceived functional benefits Perceived ease of use Perceived enjoyment Perceived financial benefits Satisfaction Trust	Perceived functional benefits Perceived ease of use Perceived enjoyment Perceived financial benefits
Malik and Rao (2019)	On-demand ride services/ride-hailing app	Extended ECM; Self-efficacy; Perceived value	Survey (N = 1552)	Perceived ease of use (+) Perceived usefulness (+) Perceived value (+) Self-efficacy (+) Satisfaction (+)	Perceived ease of use (+) Perceived usefulness (+) Confirmation (+)
Kamboj and Joshi (2021)	General travel apps	UTAUT2	Survey (N = 357)	Smartphone app use (+)	Not studied
Anand et al. (2022)	AR-based mobile travel app	IS Success Model	Survey (N = 204)	Satisfaction (+)	Information quality (+) System quality (+) Service quality (+)
Zhou et al. (2022)	General travel apps	Theory of planned behavior (TPB); TAM	Survey (N = 278)	Perceived usefulness (+) Perceived ease of use (+) Perceived enjoyment (+)	Not studied
Coves-Martínez et al. (2023)	General travel apps	Unified Theory of Acceptance and Use of Technology 2 (UTAUT2)	Survey (N = 482)	Satisfaction (+)	Performance expectancy (+) Effort expectancy (+) Hedonism (+) eWOM (+) personalization (+) Relative advantage (+) Privacy risk (-)
Liu et al. (2023)	General travel apps	Expectation - Confirmation Model (ECM); IS Success Model	Survey (N = 480)	Satisfaction (+) Perceived usefulness (+)	Perceived usefulness (+) Perceived trust (+) Perceived enjoyment (+) Perceived risk (-)

					Expectation confirmation (+)
Choi et al. (2023)	General travel apps	Technology acceptance model (TAM); ECM; Privacy–Trust–Behavioral Intention Model	Mixed methods (Survey, N = 509; Interview, N = 11)	Expectation confirmation (+) Privacy protection (/) Security (+) Satisfaction (+) Trust (+)	Expectation confirmation (+) Privacy protection (+) Perceived security (+)
İlkan et al. (2023)	General travel apps	Uses and Gratifications Theory; Diffusion of Innovation Theory	Survey (N = 510)	Perceived value (/) Satisfaction (+)	Simplicity (+) Benefit (+) Compatibility (+) Playfulness (+) Informativeness (/) Social interaction (/)
Shang et al. (2023)	General travel apps	Technology threat avoidance theory	Survey (N = 1002)	Perceived price fairness (+) Perceived deception (-) Threat appraisal (-) Avoidance intention (/) Emotion-focused coping (+)	Not studied
Foroughi et al. (2024)	General travel apps	Technology Continuance Theory	Survey (N = 355)	Perceived usefulness (/) Satisfaction (+) Attitude (+) Personal innovativeness (-) Attractiveness of alternatives (-)	Perceived enjoyment (+) Confirmation (+) Perceived usefulness (+)
Pham et al. (2024)	ChatGPT for travel services	Stimulus-organism-response model (S-O-R)	Survey (N = 606)	Trust in ChatGPT (+) Attitude towards ChatGPT (+) Satisfaction (+)	Trust in ChatGPT (+) Attitude towards ChatGPT (+)

(Notes: +: positive relationship; -: negative relationship; /: not significant)

2.2 Perceived value

The perceived value refers to the overall assessment of the discrepancy between benefits and cost of obtaining a product or service (Zeithaml, 1988). This theory assumes that a person often uses a specific product or service after assessing its values (Zeithaml, 1988). User perceived value is assumed to impact user attitude and behavioral intention, and the relative significance of perceived value may vary depending on the context (Sheth et al., 1991). Perceived value has been extensively used to explain user intentions across various IS, with previous literature examining it either as a unidimensional concept representing overall evaluation or as a multidimensional construct that

assesses various aspects of an IS product or service (see Table 2). Prior literature has demonstrated that users' behavioral intention to engage in IS may be driven by multiple values (Van der Heijden, 2004). For instance, in social media, perceived value was classified into four dimensions: hedonic, information, technology, and social values (Li et al., 2018). Regarding travel online agents, perceived values include functional, social, epistemic, and conditional values (Talwar et al., 2020).

Recent theoretical advancements call for an even broader conceptualization of value. Notably, Mindsponge Theory offers a novel and interdisciplinary perspective by viewing the human mind as an information-processing system that continuously absorbs, filters, and internalizes information through subjective cost-benefit evaluations (Vuong & Nguyen, 2024). Mindsponge theory suggests that value can be conceptualized as information within the mind that is essential for sustaining an individual's existence, including both concrete knowledge and abstract beliefs used to evaluate people, actions, events, and choices (Vuong & Nguyen, 2024). Values, under this framework, emerge through ongoing interactions between information particles in the mind and the surrounding environment, and can explain how individuals from diverse cultural or ecological backgrounds develop different values. This theoretical foundation provides critical support for expanding the perceived value framework to include environmental value, which is an increasingly relevant issue in today's sustainability.

Accordingly, this study adopts perceived value as the foundational theoretical framework for the following reasons. First, perceived value is a well-established theoretical framework widely used for studying user satisfaction and continuance intention across different contexts, highlighting its relevance and applicability to theme park apps. Its proven effectiveness in understanding determinants of user satisfaction and continuance intention reinforces its suitability for this study. Second, it provides a comprehensive framework for this study by categorizing user perceptions of value into different dimensions. This multidimensional approach allows us to contextualize the value components to fit the context of theme park apps, and to expand the value dimensions by incorporating environmental value, aligning with the emerging trend of environmentally friendly practices in the studied context. By bridging traditional IS value models with the value formation process described in Mindsponge Theory, this study aims to provide a more comprehensive understanding of the drivers of user engagement with environmentally conscious digital platforms.

Table 2. List of prior research studying perceived value of mobile apps in IS field

Reference	Forms of app	Method	Dimensions of perceived value	Dependent variable
Kim et al. (2013)	Mobile user engagement	Survey (N = 297)	Perceived value	Satisfaction Mobile engagement intention
Peng et al. (2014)	Branded app	Survey (N = 245)	Perceived quality value Perceived acquisition value Perceived efficiency value Perceived emotion value	Intention to use branded apps
Xu et al. (2015)	General mobile app	Survey (N = 347)	Utilitarian benefits (app utility, app quality) Hedonic benefits (aesthetics, enjoyment)	Satisfaction Intention to recommend Continuance intention

Shi et al. (2016)	Social media	Survey (N = 342)	Functional value (Information quality, Product-related learning, Economic benefit) Social value (Interactivity, Collaboration, social presence) Emotional value (entertainment, arousal)	Continued interaction intention
Hsiao et al. (2016)	Mobile social media	Survey (N = 378)	Utilitarian value (perceived usefulness) Hedonic value (perceived enjoyment) Social influence (social ties)	Satisfaction Habit Continuance intention
Tseng et al. (2017)	Mobile instant messaging	Survey (N = 291)	Functional value Social value Self-expressive value	Loyalty
Zhang et al. (2017)	Social media	Survey (N = 240)	Social value Information value Emotional value Hedonic value	Continuance intention
Li et al. (2018)	Social media	Survey (N = 297)	Hedonic value (enjoyment) Information value (information documentation, information sharing) Media value (media appeal) Social value (social interaction)	Continuance intention
Wang et al. (2018)	Global positioning system (GPS) navigation app	Survey (N = 219)	Perceived value	Purchase intention
Weng et al. (2018)	Collective intelligence	Measurement development (study 1, N = 134; study 2, N = 179; study 3, N = 558; study 4, N = 751)	Social value (value of enhancing interpersonal relationships, value of enhancing personal reputation) Problem-solving value (value of improving cooperative environment, value of problem-solving effectiveness)	/
Yang et al. (2018)	Mobile government microblogging service	Survey (N = 619)	Extrinsic value (information value, social value) Intrinsic value (hedonic value, emotional value)	Mobile GMS continuance
Cho et al. (2019)	Food delivery app	Survey (N = 311)	Perceived value	Attitudes Continuance intention
Karjaluoto et al. (2019)	Mobile financial services app	Survey (N = 992; N = 524)	Utilitarian value Hedonic value	Overall satisfaction Commitment
Lei et al. (2019)	Hotel mobile app	Interview (N = 1000)	Functional value Emotional value	/

