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Sustainable intelligence and cultural worldview as triggers to preserve heritage tourism resources

ABSTRACT

This empirical study examines residents' decision-making process in preserving Jeju Batdam as a World Agricultural Heritage Site. Accordingly, it extends the model of goal-directed behavior (MGB) by including cultural worldview and sustainable intelligence as triggers of desire and behavioral intentions of residents to preserve the agricultural heritage tourism resources. This study collected 368 valid responses from residents using quota sampling method. Results revealed that the cultural worldview and sustainable intelligence play a significant role in influencing residents' behaviors toward the preservation of an agricultural heritage tourism resource (Batdam). Results also showed that attitude, positive and negative anticipated emotions, and perceived behavioral control increase desire, which stimulates residents' behavioral intention to preserve the heritage. Desire mediates the effects of attitude, perceived behavioral control, positive and negative anticipated emotions on the residents' intention to preserve the heritage. Findings contribute to deepening the knowledge of sustainable agricultural heritage management by better understanding of residents' decision-making process in preserving heritage resources. The outcomes of this study also provide policy implications with sustainable development and management policies of agricultural heritage sites.

KEYWORDS: Sustainable intelligence; cultural worldview; model of goal-directed behavior; agricultural heritage tourism; Jeju Batdam; South Korea

Introduction

The Food and Agriculture Organization of the United Nations (FAO, 2021a) has designated Globally Important Agricultural Heritage Systems (GIAHS) that possess exceptionally beautiful landscapes and cultural heritage along with agricultural biodiversity and ecosystems. These sites provide small-scale farmers with multiple goods and services, as well as food and livelihood security (FAO, 2021a). 'The primary goal of the GIAHS program aims to identify and protect Globally Important Agricultural Heritage Systems and related landscapes, agricultural biodiversity, knowledge systems, and culture' (FAO, 2021b). Moreover, according to FAO (2021c) cultural identity and sense of place are embedded in specific agricultural heritage sites. 'one of the main objectives is related to generate income and add economic value to the goods and services of such systems in a sustainable way by ecotourism' (FAO, 2021b). Thus, sustainably maintaining agricultural heritage sites may be an important issue for a number of countries, as these sites can be damaged by various factors, such as climate change, natural disasters, animal disturbances, and human misbehavior.

Jeju Batdam in South Korea was designated as an important National Agricultural Heritage in 2013, and it was registered as a GIAHS in April 2014 (Jeju Batdam, 2021). Batdam is a wall made of basalt, which is unique to Jeju Island and was created by the efforts of Jeju ancestors for over 1,000 years (Jeju Batdam, 2021). Batdam is not only helpful for filtering out strong winds to help grow crops, prevent soil loss, and protect livestock from invading farmlands and damaging crops, it also functions as a landmark for farming. As such, Jeju Batdam is also considered a cultural heritage that contains the life of the locals' ancestors and the history of Jeju agriculture. An interviewee residing in Jeju (male, 50s) said that Jeju Batdam is regarded as an aspect of the traditional culture of Jeju. It contains the wisdom of their ancestors and is a

valuable resource for future generations. Recently, Batdam has been attracting attention from tourists as a part of agricultural tourism given that Jeju is a popular destination for domestic and foreign travelers.

Sustainably maintaining Batdam is currently an emerging issue, as the site has been gradually damaged. The primary reason is that the structure is increasingly threatened by the changes in agriculture and urbanization (Kim, 2013). Particularly, as the population and number of tourists increase, farmlands are converted to lands where pensions and houses are built, thereby ultimately accelerating damage to Batdam. A farmer lamented that "stone walls that block the view are being demolished as guesthouses are being built in coastal tourist destinations. It is not known whether these stones will disappear unless they are well preserved in policy" (Kwon, 2018). Most of the Batdam in Jeju is a private property; therefore, trade or damage can occur at any time according to individual will (Kwon, 2018). Another Jeju resident (female, 20s) insisted that even if Batdam is a private property, owners of the area should be responsible for its preservation, and tourists who damage it should pay for its preservation.