			Social value Epistemic value Value of personalization	
Shaw and Sergueeva (2019)	Mobile commerce	Survey (N = 287)	Perceived value	Intention to use
Wang et al. (2019)	Mobile catering app	Survey (N = 196)	Perceived value	Satisfaction eWOM intention to reuse
Chen et al. (2020)	Traffic-related social media	Survey (group 1, N = 248; group 2, N = 224)	Perceived utilitarian value Perceived hedonic value Relational capital	Satisfaction Affective commitment Continuance intention to consume Continuance intention to provide
Talwar et al. (2020)	Online travel agency	Survey (N = 809)	Functional value (monetary value, quality of benefits value) Social value (social status value) Epistemic value (information value) Conditional value (preference value)	Purchase intention
Su et al. (2022)	Mobile food delivery service	Survey (N = 494)	Perceived value	Loyalty
Kurtaliqi et al. (2022)	Mobile tracing apps	Survey (N = 832)	Perceived value	Trust in government Wellbeing Trust in the future Word of mouth
Shi et al. (2022)	Online travel agency	Mixed method (study 1, literature review; study 2, N = 317)	Functional value Social value Emotional value	Purchase intention
Touni et al. (2022)	Brand social media	Survey (N = 396)	Functional value Social value Entertainment value	Booking intention Customer-brand relationship strength
Zhu et al. (2023)	Health and fitness apps	Survey (N = 613)	Functional value (physical appearance, general health) Emotional value (enjoyment) Epistemic value (learning) Social value (social interaction, affiliation) Conditional value (condition)	Intention to use

3. Research model and hypothesis

Following prior studies on perceived value, we propose that user satisfaction and continuance intention with a theme park app are affected by four dimensions of perceived value, including functional, hedonic, social, and environmental values. Specifically, perceived usefulness is conceptualized as a functional value, perceived enjoyment as a hedonic value, perceived social interaction as a social value, and perceived environmental friendliness as an environmental value. The definitions of these constructs are provided in Table 3. This study adopts variables from prior literature because the perceived value theory does not specify constructs to measure different value dimensions. Previous research has employed various variables to capture these dimensions, even when they originate from different theoretical paradigms. For instance, past studies have used perceived usefulness to represent functional value (e.g., Hsiao et al., 2016). As theme park apps offer features like interactive maps, event information, and booking services to streamline visits and enhance user performance, perceived usefulness is suitable for capturing functional value in this study. Perceived enjoyment has been used to reflect hedonic value in prior studies (e.g., Li et al., 2018). Many theme park apps incorporate entertaining elements such as appealing visuals, music, and videos to make the app enjoyable; therefore, perceived enjoyment is assumed to represent hedonic value. Perceived social interaction has been employed to capture social value in past research (e.g., Zhu et al., 2023). Theme park apps offer functions to facilitate communication and interaction with others; therefore, perceived social interaction fits well with the meaning of social value and can be proposed to reflect social value in this study. Finally, environmental friendliness is assumed to reflect environmental value, as the app's use can reduce paper consumption in parks. The research model is presented in Figure 1.

Table 3. Definitions of the constructs included in the model

Construct	Definition
Perceived usefulness	The degree to which a user believes that using an app enhances their performance (Bhattacharjee, 2001; Davis, 1989).
Perceived enjoyment	The pleasure and fun derived from using an app, aside from any performance consequences (Davis, 1989).
Perceived social interaction	The degree to which an app can be used as a communication channel to interact with others (Deci & Ryan, 2000).
Perceived environmental friendliness	The degree to which a user believes that using an app can help reduce waste and protect the environment (Chen et al., 2015).
Continuance intention	The degree to which a user intends to continue their usage of a theme park app (Bhattacharjee, 2001).
Satisfaction	The degree to which a user feels satisfied with previous usage of a theme park app (Bhattacharjee, 2001).

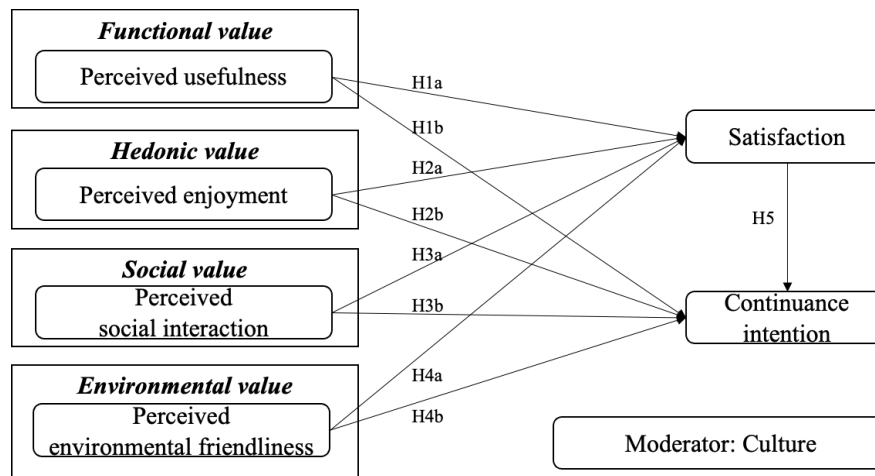


Figure 1. The proposed research model

The positive influences of perceived usefulness on both satisfaction and continuance intention have been validated in various contexts, such as online banking services (Bhattacharjee, 2001), financial technology (Bergmann et al., 2023), and travel apps (Liu et al., 2023). These prior studies demonstrate that when users perceive an IS to be useful, they are likely to feel satisfied with the app and intend to sustain its usage. In the context of theme park apps, this is particularly relevant, as users can use the app to solve practical problems and enhance their overall experience in parks, such as reducing wait times, staying informed about recent events, and avoiding crowded areas. By addressing these practical issues effectively, theme park apps can boost user satisfaction and encourage sustained usage. Therefore, this study hypothesizes:

H1a: Perceived usefulness positively affects users' satisfaction with the theme park app.

H1b: Perceived usefulness positively affects users' continuance intention.

Nowadays, many IS providers increasingly incorporate enjoyable elements and features into their system designs to meet users' hedonic needs, thereby forming user perceptions of enjoyment to enhance satisfaction levels and continuance intention (Lu et al., 2017; Van der Heijden, 2004). Numerous studies have reported positive outcomes from these efforts. For example, Hsiao et al. (2016) found that enjoyment significantly and directly influences satisfaction and continuance intention in the context of mobile social media. Regarding general travel apps, Liu et al. (2023) found that perceived enjoyment positively affects satisfaction, and Zhou et al. (2022) reported significant impacts on continuance intention. Similarly, in the context of theme park apps, various entertaining features, such as themed pictures, music, and games, are integrated to stimulate users' enjoyment and fun. When users enjoy using such apps, they are likely to feel satisfied with the app and sustain their usage. Thus, this study hypothesizes:

H2a: Perceived enjoyment positively affects users' satisfaction with the theme park app.

H2b: Perceived enjoyment positively affects users' continuance intention.

Perceived social interaction has been viewed as an essential part of an IS to fulfill the basic human needs for connection and community (Wang & Chiang, 2009; Zhang et al., 2017). In prior studies, it has been identified as a determinant of continuance intention. For instance, Wang and Chiang (2009) reported a positive influence of social interaction on continuance in the context of online auctions. Zhang et al. (2017) found a similar positive impact on continuance intention in the context of social media. Perceived social interaction has also been found to promote user

satisfaction with social media (Whiting & Williams, 2013). In the context of theme park apps, social interaction can include sharing experiences, posting reviews, engaging in discussions, and participating in community activities facilitated by the app. When users perceive that using these functions can satisfy their social needs, they are inclined to be satisfied with the app and continue using it. Therefore, this study proposes the following hypothesis:

H3a: Perceived social interaction positively affects users' satisfaction with the theme park app.

H3b: Perceived social interaction positively affects users' continuance intention.

Perceived environmental friendliness refers to the degree to which a user believes that using an app can help reduce waste and protect the environment (Chen et al., 2015). As environmental awareness grows, more people prioritize sustainability in their decision-making regarding an IS. According to Mindsponge theory, the human mind is conceptualized as an information-filtering system that continuously absorbs, evaluates, and retains information aligned with one's core values (Nguyen et al., 2022; Vuong & Nguyen, 2024). When a theme park app is perceived as environmentally friendly, this information is more likely to be absorbed into the user's cognitive system if it resonates with their internalized environmental values. Such value alignment enhances the perceived benefit of using the app, not just for personal utility but also for contributing to a broader social good. This, in turn, fulfills users' eco-centric psychological needs and reinforces positive affect toward the app. Consequently, people are more likely to be satisfied with the app and intend to continue using it for the greater good of the public. Thus, this study hypothesizes:

H4a: Perceived environmental friendliness positively affects users' satisfaction with the theme park app.