The above statement implies that Batdam, as an agricultural heritage site, can be harmed by human behaviors. Social psychological theory may be appropriate to explain human behavior toward the conservation of agricultural heritage tourism resources. Therefore, the current study fills the gap by developing a research framework using goal-directed behavior (MGB) (Lee et al., 2020; Perugini & Bagozzi, 2001), which describes residents' decision-making processes in preserving the agricultural heritage site of Batdam.

Perugini and Bagozzi (2001) suggested that the inclusion of important variables in the original MGB contributes to the increase in explanatory power, thereby deepening the behavioral theory and broadening the knowledge of the research area. In this respect, this study

extends MGB by introducing two important variables of cultural worldview and sustainable intelligence, which may contribute to preserving heritage resources. Kang et al. (2016) introduced cultural worldview, which refers to individuals' evaluation of a specific subject based on a belief system about their cultures (Matsumoto, 2006). The study of Lee et al. (2020) highlighted that cultural worldview plays an important role in predicting positive attitude directly and behavioral intention indirectly toward experiencing cultural heritage tourism resources. Research on how cultural worldview influences behavioral intention when preserving agricultural heritage tourism resources are limited. Sustainable intelligence is defined as individuals' ability to apply their knowledge and experience to demonstrate pro-environmental behavior toward sustainable tourism (López-Sánchez & Pulido-Fernández, 2016). Many scholars suggest that sustainable intelligence contributes to sustainable heritage or tourism development (Edgell Sr., 2016; Higgins-Desbiolles, 2018; Kato & Progano, 2017; Kim et al., 2019; Lee et al., 2021; Stevenson, 2016; Zhang et al., 2020). Lee et al. (2021) insisted that sustainable intelligence is an important antecedent of pro-environmental behavior at an ecotourism destination. Thus, sustainable intelligence provides destination managers with understanding visitors and their needs for better assistance (Lee et al., 2021). However, research on how sustainable intelligence contributes to the decision-making process in preserving heritage resources is not fully understood. Thus, the current study fills the gap by extending the original MGB using cultural worldview and sustainable intelligence to explore how these concepts broaden the knowledge of human behavior toward the preservation of agricultural heritage tourism resources.

The theoretical framework in this study will contribute not only to deepening social psychological theory but also broadening the knowledge of heritage resources by better

understanding residents' decision-making process in preserving Jeju Batdam as an agricultural heritage site. Moreover, this study will provide policy implications with the sustainable development and management policies of agricultural heritage sites.

Literature review

Value–belief–norm (VBN) theory and MGB

This study applies VBN theory to extend the MGB model. Stern et al. proposed VBN theory (1999) by integrating value theory (Schwartz, 1992) with norm activation model (Schwartz, 1977) to describe individuals' eco-friendly behavior. Thus, a combination of values and norms triggers pro-environmental behavior. For example, people will highly likely engage in pro-environmental behavior if they have certain values, norms, and beliefs (e.g., cultural worldview and sustainable intelligence) about the need to protect natural and cultural resources. Han et al. (2018) applied VBN theory to support a cognitive–affective model of predicting travelers' pro-environmental behavior. Similarly, a recent study by Lee et al. (2021) applied biospheric value and sustainable intelligence as antecedents of the model that predict pro-environmental behavior at an ecotourism site. In line with the cognitive–affective framework, cultural worldview is considered as an antecedent of MGB to model the decision-making process of tourists in visiting a cultural tourism heritage site (Lee et al., 2020). On the basis of VBN theory, this study incorporated cultural worldview and sustainable intelligence in combination with MGB to understand the behavioral intentions of residents in preserving agricultural heritage tourism resources. Further theoretical reasoning for linkages between cultural worldview and sustainable intelligence with MGB component will be elaborated in the following subsections.