H4b: Perceived environmental friendliness positively affects users' continuance intention.

According to the expectation confirmation theory, user satisfaction positively impacts IS continuance intention (Bhattacharjee, 2001). Such influence was confirmed in a wide range of IS contexts (Yan et al., 2021). Likewise, in the context of theme park apps, when users are satisfied with it, they are likely to continue using it. Therefore, this study hypothesizes:

H5: Satisfaction positively affects users' continuance intention

In prior literature, cultural differences have been argued to influence individual behaviors (Coves-Martínez et al., 2023; McCoy et al., 2007). For instance, culture has been reported to moderate the impacts of motivators on satisfaction with general travel apps; specifically, for people from collectivistic, uncertainty-avoidant cultures like Spanish, perceived interaction exerts more significant influences on satisfaction than those from individualistic, non-uncertainty-avoidant cultures like Britain (Coves-Martínez et al., 2023). Similarly, in the context of mobile augmented reality, collectivistic, uncertainty-avoidant cultures like South Korea, displayed stronger dependence on hedonic features than those from Ireland with individualistic, non-uncertainty-avoidant cultures (Lee et al., 2015). Building on the influence of cultural differences on user behaviors, it is worth exploring the potential disparities between Chinese and European users in their interactions with apps. Given their distinct cultural backgrounds, these differences are likely to affect how users perceive value in apps and, consequently, their satisfaction and continuance intention levels. For example, Chinese users, shaped by cultural factors prioritizing social interaction and functionality, may emphasize perceived usefulness and social interaction more. In contrast, European users may focus more on hedonic aspects, such as perceived enjoyment. These

cultural distinctions suggest that the relationship between perceived value and satisfaction, as well as between perceived value and continuance intention, may be moderated by cultural background, leading to potential differences in how various dimensions of perceived value impact satisfaction across these groups. Thus, the following hypotheses are proposed:

H6: The relationship between perceived value and satisfaction is moderated by cultural background, such that the effects of perceived usefulness (H6a), perceived enjoyment (H6b), and perceived social interaction (H6c) on satisfaction are stronger among Chinese users than European users.

H7: The relationship between perceived value and continuance intention is moderated by cultural background, such that the effects of perceived usefulness (H7a), perceived enjoyment (H7b), and perceived social interaction (H7c) on continuance intention are stronger among Chinese users than European users.

Additionally, according to rankings of the most environmentally friendly countries in 2024, the top 10 are predominantly from Europe (WorldPopulationReview.com, 2024). This suggests that environmental consciousness is more deeply embedded in European cultures. Consequently, this study assumes that European users are more likely to prioritize eco-friendly practices than Chinese users. European users are more attuned to and appreciative of environmental sustainability efforts, making them more likely to derive satisfaction from apps and continue their app usage. Therefore, we propose:

H8: Perceived environmental friendliness will have a stronger impact on satisfaction (H8a) and continuance intention (8b) among European users than among Chinese users.

4. Method

4.1. Measurement

The measurements of all constructs included in the model were adopted from prior literature to ensure content validity (Wang & Sun, 2025; Wang et al., 2024). The initial pool of items was identified through an English-language literature review. A first version of the survey was developed in English and reviewed through a collaborative discussion among the authors. This version was then subjected to a pre-test with 17 respondents, whose feedback was used to revise item wording for clarity and contextual fit. Following this, the revised English version was translated into Chinese by the first author and subsequently reviewed by another bilingual IS researcher for linguistic accuracy and conceptual equivalence. A back-translation process was then conducted to ensure semantic consistency between the two language versions. A second pre-test involving 20 Chinese respondents was used to confirm the clarity, relevance, and readability of the translated items. Final adjustments were made to both language versions to enhance comprehensibility and contextual appropriateness for the target samples.

Specifically, the measurement items of perceived usefulness, satisfaction, and continuance intention were taken from the study of Bhattacharjee (2001). The items of perceived enjoyment and social interaction were adopted from studies by Venkatesh et al. (2012) and M. J. Kim et al. (2019), respectively. The items for measuring perceived environmental friendliness were from the work by Chen et al. (2015). All the measurement items are presented in the Appendix.

4.2. Data collection

The official survey was conducted in both China and Europe to explore potential cultural differences. In China, the Chinese survey was disseminated via popular social media platforms such as Weibo. In Europe, the initial distribution through Facebook and Instagram yielded a low response rate. Therefore, the survey was shifted to Prolific, a professional survey platform. We shifted to Prolific for several reasons. First, it enabled us to obtain an adequate and diverse sample size within a relatively short time frame. Second, it offers built-in quality control features, such as IP verification and attention checks, which help ensure the reliability and validity of responses. Third, Prolific allowed us to pre-screen participants based on geographic and demographic criteria, enhancing the relevance of the European sample to the study's target population.

The survey comprised four parts: informed consent, demographic information, personal habits and experiences, and app usage perceptions. The informed consent form detailed the survey's purpose, voluntary participation, confidentiality of information, and researchers' contact information. Only respondents who agreed and confirmed their use of theme park apps proceeded to the survey. The second part collected basic demographic information. The third part focused on respondents' habits and previous theme park experiences. The fourth part assessed respondents' experiences with theme park apps, emphasizing their perceptions of their usefulness, enjoyment, and intention to continue using them. Two attention check questions (e.g., please select "disagree" or "agree" for this question) were incorporated into the survey to ensure respondents were attentive.

For the Chinese sample, data collection occurred from February 19 to February 29, 2024, resulting in 316 valid responses from an initial 378 responses. A total of 62 responses were excluded due to the following reasons: 8 respondents had never used a theme park app, 52 failed the first attention check, and 2 failed the second attention check. Participants were incentivized with red packets ranging from 2 to 10 RMB. Meanwhile, for the European sample, data were collected from February 23 to February 29, 2024, yielding 330 valid responses from an initial 358. A total of 28 responses were excluded: 21 respondents listed non-existent app names, and seven indicated they had never used the app. Participants were compensated through Prolific, receiving €1.22 each. Finally, a total of 646 valid responses were obtained for this study, comprising 316 from China and 330 from Europe. Among these respondents, 53.6% were female, 46.1% were male, and 0.3% preferred not to disclose their gender. Nearly half of the respondents (46.9%) were aged between 26 and 35. More than half of the respondents (52.6%) had bachelor's degrees. A significant majority (83.2%) indicated they had been using theme park apps for over three years. When asked about their theme park visit frequency, 37.3% reported visiting once a year, 31.4% reported visiting less than once a year, and 26% reported visiting 2 to 3 times a year. Table 4 presents the respondents' basic demographic information and theme park visit characteristics.

Table 4. The demographics of survey participants

Measures	Items	Frequency	Percentage (%)
Countries and areas	Europe	330	51.1
	China	316	48.9
Age	>18 and <=25	205	31.7
	>26 and <=35	303	46.9
	>36 and <=45	99	15.3
	>46 and <=55	26	4.0
	>55	13	2.0
Gender	Male	346	53.6

	Female	298	46.1
	Prefer not to disclose	2	0.3
Education	Primary education	2	0.3
	Junior high school	6	0.9
	Secondary vocational school	7	1.1
	High school	87	13.5
	Junior college	62	9.6
	Bachelor	340	52.6
	Master	125	19.3
	Doctor	17	2.6
Length of using a theme park app	>0 and ≤1 years	293	45.4
	>1 and ≤3 years	244	37.8
	>3 and ≤5 years	75	11.6
	>5 years	34	5.3
The frequency of visits to a theme park	Less than once a year	203	31.4
	Once a year	241	37.3
	2-3 times a year	168	26.0
	More than 4 times a year	34	5.3

4.3. Measurement invariance, common method bias, and collinearity

As the data were gathered from two platforms in two different areas, this study conducted an invariance test to check whether the measurement invariance exists in the two samples via the Measurement Invariance Assessment (MICOM) proposed by Henseler et al. (2016). The MICOM procedure follows a three-step approach to assess measurement invariance by examining: (1) configural invariance, (2) compositional invariance, and (3) equality of composite means and variances. Full measurement invariance is confirmed only when all three conditions are satisfied. As Table 5 shows, all c values, the difference in mean values, and the variance of the composites between China and Europe groups fall between the lower and upper bound for the 95% confidence interval; therefore, full measurement invariance was established (Henseler et al., 2016). Thus, pooling the two samples together and proceeding with the data analysis is safe.