Cultural worldview and its relationships with MGB components

Matsumoto (2006) defined cultural worldview as belief systems about individual culture, which can be explained by heritage and traditions, as well as behavior. Matsumoto (2006) asserted that a big part of cultural worldview involves evaluating individuals' and their culture's attitudes, values, beliefs, and motivations. Kang et al. (2016) mentioned that cultural worldview entails evaluating cultural values via one's filter lens when interpreting experience with other cultures. Choi et al. (2007) developed the cultural worldview scale, which measures individuals' attitudes (i.e., beliefs and perceptions) toward conservation activities at cultural heritage sites. Choi and Fielding (2016) used this scale and found that cultural worldview significantly influences motivation for willingness to pay for preserving cultural heritage sites.

Despite the importance of cultural worldview, research on exploring the relationship of cultural worldview with MGB components is limited. Lee et al. (2020) studied cultural worldview and its relationships with MGB at a cultural heritage site. They found that cultural worldview has a positive effect on MGB components (e.g., attitude and perceived behavioral control). They also found that cultural worldview has an indirect positive effect on desire and behavioral intention. On the basis of the literature review, this study postulates the following hypotheses:

> H_1: Cultural worldview positively influences attitude (H_{1a}), subjective norm (H_{1b}), perceived behavioral control (H_{1c}), positive anticipated emotion (H_{1d}), and negative anticipated emotion (H_{1e}) toward preserving the heritage site of Jeju Batdam.

Sustainable intelligence and its relationship with MGB components

Sustainable intelligence represents "an inherent capacity for a certain type of tourist, the possession of which conditions their motivation, expectations, and behaviors" (López-Sánchez

& Pulido-Fernández, 2016, p. 61). This definition suggests that sustainable intelligence is the ability of tourists who can apply their knowledge and experience to adopting proactive behavior toward sustainable tourism. López-Sánchez and Pulido-Fernández (2016) maintain that tourists with high sustainable intelligence are concerned about their behavior toward sustainable tourism development. Silvestre and Fonseca (2020) asserted that tourists with high sustainable intelligence are more likely to demonstrate sustainable behavior toward tourism development. Lee et al. (2021) found that sustainable intelligence is a significant antecedent of predicting pro-environmental behavior toward a heritage tourism destination.

In line with social cognitive theory, the interaction of personal and environmental factors shapes the behaviors of tourists (Phipps et al., 2013). Font et al. (2016) used social cognitive theory to explain the effects of personal and environmental factors in predicting empathy toward sustainable tourism. On the basis of social cognitive theory, along with ecological worldview, sustainable intelligence is interacted with personal (e.g., attitude and emotion) and environmental (e.g., subjective norms) factors to stimulate the attitude and desire of individuals toward sustainability. Therefore, the following hypotheses are proposed:

> H_2: Sustainable intelligence positively influences attitude (H_{2a}), subjective norm (H_{2b}), perceived behavioral control (H_{2c}), positive anticipated emotion (H_{2d}), and negative anticipated emotion (H_{2e}) toward preserving the heritage site of Jeju Batdam.

MGB and the relationships among its components

The theory of reasoned action (TRA) proposed by Fishbein and Ajzen (1975) postulates that attitude and subjective norm can predict an individual's behavioral intention. Here, attitude refers to an individual's favorable or unfavorable evaluation when performing a behavior, and

subjective norm refers to his/her perception of social pressure from people around him/her to perform the behavior (Ajzen, 1985). Ajzen (1991) recognized that an individual's behavior is also dependent upon his/her volitional control, which refers to perceived behavioral control, thereby indicating the ability to perform the behavior (e.g., time and money). To overcome the shortcomings of the theory, Ajzen (1991) expanded TRA to the theory of planned behavior (TPB), which posits that an individual's behavior can be predicted by perceived behavioral control, as well as attitude and subjective norm (Ahmed et al., 2021).

Perugini and Bagozzi (2001) suggested that an individual's behavior is also influenced by his/her affective state and motivational state of mind, where the former is related to positive and negative anticipated emotions (e.g., "If I help preserve Jeju Batdam, I feel glad") and the latter is associated with desire (e.g., "If I can't help preserve Jeju Batdam, I will be disappointed"). Thus, they proposed MGB, which was expanded from TPB to compensate for its shortcomings. MGB posits that two emotions, as well as attitude, subjective norm, and perceived behavioral control, affect desire, which provides motivational force to perform a behavior (Perugini & Bagozzi, 2001). In MGB, desire mediates the relationship between MGB antecedents.

Several researchers have suggested that MGB performs better than TRA and TPB. For instance, Han et al. (2011) asserted that TPB has better explanatory power than TRA. Furthermore, Lee et al. (2017) demonstrated that the total variance (R^2) of behavioral intention is 14.2% for TRA, 34.3% for TPB, and 60.1–66.0% for MGB. This outcome indicates that MGB has larger explanatory power than TPB, followed by TRA.

As shown in Table 1, MGB has been applied in numerous areas, including the H1N1 influenza outbreak (Lee et al., 2012), festivals (Song et al., 2012a), responsible gambling (Song et al., 2012b), international tourism (Kim et al., 2012; Song et al., 2017), pop cultural tourism

(Lee et al. 2018), heritage tourism (Lee et al., 2020), Hong Kong protests (Kim et al., 2020), ecotourism (Jin et al., 2020), purchase of sportswear products online (Chiu & Choi, 2018), crowdfunding (Kim & Hall, 2019), smog and tourism (Wang et al., 2020), visa exemption (Song, 2017), responsible drinking (Fry et al., 2014), and video games (Holevová, 2018). The literature review indicates that the exogenous variables of MGB generally have positive effects on desire, which affect behavioral intention. This trend suggests that the MGB proposed by Perugini and Bagozzi (2001) performs decision-making processes effectively. Moreover, positive anticipated emotion has the largest effect on desire among all the exogenous variables (Lee et al., 2020; Song et al., 2012b). In this study, negative anticipated emotion is associated with double negative expressions (e.g., "If I can't help preserve Jeju Batdam, I will be disappointed"), thereby suggesting a positive influence on desire. Hence, this study posits the following hypotheses:

H3: Residents' intention to preserving the heritage site of Jeju Batdam is positively affected by attitude (H_{3a}), subjective norm (H_{3b}), perceived behavioral control (H_{3c}), positive anticipated emotion (H_{3d}), and negative anticipated emotion (H_{3e}).

H4: Desire positively influences behavioral intention toward preserving the heritage site of Jeju Batdam.

Insert Table 1 here

A research model is developed based on the hypotheses from the literature review (see Figure 1).

Insert Figure 1 here

Methods

Measures

This study included 11 constructs with a total of 48 measurement items by using prior validated multi-measurement scales (Churchill, 1979). Specifically, 14 items assessing cultural worldview [identify/preservation (5 items), tangible attachment (4 items), and

understanding/concerns (5 items)] were adapted from extant research (Choi et al., 2007; Kang et al., 2016; Lee et al., 2020). Sustainable intelligence was measured with five items adapted from existing studies (López-Sánchez & Pulido-Fernández, 2016). MGB measures of attitude (4 items), subjective norm (4 questions), positive anticipated emotion (4 questions), negative anticipated emotion (4 items), perceived behavioral control (6 questions), desire (3 questions), and behavioral intention (3 questions) were also adapted from previous research (Kim et al., 2012; Kim et al., 2020; Lee et al., 2012; Lee et al., 2020).

For content validity, two professors were requested to review the measurement items to check whether they were appropriate for evaluating Jeju Batdam. Then, pre-test was conducted with 30 Jeju residents. The results of the two procedures indicated minor wording changes, such as consistency in current or future tense. All of the measurement items were evaluated based on five-point Likert-type scales (1 = strongly disagree and 5 = strongly agree). Demographic characteristics were also included in the questionnaire.