Table 5. The results of Measurement Invariance Assessment (MICOM)

Group	Composite	c value (=1)	95% confidence interval	Compositional invariance	Equal mean values and variances
China vs. Europe	PE	1.000	[0.999, 1.000]	Yes	Yes
	PU	1.000	[0.999, 1.000]	Yes	Yes
	PS	1.000	[0.999, 1.000]	Yes	Yes
	CI	1.000	[0.999, 1.000]	Yes	Yes
	PEF	0.999	[0.997, 1.000]	Yes	Yes
	SAT	1.000	[0.999, 1.000]	Yes	Yes

The Harman's single-factor test (Podsakoff et al., 2003) was used to check the common method bias, and the result showed that the greatest total variance for any factor was 43.033%, which was lower than 50%, therefore, common method bias was not a critical concern in this study. Additionally, a full collinearity test was employed, and the results show the values of variance

inflation factors (VIFs) ranged from 1.618 to 2.934, lower than 3.3, suggesting that collinearity was not a severe issue in this study (Kock, 2015).

4.4. Data analysis

4.4.1. Measurement model

This study used SmartPLS 4 to test both measurement and structural models. The measurement model was tested through the examination of convergent validity and discriminant validity. Specifically, convergent validity was assessed using multiple metrics, including factor loadings, Cronbach's alpha (CA), composite reliability (CR), and average variance extracted (AVE) (Fornell & Larcker, 1981; Tenenhaus et al., 2005). As Table 6 shows, all items' factor loadings exceeded 0.7. The CA values of all constructs were within the range of 0.845 and 0.964, which exceeded the suggested value of 0.7. CR values were between 0.849 and 0.965, exceeding the recommended value of 0.7. All AVE values were greater than 0.5. Therefore, convergent validity was established in this study (Fornell & Larcker, 1981; Tenenhaus et al., 2005).

The discriminant validity was assessed through the cross-loading of each indicator (Chin, 1998), Fornell–Larcker criterion (Fornell & Larcker, 1981), and the heterotrait–monotrait ratio of correlation (HTMT) (Henseler et al., 2015). As Table 7 shows, the factor-loading of each indicator for its relevant construct was greater than the cross-loadings of the other constructs. Additionally, each construct's correlations with other constructs were lower than the square root of its AVE (see Table 8). Moreover, HTMT values ranged from 0.278 to 0.786 (see Table 9), below 0.85. Therefore, discriminant validity was confirmed in this study.

Table 6. Assessment results of the measurement model

Factor	Items	Loading	AVE	CR	Cronbach's alpha
Perceived useful (PU)	PU1	0.892	0.763	0.849	0.845
	PU2	0.857			
	PU3	0.871			
Perceived enjoyment (PE)	PE1	0.929	0.840	0.911	0.905
	PE2	0.907			
	PE3	0.914			
Perceived social interaction (PSI)	PSI1	0.942	0.902	0.965	0.964
	PSI2	0.955			
	PSI3	0.948			
	PSI4	0.953			
Perceived environmentally friendly (PEF)	PEF1	0.894	0.777	0.856	0.856
	PEF2	0.894			
	PEF3	0.856			
Satisfaction (SAT)	SAT1	0.861	0.793	0.920	0.913
	SAT2	0.901			
	SAT3	0.895			
	SAT4	0.904			
Continuance intention (CI)	CI1	0.889	0.791	0.869	0.868
	CI2	0.879			
	CI3	0.900			

Table 7. Results of cross-loadings

	PU	PE	PSI	PEF	SAT	CI
PU1	0.892	0.583	0.304	0.483	0.480	0.635
PU2	0.857	0.521	0.230	0.447	0.474	0.579
PU3	0.871	0.602	0.363	0.515	0.412	0.551
PE1	0.601	0.929	0.639	0.512	0.435	0.484
PE2	0.623	0.907	0.493	0.502	0.476	0.533
PE3	0.559	0.914	0.696	0.494	0.396	0.452
PSI1	0.331	0.637	0.942	0.392	0.256	0.260
PSI2	0.331	0.630	0.955	0.405	0.275	0.277
PSI3	0.311	0.614	0.948	0.410	0.233	0.267
PSI4	0.321	0.620	0.953	0.412	0.237	0.288
PEF1	0.477	0.558	0.480	0.894	0.329	0.462
PEF2	0.486	0.495	0.423	0.894	0.295	0.465
PEF3	0.491	0.398	0.224	0.856	0.269	0.494
SAT1	0.540	0.483	0.242	0.360	0.861	0.478
SAT2	0.421	0.387	0.182	0.240	0.901	0.377
SAT3	0.426	0.382	0.212	0.256	0.895	0.384
SAT4	0.454	0.430	0.295	0.328	0.904	0.400
CI1	0.596	0.472	0.283	0.492	0.402	0.889
CI2	0.585	0.456	0.223	0.473	0.409	0.879
CI3	0.621	0.504	0.261	0.470	0.431	0.900

Table 8. Results of Fornell-Larcker criterion

	PU	PE	PSI	PEF	SAT	CI
Perceived useful (PU)	0.874					
Perceived enjoyment (PE)	0.650	0.917				
Perceived social interaction (PSI)	0.341	0.658	0.950			
Perceived environmental friendliness (PEF)	0.550	0.549	0.426	0.881		
Satisfaction (SAT)	0.523	0.478	0.264	0.338	0.890	
Continuance intention (CONT)	0.676	0.537	0.287	0.537	0.466	0.890

Table 9. Results of Heterotrait-monotrait ratio (HTMT) test

	PU	PE	PSI	PEF	SAT	CI
Perceived useful (PU)						
Perceived enjoyment (PE)	0.742					
Perceived social interaction (PSI)	0.380	0.711				
Perceived environmental friendliness (PEF)	0.648	0.623	0.469			
Satisfaction (SAT)	0.586	0.516	0.278	0.376		
Continuance intention (CONT)	0.786	0.602	0.314	0.624	0.517	

4.4.2. Structural model

The structural model was tested by assessing path significance, the hypotheses' effects, and predictive relevance. Figure 2 shows the PLS path modeling results. The model explains 51.4% of the variance in continuance intention, and 30.7% of the variance in satisfaction. Perceived usefulness ($\beta = 0.358$, $p < 0.001$) and enjoyment ($\beta = 0.261$, $p < 0.001$) significantly positively affect satisfaction, while social interaction and environmental friendliness do not. Perceived usefulness ($\beta = 0.437$, $p < 0.001$), enjoyment ($\beta = 0.114$, $p < 0.05$), and environmental friendliness ($\beta = 0.219$, $p < 0.001$) significantly positively affect continuance intention, while social interaction does not. Satisfaction significantly influences continuance intention ($\beta = 0.125$, $p < 0.001$). therefore, H1a, H1b, H2a, H2b, H4b, and H5 are supported, while H3a, H3b, and H4a are not. Figure 2 presents the results.

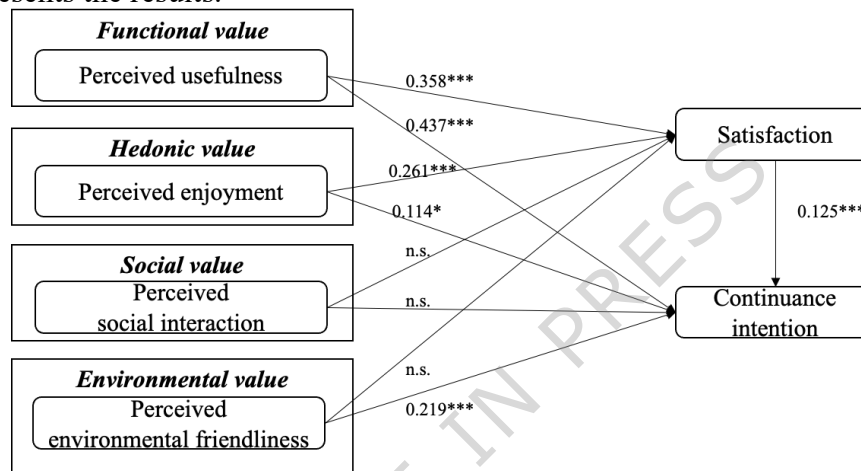


Figure 2. The results of the proposed research model

4.4.3. Moderation analysis

As Table 10 shows, only a significant difference was found between Chinese and European users regarding the impact of perceived enjoyment on satisfaction and continuance intention. Specifically, perceived enjoyment exerts a stronger impact on satisfaction for European users ($\beta = 0.346$, $p < 0.001$) than for Chinese users ($\beta = 0.144$, $p < 0.05$). Perceived enjoyment significantly affects continuance intention only for Chinese users ($\beta = 0.216$, $p < 0.05$), but not for European users. Therefore, H6a, H6b, H6c, H7a, H7b, H7c, H8a, and H8b were not supported.