Data collection

The study's population was Jeju residents. This study applied quota sampling method (see Table 2 for details) using the age and gender of the Jeju population (Jeju Special Self-governing Province, 2020). This study primarily conducted an online survey with respondents from December 11, 2020 to January 14, 2021 via KakaoTalk (a popular mobile instant messaging application in Korea) using Google Forms because local residents are reluctant to conduct onsite surveys due to COVID-19. This study also used snowball sampling method. The researchers sent the Google Forms survey via a KakaoTalk link to the respondents, who also sent it to their connections, such as family, friends, and relatives. This study also conducted an

onsite survey mainly for senior respondents who are not familiar with the online mobile survey. Survey respondents were given a coffee coupon (equivalent to US$ 2) in gratitude for their sincere responses. This study collected a total of 408 responses, which consisted of 307 responses via the online survey and 101 responses via the onsite survey. However, 40 responses were deleted from the initial quota samples (408 cases), as the respondents were not interested in preserving the agricultural heritage site of Jeju Batdam. Thus, the final data set had 368 respondents.

Insert Table 2 around here

Data analysis

This study tested the research model using partial least squares (PLS) structural equation modeling (SEM), which is claimed to be better suitable for multi-group analysis or conceptually combined models than traditional SEM approaches (Chin et al., 2003; Hair et al., 2012; Hair et al., 2017). In addition, PLS-SEM enables researchers to analyze formative and reflective constructs within a research model simultaneously. Particularly, different from regression analyses, PLS-SEM does not require the data to be normally distributed. Thus, parametric statistical tests (Hair et al., 2010), SPSS 25.5 and SmartPLS 3.3.3 (Ringle et al., 2015) were used in this study, as this study's model had formative and reflective indicators with a comprehensive model.

Results

Profile of samples

As shown in Table 3, the proportion of males (50.3%) were almost the same as that of females (49.7%). The age group of 18–29 years old (28.2%) was dominant, followed by the age group

with individuals 60 years old and over (23.4%). Almost two-thirds of the respondents attended university and/or higher (72.0%). Monthly income between 2 and 4 million KRW (US$ 1 is equivalent to 1,099 KRW) was dominant, representing 60.8%. Moreover, the majority of the respondents had been living in Jeju for more than 30 years (61.5%), and almost a half of the respondents (48.9%) recognized that Jeju Batdam was registered as a World Agriculture Heritage Site. The respondents demonstrated their interest in preserving Jeju Batdam, with the ranges of average (31.0%), somewhat (36.9%), and strongly (32.1%).

Insert Table 3 around here

Measurement model

First of all, exploratory factor analysis (EFA) was conducted to test the validity of sustainable intelligence because this study initially used sustainable intelligence for the residents. The results of EFA showed that the construct of sustainable intelligence was valid based on KMO = 0.816, Bartlett's test of sphericity x^2 = 786.154 ($p < 0.001$), eigenvalue greater than 1, factor loadings = 0.700–0.860(≥0.7), and reliability coefficient = 0.839 (≥0.7) (see Appendix), exceeding the required criteria (Hair et al., 2010).

Then, confirmatory factor analysis (CFA) estimated the measurement model in Table 4. PLS-SEM depends on a nonparametric bootstrap procedure to test the significance of the estimated hypotheses (Davison & Hinkley, 1997; Efron & Tibshirani, 1993). Accordingly, this study used PLS-SEM with bootstrapping of 5,000 resamples, which is deemed an appropriate analysis method for the non-normal distribution data. Five items with factor loadings below 0.7 were eliminated (Hair et al., 2010): two items from identify/preservation of cultural worldview, one item from tangible/attachment of cultural worldview, and one item from perceived behavioral control.

Insert Table 4 around here

Cronbach's α and Rho_A for all constructs revealed that all of them were larger than 0.7, which suggested good internal consistency, as shown in Table 5 (Hair et al., 2017). In addition, the composite reliability and average variance extracted (AVE) for eight constructs were over 0.7 and 0.5, respectively, along with factor loadings for 42 items larger than 0.7, which confirmed convergent validity (Stevens, 2009). Values for the square root of AVE for all constructs were larger than the corresponding correlations, which confirmed discriminant validity (Henseler et al., 2014).