Table 10. Results of moderation analysis

Hypotheses	Comparison by culture China vs. Europe	Path coefficients of separate structural models	
		China (N = 316)	Europe (N = 330)
PEF→SAT	n.s.	n.s.	n.s.
PEF→CI	n.s.	0.242*	0.189***
PU→SAT	n.s.	0.314***	0.406***
PU→CI	n.s.	0.371***	0.413***
PE→SAT	$p < 0.05$	0.144*	0.346***
PE→CI	$p < 0.05$	0.216*	n.s.
PSI→SAT	n.s.	n.s.	n.s.
PSI→CI	n.s.	n.s.	n.s.
SAT→CI	n.s.	0.107**	0.221***

5. Discussion

First, this study found that perceived environmental friendliness has a significantly positive impact on continuance intention but not on satisfaction. A possible explanation lies in the public good nature of environmental friendliness, which tends to align more with users' long-term values than with their immediate experiential gratification. Users may continue using an app because they believe it contributes to a larger societal benefit, such as environmental sustainability, even if they do not see immediate personal gains. This finding can be further understood through the lens of Mindsponge Theory. According to the theory, the human mind acts as an information filtering system, continuously evaluating and integrating new information based on subjective cost-benefit judgments and alignment with the individual's core values (Nguyen et al., 2022; Vuong & Nguyen, 2024). When users perceive that an app supports environmentally friendly practices, this information may be absorbed and retained within their cognitive framework if it resonates with deeply held pro-environmental values. However, because environmental friendliness often benefits the collective rather than the individual directly, it may not contribute to immediate satisfaction, which tends to be driven by more individual-centric values, such as usefulness or enjoyment. In contrast, perceived usefulness and enjoyment function as self-oriented value dimensions, more likely to satisfy immediate needs and generate positive affective responses. These values are typically absorbed through filters focused on personal benefit, making them more closely linked to satisfaction. Environmental value, in this case, operates as a long-term value—one that may not deliver short-term gratification but still plays a crucial role in shaping continuance intention.

Surprisingly, perceived social interaction does not influence either satisfaction or continuance intention in the context of theme park apps. This finding contrasts with previous research on social media, where social interaction with others is a significant driver of satisfaction and continuance intention (Shi et al., 2016). However, the finding aligns with prior studies on general travel apps, where perceived social interaction does not affect app satisfaction (İlkan et al., 2023). One possible explanation lies in the design orientation and user expectations of theme park apps. Unlike social media, where social interaction is central to the user experience, theme park apps are primarily a tool designed to facilitate the in-park experience. As a result, these apps may deprioritize social features or limit social functionalities to basic functions (e.g., sharing photos), thereby minimizing opportunities for meaningful interaction within the app. Additionally, users prefer sharing their experiences with their social networks through mainstream social media platforms like Facebook or WeChat, which offer broader audiences and richer social affordances. Therefore, theme park apps are viewed as a personal planning and managing tool, rather than a social channel, leading users to disengage from in-app social features that may be presented. Furthermore, the situational dynamics of theme park visits may also contribute to the diminished role of social interactions. Theme parks are typically highly immersive, time-sensitive, and physically demanding environments, where users are primarily focused on maximizing their physical experience, such as riding attractions or watching shows. This limits both the opportunity and the motivation to engage in real-time social interactions through the app. Consequently, social interaction plays a diminished role in shaping users' satisfaction and continuance intention with theme park apps.

Third, we identified cultural differences in the impact of perceived enjoyment on satisfaction and continuance intention. The influence of perceived enjoyment on satisfaction is stronger for European users than Chinese users, contrasting with prior findings on general travel apps (Coves-

Martínez et al., 2023). For the previous study, perceived enjoyment significantly impacted satisfaction primarily for users from collectivistic, uncertainty-avoidant cultures like Spain (Coves-Martínez et al., 2023). This discrepancy may be due to the specific context of theme park apps and the need for a more nuanced interpretation of cultural dimensions. Drawing on Hofstede's cultural framework (Hofstede, 2001), prior studies suggest that many European cultures tend to be more individualistic and exhibit low uncertainty avoidance. Such cultures emphasize flexibility, independence, freedom, risk-taking, and tolerance (Hofstede, 2001). In these cultures, digital experiences that enhance personal enjoyment and entertainment are more likely to generate immediate satisfaction. Theme park apps, which often include entertainment content, may be particularly appealing to users who seek individual hedonic rewards from their digital tools. In contrast, users from China, often viewed in culture research as belonging to a more collectivistic and uncertainty avoidance culture, tend to place greater emphasis on their group identity and prioritize group norms and goals over personal preferences (Hofstede, 2001). These users may be more inclined to derive enjoyment from shared, in-person experiences (e.g., exploring the park together) rather than from digital platforms. As such, the app may be viewed more as a tool to support group experiences, rather than as a standalone source of pleasure. Moreover, unlike general travel apps where the digital interface may be central to the service experience, theme park apps are typically supplementary to enhance an already rich and immersive physical experience. For users from collectivist backgrounds, enjoyment is likely to be drawn from in-group social interactions and shared offline experiences, not from the app itself. In contrast, individualistic users are more likely to experience and evaluate enjoyment personally. For these users, enjoyment derived from the app contributes more to satisfaction, which aligns with their emphasis on self-oriented outcomes and personal gratification. Therefore, perceived enjoyment from the app plays a stronger role in shaping satisfaction among European users than Chinese users in our sample. It is important to note that these interpretations reflect general cultural tendencies identified in the literature and are applied here to interpret patterns observed within our study sample. It does not mean that all individuals within Europe or China conform to these traits. Indeed, both regions exhibit cultural differences, but a cleaner and more granular examination of within-region cultural variation would be a valuable direction for future research.

Furthermore, perceived enjoyment significantly impacts continuance intention for Chinese users but not Europeans in our study sample. This might be because perceived enjoyment indirectly influences continuance intention via satisfaction. Indeed, the post hoc mediation analysis showed that satisfaction fully mediates the impact of perceived enjoyment on continuance intention (indirect effect $\beta = 0.076$, $p < 0.01$; direct effect, $\beta = 0.002$, $p > 0.05$). For European users in our sample, the enjoyment alone may be insufficient to enhance their intention to continue the app usage; only when they feel satisfied are they likely to sustain the usage. These findings suggest that cultural context plays a crucial role in shaping how users respond to different aspects of an app, and that perceived enjoyment carries different psychological weights across cultures. This highlights the need for culturally adaptive design and communication strategies in theme park app development.

Fourth, perceived usefulness has a positive impact on both satisfaction and continuance intention, consistent with findings from prior studies on travel apps, where perceived usefulness has similarly been shown to play a crucial role in driving user satisfaction and continued usage (Liu et al., 2023; Malik & Rao, 2019). When users believe that a theme park app effectively

enhances their visit performance, they are more likely to feel satisfied with the app and continue using it. This finding supports the idea that functional value remains a foundational driver of satisfaction and continuance intention, even in hedonic, experience-rich environments, such as theme parks. Despite the entertainment-oriented nature of the context, users still prioritize functional benefits that help optimize their visit performance.

6. Conclusion

6.1. Theoretical contribution

This study contributes to research on travel apps on several fronts. First, this study extends the perceived value framework by incorporating an environmental dimension grounded in Mindsponge Theory (Vuong & Nguyen, 2024), thereby broadening the conceptualization of value beyond traditional dimensions like functional, hedonic, and social values. By doing so, this study emphasizes that users may adopt and retain environmentally friendly technologies not solely for personal benefit, but because these align with deeply held societal values. This integration also offers a novel interdisciplinary perspective that captures both rational and value-driven motivations, thereby enriching our understanding of user satisfaction and continuance intention with theme park apps in an era of growing environmental sustainability awareness.

Second, the findings on cultural differences provide new insights into the role of culture in moderating the impact of hedonic value on satisfaction and continuance intention. Specifically, in more individualistic cultures, perceived enjoyment exerts a stronger influence on satisfaction, whereas in collectivistic, uncertainty-avoidant contexts, enjoyment plays a more limited role. This contributes to the literature by demonstrating that culture significantly influences how users perceive and respond to enjoyment, with varying effects on their satisfaction and long-term usage of apps. These findings underscore that hedonic value is not universally experienced or equally weighted across cultures. Instead, its impact is shaped by deeper cultural dimensions such as individualism/collectivism and uncertainty avoidance levels. By highlighting these distinctions, this study advances a more culture-sensitive understanding of user behaviors of theme park apps.

Third, by re-examining the role of perceived value in the specific context of theme park apps, this study emphasizes the importance of contextual factors in determining the impact of value dimensions on user satisfaction and continuance intention. The results suggest that the influence of perceived value is not uniform across different contexts, rather, the impact of each value dimension depends upon the nature and the purpose of the app services. In the context of theme park apps, functional value continues to be a key driver of satisfaction and continuance intention, as users prioritize features that enhance efficiency and optimize the park experience. In contrast, social value has a limited role, suggesting that direct social interaction features may be less relevant in this context. These insights contribute to the literature by reinforcing the need for context-sensitive examination of perceived value.

6.2. Practical implications

First, the finding that perceived environmental friendliness positively impacts continuance intention suggests that theme park operators should actively showcase the app's environmental sustainability benefits. Rather than simply stating that the app can reduce paper waste, operators

could communicate specific, measurable contributions, such as tracking the number of digital tickets issued, the amount of paper saved, and even offering visible “carbon footprint reduction” indicators to help users understand their environmental impacts by using the app.

Second, the finding regarding cultural differences in the perception of hedonic value offers actionable guidance for localizing app design strategies. For instance, in individualistic and low uncertainty avoidance culture, where enjoyment strongly influences satisfaction and exerts an indirect impact on continuance intention via satisfaction, developers should focus on creating highly engaging and entertaining app experiences. This can be achieved by incorporating features such as augmented reality enhancements, interactive storytelling, or visually immersive design elements that can increase users’ perceived enjoyment. Conversely, in collectivist and high uncertainty avoidance cultures, like China, where enjoyment is less central, apps should emphasize more functionality.

Third, the finding on the insignificant impact of perceived social interaction suggests that theme park operators could deprioritize social functions within their apps that facilitate direct communication between users. Instead, efforts could be more effectively directed toward integrating seamless sharing capabilities with popular social media platforms, allowing users to easily share their experiences on widely used social media networks, such as Facebook, WeChat, and TikTok. In so doing, operators can leverage the network effects of external platforms without diverting resources into developing native social features with limited user impact.

6.3 Limitations and future research direction

This study has limitations. First, this study may have overlooked other potential dimensions of perceived value beyond those examined, such as aesthetic value, which could also play significant roles in influencing user satisfaction and continuance intention. Future research could explore these additional dimensions to provide a more comprehensive understanding of perceived value in the context of theme park apps. Second, the study relied solely on a survey method for data collection, which may limit the depth of insights obtained. Future research could benefit from using a mixed-method approach, incorporating qualitative methods such as interviews or focus groups to gain a deeper understanding of the underlying motivations and contextual factors influencing user perceptions. Third, the data sample was limited to users in China and Europe, which may restrict the generalizability of the findings to other cultural or geographical contexts. Moreover, Europe comprises a wide range of subcultures, which were not examined in this study. Future research should consider expanding the sample to include participants from additional regions and more granular cultural categories, enabling a more nuanced understanding of cross-cultural differences. Fourth, this study examined culture (China vs. Europe) as a moderator using a binary group comparison. However, future research could benefit from exploring more fine-grained, individual-level cultural constructs—such as individualism–collectivism and uncertainty avoidance—as potential mediators in the relationship between perceived value and user outcomes (e.g., satisfaction and continuance intention). Such an approach would offer deeper insights into the psychological mechanisms through which cultural values influence user behavior.

References

- Abbott, I. (2023). *How much waste do theme parks produce?* NCESC.COM. Retrieved May 7 from <https://www.ncesc.com/how-much-waste-do-theme-parks-produce/>

- Akdim, K., Casalo, L. V., & Flavian, C. (2022). The role of utilitarian and hedonic aspects in the continuance intention to use social mobile apps. *Journal of Retailing and Consumer Services*, 66, 1-14. <https://doi.org/10.1016/j.jretconser.2021.102888>
- Anand, K., Arya, V., Suresh, S., & Sharma, A. (2022). Quality dimensions of augmented reality-based mobile apps for smart-tourism and its impact on customer satisfaction & reuse intention. *Tourism Planning & Development*, 20(2), 236-259. <https://doi.org/10.1080/21568316.2022.2137577>
- Anderson, R. E., & Srinivasan, S. S. (2003). E-satisfaction and e-loyalty: A contingency framework. *Psychology & marketing*, 20(2), 123-138.
- Bergmann, M., Maçada, A. C. G., de Oliveira Santini, F., & Rasul, T. (2023). Continuance intention in financial technology: a framework and meta-analysis. *International Journal of Bank Marketing*, 41(4), 749-786. <https://doi.org/10.1108/IJBM-04-2022-0168>
- Bhattacharjee, A. (2001). Understanding information systems continuance: an expectation-confirmation model. *MIS Quarterly*, 25(3), 351-370. <https://doi.org/10.2307/3250921>
- Cao, X., Yu, L., Liu, Z., Gong, M., & Adeel, L. (2018). Understanding mobile payment users' continuance intention: a trust transfer perspective. *Internet Research*, 28(2), 456-476.
- Chen, J. V., Nguyen, T., & Oncheunjit, M. (2020). Understanding continuance intention in traffic-related social media: Comparing a multi-channel information community and a community-based application. *Internet Research*, 30(2), 539-573.
- Chen, Y.-S., Lin, C.-Y., & Weng, C.-S. (2015). The Influence of Environmental Friendliness on Green Trust: The Mediation Effects of Green Satisfaction and Green Perceived Quality. *Sustainability*, 7(8), 10135-10152. <https://www.mdpi.com/2071-1050/7/8/10135>
- Chin, W. W. (1998). The partial least squares approach to structural equation modeling. *Modern methods for business research*, 295(2), 295-336.
- Cho, M., Bonn, M. A., & Li, J. (2019). Differences in perceptions about food delivery apps between single-person and multi-person households [Article]. *International Journal of Hospitality Management*, 77, 108-116. <https://doi.org/10.1016/j.ijhm.2018.06.019>
- Choi, K., Wang, Y., & Sparks, B. (2019). Travel app users' continued use intentions: it's a matter of value and trust. *Journal of Travel & Tourism Marketing*, 36(1), 131-143. <https://doi.org/10.1080/10548408.2018.1505580>
- Choi, K., Wang, Y., Sparks, B. A., & Choi, S. M. (2023). Privacy or security: does it matter for continued use intention of travel applications? *Cornell Hospitality Quarterly*, 64(2), 267-282.
- Chu, X., Luo, X. R., & Chen, Y. (2019). A systematic review on cross-cultural information systems research: Evidence from the last decade. *Information & Management*, 56(3), 403-417.
- Coves-Martinez, A. L., Sabiote-Ortiz, C. M., & Frias-Jamilena, D. M. (2023). How to improve travel-app use continuance: The moderating role of culture [Article]. *Tourism Management Perspectives*, 45, Article 101070. <https://doi.org/10.1016/j.tmp.2022.101070>
- Coves-Martínez, Á. L., Sabiote-Ortiz, C. M., & Frías-Jamilena, D. M. (2023). How to improve travel-app use continuance: the moderating role of culture. *Tourism Management Perspectives*, 45(12), 1-13. <https://doi.org/10.1016/j.tmp.2022.101070>
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319-340. <https://doi.org/10.2307/249008>
- Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological inquiry*, 11(4), 227-268.
- Fang, J., Zhao, Z., Wen, C., & Wang, R. (2017). Design and performance attributes driving mobile travel application engagement. *International Journal of Information Management*, 37(4), 269-283.
- Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39-50.
- Foroughi, B., Sitthisirinan, S., Iranmanesh, M., Nikbin, D., & Ghobakhloo, M. (2024). Determinants of travel apps continuance usage intention: extension of technology continuance theory. *Current Issues in Tourism*, 27(4), 619-635. <https://doi.org/10.1080/13683500.2023.2169109>

- Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, 43(1), 115-135. <https://doi.org/10.1007/s11747-014-0403-8>
- Henseler, J., Ringle, C. M., & Sarstedt, M. (2016). Testing measurement invariance of composites using partial least squares. *International Marketing Review*, 33(3), 405-431. <https://doi.org/10.1108/imr-09-2014-0304>
- Hofstede, G. (2001). *Culture's consequences: Comparing values, behaviors, institutions and organizations across nations*. Sage publications.
- Hsiao, C.-H., Chang, J.-J., & Tang, K.-Y. (2016). Exploring the influential factors in continuance usage of mobile social Apps: Satisfaction, habit, and customer value perspectives. *Telematics and Informatics*, 33(2), 342-355. <https://doi.org/10.1016/j.tele.2015.08.014>
- İlkan, Ş. P., Öztüren, A., Avcı, T., & Irani, F. (2023). Mobile application features effects on the application's engagement and intention for continuing use in tourism. *Asia Pacific Journal of Tourism Research*, 28(4), 386-400. <https://doi.org/10.1080/10941665.2023.2230328>
- Kamboj, S., & Joshi, R. (2021). Examining the factors influencing smartphone apps use at tourism destinations: a UTAUT model perspective [Article]. *International Journal of Tourism Cities*, 7(1), 135-157. <https://doi.org/10.1108/ijtc-05-2020-0094>
- Karjaluoto, H., Shaikh, A. A., Saarijärvi, H., & Saraniemi, S. (2019). How perceived value drives the use of mobile financial services apps. *International Journal of Information Management*, 47, 252-261.
- Kim, M. J., Lee, C.-K., & Contractor, N. S. (2019). Seniors' usage of mobile social network sites: Applying theories of innovation diffusion and uses and gratifications. *Computers in Human Behavior*, 90, 60-73. <https://doi.org/10.1016/j.chb.2018.08.046>
- Kim, N., & Lee, K. (2023). Environmental consciousness, purchase intention, and actual purchase behavior of eco-friendly products: the moderating impact of situational context. *International Journal of Environmental Research and Public Health*, 20(7), 5312.
- Kim, S. H., Bae, J. H., & Jeon, H. M. (2019). Continuous intention on accommodation apps: integrated value-based adoption and expectation–confirmation model analysis. *Sustainability*, 11(6), 17. <https://doi.org/10.3390/su11061578>
- Kim, Y. H., Kim, D. J., & Wachter, K. (2013). A study of mobile user engagement (MoEN): Engagement motivations, perceived value, satisfaction, and continued engagement intention. *Decision Support Systems*, 56, 361-370. <https://doi.org/10.1016/j.dss.2013.07.002>
- Kock, N. (2015). Common method bias in PLS-SEM: A full collinearity assessment approach. *International Journal of e-Collaboration*, 11(4), 1-10.
- Kurtaliqui, F., Zaman, M., & Sohier, R. (2022). The psychological reassurance effect of mobile tracing apps in Covid-19 Era. *Computers in Human Behavior*, 131, 107210. <https://doi.org/10.1016/j.chb.2022.107210>
- Lee, H., Chung, N., & Jung, T. (2015). Examining the cultural differences in acceptance of mobile augmented reality: Comparison of South Korea and Ireland. *Information and Communication Technologies in Tourism 2015: Proceedings of the International Conference in Lugano, Switzerland, February 3-6, 2015*,
- Lei, S. I., Wang, D., & Law, R. (2019). Perceived technology affordance and value of hotel mobile apps: A comparison of hoteliers and customers [Article]. *Journal of Hospitality and Tourism Management*, 39, 201-211. <https://doi.org/10.1016/j.jhtm.2019.02.006>
- Li, H. X., Li, L. R., Gan, C. M., Liu, Y., Tan, C. W., & Deng, Z. H. (2018). Disentangling the factors driving users' continuance intention towards social media: A configurational perspective. *Computers in Human Behavior*, 85, 175-182. <https://doi.org/10.1016/j.chb.2018.03.048>
- Li, J. (2021). *The state of travel apps 2021—an analysis of travel app market trends and top apps in the U.S.* Sensor Tower. Retrieved May 24 from <https://sensortower.com/blog/state-of-travel-apps-us-report-2021>

- Liu, Y., Li, Q., Edu, T., & Negricea, I. C. (2023). Exploring the Continuance Usage Intention of Travel Applications in the Case of Chinese Tourists. *Journal of Hospitality & Tourism Research*, 47(1), 6-32. <https://doi.org/10.1177/1096348020962553>
- Lu, J., Liu, C., & Wei, J. (2017). How Important Are Enjoyment and Mobility for Mobile Applications? *Journal of Computer Information Systems*, 57(1), 1-12. <https://doi.org/10.1080/08874417.2016.1181463>
- Maduku, D. K. (2024). How environmental concerns influence consumers' anticipated emotions towards sustainable consumption: The moderating role of regulatory focus. *Journal of Retailing and Consumer Services*, 76, 103593.
- Malik, G., & Rao, A. S. (2019). Extended expectation-confirmation model to predict continued usage of ODR/ride hailing apps: role of perceived value and self-efficacy [Article]. *Information Technology & Tourism*, 21(4), 461-482. <https://doi.org/10.1007/s40558-019-00152-3>
- McCoy, S., Galletta, D. F., & King, W. R. (2007). Applying TAM across cultures: the need for caution. *European Journal of Information Systems*, 16(1), 81-90.
- Nguyen, M.-H., La, V.-P., Le, T.-T., & Vuong, Q.-H. (2022). Introduction to Bayesian Mindsponge Framework analytics: An innovative method for social and psychological research. *MethodsX*, 9, 101808. <https://doi.org/https://doi.org/10.1016/j.mex.2022.101808>
- Pencarelli, T. (2020). The digital revolution in the travel and tourism industry. *Information Technology & Tourism*, 22(3), 455-476. <https://doi.org/10.1007/s40558-019-00160-3>
- Peng, K. F., Chen, Y., & Wen, K. W. (2014). Brand relationship, consumption values and branded app adoption. *Industrial Management & Data Systems*, 114(8), 1131-1143. <https://doi.org/10.1108/imds-05-2014-0132>
- Pham, H. C., Duong, C. D., & Nguyen, G. K. H. (2024). What drives tourists' continuance intention to use ChatGPT for travel services? A stimulus-organism-response perspective. *Journal of Retailing and Consumer Services*, 78, 103758. <https://doi.org/https://doi.org/10.1016/j.jretconser.2024.103758>
- Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88(5), 879-903. <https://doi.org/10.1037/0021-9010.88.5.879>
- Resort, D., & World, W. D. (2023). *Disney and sustainability: how the parks are going green*. *TyaloredTripsBlog*. TayloredTripsBlog. Retrieved May 7 from <https://www.tyaloredtripsblog.com/disney-and-sustainability-how-the-parks-are-going-green/>
- Shang, Y., Li, F., & Su, Q. (2023). The influence of big data-enabled price discrimination on tourists' continuance usage intention to mobile applications: a technology threat avoidance perspective. *Current Issues in Tourism*, 26(19), 3209-3230.
- Shaw, N., & Sergueeva, K. (2019). The non-monetary benefits of mobile commerce: Extending UTAUT2 with perceived value. *International Journal of Information Management*, 45, 44-55. <https://doi.org/https://doi.org/10.1016/j.ijinfomgt.2018.10.024>
- Sheth, J. N., Newman, B. I., & Gross, B. L. (1991). Why we buy what we buy: A theory of consumption values. *Journal of Business Research*, 22(2), 159-170.
- Shi, S., Chen, Y., & Chow, W. S. (2016). Key values driving continued interaction on brand pages in social media: An examination across genders. *Computers in Human Behavior*, 62, 578-589.
- Shi, S., Leung, W. K., & Munelli, F. (2022). Gamification in OTA platforms: A mixed-methods research involving online shopping carnival. *Tourism Management*, 88, 104426.
- Su, D. N., Duy, Q. N. P., Duong, T. H., Dinh, M. T. T., Luu, T. T., & Johnson, L. (2022). How does quality of mobile food delivery services influence customer loyalty? Grönroos service quality perspective [Article]. *International Journal of Contemporary Hospitality Management*, 34(11), 4178-4205. <https://doi.org/10.1108/ijchm-08-2021-1039>
- Sunio, V., & Schmöcker, J.-D. (2017). Can we promote sustainable travel behavior through mobile apps? Evaluation and review of evidence. *International Journal of Sustainable Transportation*, 11(8), 553-566. <https://doi.org/10.1080/15568318.2017.1300716>

- Talwar, S., Dhir, A., Kaur, P., & Mäntymäki, M. (2020). Why do people purchase from online travel agencies (OTAs)? A consumption values perspective. *International Journal of Hospitality Management*, 88, 102534.
- Tenenhaus, M., Vinzi, V. E., Chatelin, Y.-M., & Lauro, C. (2005). PLS path modeling. *Computational Statistics & Data Analysis*, 48(1), 159-205. <https://doi.org/https://doi.org/10.1016/j.csda.2004.03.005>
- Thompson, J. (2021). *Going paperless - Why more attractions are ditching the traditional map in favour of digital alternatives*. Attraction.io. Retrieved May 6 from <https://attractions.io/learn/going-paperless-why-more-attractions-are-ditching-the-traditional-map-in-favour-of-digital-alternatives>
- Touni, R., Kim, W. G., Haldorai, K., & Rady, A. (2022). Customer engagement and hotel booking intention: The mediating and moderating roles of customer-perceived value and brand reputation. *International Journal of Hospitality Management*, 104, 103246.
- Tseng, F.-C., Cheng, T., Li, K., & Teng, C.-I. (2017). How does media richness contribute to customer loyalty to mobile instant messaging? *Internet Research*, 27(3), 520-537.
- Van der Heijden, H. (2004). User acceptance of hedonic information systems. *MIS Quarterly*, 695-704.
- Venkatesh, V., Thong, J. Y. L., & Xu, X. (2012). Consumer Acceptance and Use of Information Technology: Extending the Unified Theory of Acceptance and Use of Technology. *Mis Quarterly*, 36(1), 157-178. <https://doi.org/10.2307/41410412>
- Vuong, Q.-H., & Nguyen, M.-H. (2024). *Better Economics for the Earth: A Lesson from Quantum and Information Theories*. Hanoi, Vietnam: AISDL.
- Wang, J.-C., & Chiang, M.-J. (2009). Social interaction and continuance intention in online auctions: A social capital perspective. *Decision Support Systems*, 47(4), 466-476.
- Wang, S., & Sun, Z. (2025). Roles of artificial intelligence experience, information redundancy, and familiarity in shaping active learning: Insights from intelligent personal assistants. *Education and Information Technologies*, 30(2), 2525-2546. <https://doi.org/10.1007/s10639-024-12895-6>
- Wang, S., Sun, Z., Li, M., Zhang, H., & Metwally, A. H. S. (2024). Leveraging TikTok for active learning in management education: An extended technology acceptance model approach. *The International Journal of Management Education*, 22(3), 101009. <https://doi.org/https://doi.org/10.1016/j.ijme.2024.101009>
- Wang, Y.-Y., Lin, H.-H., Wang, Y.-S., Shih, Y.-W., & Wang, S.-T. (2018). What drives users' intentions to purchase a GPS Navigation app The moderating role of perceived availability of free substitutes [Article]. *Internet Research*, 28(1), 251-274. <https://doi.org/10.1108/IntR-11-2016-0348>
- Wang, Y. S., Tseng, T. H., Wang, W. T., Shih, Y. W., & Chan, P. Y. (2019). Developing and validating a mobile catering app success model [Article]. *International Journal of Hospitality Management*, 77, 19-30. <https://doi.org/10.1016/j.ijhm.2018.06.002>
- Weng, S.-S., Yang, M.-H., & Hsiao, P.-I. (2018). A factor-identifying study of the user-perceived value of collective intelligence based on online social networks. *Internet Research*, 28(3), 696-715.
- Whiting, A., & Williams, D. (2013). Why people use social media: a uses and gratifications approach. *Qualitative Market Research: An International Journal*, 16(4), 362-369. <https://doi.org/10.1108/QMR-06-2013-0041>
- WorldPopulationReview.com. (2024). *Most Environmentally Friendly Countries 2024*. World Population Review. Retrieved May 9 from <https://worldpopulationreview.com/country-rankings/most-environmentally-friendly-countries>
- Wu, J., & Lu, X. (2013). Effects of extrinsic and intrinsic motivators on using utilitarian, hedonic, and dual-purposed information systems: A meta-analysis. *Journal of the Association for Information Systems*, 14(3), 1.
- Xu, C. Y., Peak, D., & Prybutok, V. (2015). A customer value, satisfaction, and loyalty perspective of mobile application recommendations [Article]. *Decision Support Systems*, 79, 171-183. <https://doi.org/10.1016/j.dss.2015.08.008>

- Yan, M., Filieri, R., & Gorton, M. (2021). Continuance intention of online technologies: A systematic literature review. *International Journal of Information Management*, 58, 102315.
- Yang, S., Jiang, H., Yao, J., Chen, Y., & Wei, J. (2018). Perceived values on mobile GMS continuance: A perspective from perceived integration and interactivity [Article]. *Computers in Human Behavior*, 89, 16-26. <https://doi.org/10.1016/j.chb.2018.07.032>
- Zeithaml, V. A. (1988). Consumer perceptions of price, quality, and value: a means-end model and synthesis of evidence. *Journal of Marketing*, 52(3), 2-22.
- Zhang, C.-B., Li, Y.-N., Wu, B., & Li, D.-J. (2017). How WeChat can retain users: Roles of network externalities, social interaction ties, and perceived values in building continuance intention. *Computers in Human Behavior*, 69, 284-293. <https://doi.org/10.1016/j.chb.2016.11.069>
- Zhou, T., Song, Y., & Zhou, P. (2022). Continued use intention of travel apps: from the perspective of control and motivation. *Technology Analysis & Strategic Management*, 34(6), 703-716. <https://doi.org/10.1080/09537325.2021.1916457>
- Zhu, Y., Wang, R., Zeng, R., & Pu, C. (2023). Does gender really matter? Exploring determinants behind consumers' intention to use contactless fitness services during the COVID-19 pandemic: a focus on health and fitness apps [Article]. *Internet Research*, 33(1), 280-307. <https://doi.org/10.1108/intr-07-2021-0454>

Competing interests

The author declares no competing interests.

Ethical approval

The research protocol was self-assessed and confirmed to be exempt from formal ethical review by the Ethics Committee for Human Sciences at the University of Turku, Finland. According to the University of Turku's policy on Ethical Review in Human Sciences in Finland, which follows the national guidelines of the Finnish National Board on Research Integrity (TENK, formerly the National Advisory Board on Research Ethics), ethical review is required only if a study includes one or more of the following conditions:

- (a) deviation from the principle of informed consent,
- (b) intervention in the physical integrity of participants,
- (c) involvement of minors under the age of 15 without guardian consent,
- (d) exposure to exceptionally strong stimuli,
- (e) risk of causing mental harm beyond normal daily life, or
- (f) threat to the safety of participants or researchers.

This study did not involve any of the above elements. It investigated adult users' continuous use of theme park mobile applications through anonymous online surveys. Participants were recruited voluntarily via Prolific (for European participants) and Wenjuanxing (for Chinese participants). No identifiable or sensitive personal data were collected, and all participants provided digital informed consent before participation. Under Finnish ethical research regulations, such studies are exempt from formal ethics committee review, as they pose no physical, psychological, or privacy-related risks beyond those of everyday life and adhere fully to the principles of voluntary participation, respect for autonomy, avoidance of harm, and data protection.

The Ethics Committee for Human Sciences at the University of Turku served as the independent ethical review body for this research and confirmed that the study was exempt from formal review. Its decision applies to the entire project, including data collection conducted outside Finland,

thereby fulfilling the requirement of Article 23 (paragraph 3) of the Declaration of Helsinki regarding independent ethical oversight.

All data collection and handling procedures complied with the EU General Data Protection Regulation (GDPR, Regulation (EU) 2016/679) and the Personal Information Protection Law (PIPL, 2021) of the People's Republic of China. The study fully adhered to the principles of voluntary participation, informed consent, anonymity, avoidance of harm, and data protection, in accordance with the Declaration of Helsinki and the Responsible Conduct of Research (RCR) guidelines of the Finnish National Board on Research Integrity (TENK, 2012).

Informed consent

Informed consent was obtained from all participants prior to the start of data collection. Participants were adults aged 18 or older who were recruited voluntarily through the Prolific platform and social media channels. Data were collected between 19 and 29 February 2024.

Electronic written consent was obtained through an online consent form embedded at the beginning of the questionnaire. Participants were required to read the consent agreement carefully, and only those who selected "I agree" were able to proceed to the survey. The consent form informed participants about the voluntary nature of the study, their right to withdraw at any time before submission without penalty, the anonymity and confidentiality of their responses, and the use of the data solely for academic research and publication purposes. Participants provided their informed consent in digital form by clicking an "I agree" button at the bottom of the consent page before beginning the survey.

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