The results revealed that the Q^2 values for all the endogenous variables of subjective norm, attitude, positive and negative anticipated emotions, perceived behavioral control, desire, and behavioral intention were larger than zero, thereby indicating acceptability and representing cross-validated predictive relevance as an evaluation criterion (Geisser, 1974; Stone, 1974). Furthermore, multicollinearity among constructs was assessed by applying variance inflation factor (VIF). Given that all inter VIF values of constructs ranged from 1.000 to 4.120, multicollinearity was not a problem (Hair et al., 2012).

Insert Table 5 around here

Structural model

The PLS-SEM model tested the hypotheses, as shown in Figure 2 (Ringle et al., 2015). The variance explained (R^2) for the three endogenous variables were attitude (48.1%), subjective norm (50.1%), perceived behavioral control (53.9%), positive anticipated emotion (58.7), negative anticipated emotion (35.7%), desire (83.8%), and behavioral intention (74.3%). The path coefficients and the evaluated t-statistics were used to test the hypotheses by applying PLS bootstrapping (5,000 resamplings) (Hair et al., 2012; Stevens, 2009) to estimate the sampling

distribution of statistics using random resamplings (Chin et al. 2003).

The results showed that cultural worldview had a significant effect on attitude ($\gamma = 0.301$, $t = 5.274$, $p < 0.001$), subjective norm ($\gamma = 0.233$, $t = 3.880$, $p < 0.001$), perceived behavioral control ($\gamma = 0.206$, $t = 3.882$, $p < 0.001$), and positive anticipated emotion ($\gamma = 0.170$, $t = 3.529$, $p < 0.001$). Thus, H_{1a}, H_{1b}, H_{1c}, and H_{1d} were supported. Sustainable intelligence had a significant effect on attitude ($\gamma = 0.467$, $t = 9.706$, $p < 0.001$), subjective norm ($\gamma = 0.540$, $t = 10.194$, $p < 0.001$), perceived behavioral control ($\gamma = 0.589$, $t = 12.821$, $p < 0.001$), positive anticipated emotion ($\gamma = 0.649$, $t = 15.833$, $p < 0.001$), and negative anticipated emotion ($\gamma = 0.548$, $t = 12.244$, $p < 0.001$). Thus, H_{2a}, H_{2b}, H_{2c}, H_{2d}, and H_{2e} were supported.

Furthermore, desire was found to be significantly influenced by attitude ($\beta = 0.128$, $t = 2.729$, $p < 0.01$), perceived behavioral control ($\beta = 0.085$, $t = 2.331$, $p < 0.05$), positive anticipated emotion ($\beta = 0.430$, $t = 7.981$, $p < 0.001$), and negative anticipated emotion ($\beta = 0.369$, $t = 9.923$, $p < 0.001$). Thus, H_{3a}, H_{3c}, H_{3d}, and H_{3e} were supported. Finally, behavioral intention was significantly affected by desire ($\beta = 0.862$, $t = 55.771$, $p < 0.001$), supporting H_4. However, the two relationships between cultural worldview and negative anticipated emotion, as well as subjective norm and desire, were found to be insignificant. Thus, H_{1e} and H_{3b} were not supported. A possible reason for the insignificant relationship between cultural worldview and negative anticipated emotion is that the concept of cultural worldview is extremely valuable; thus, the respondents do not feel any negative emotion to help preserve Jeju Batdam. Another plausible reason for the insignificant relationship between subjective norm and desire is that preserving Jeju Batdam as a heritage resource to Jeju residents is highly desirable; thus, the respondents do not care about what others think of their participation in the Jeju Batdam conservation.

Insert Figure 2 around here

PLS bootstrapping with 5,000 resampling was implemented to confirm the mediating effects in the proposed study model (Table 6). Cultural worldview significantly and indirectly influenced desire ($\gamma = 0.164$, $t = 3.713$, $p < 0.001$) and behavioral intention ($\gamma = 0.141$, $t = 3.730$, $p < 0.001$). Sustainable intelligence significantly and indirectly influenced desire ($\gamma = 0.606$, $t = 16.485$, $p < 0.001$) and behavioral intention ($\gamma = 0.522$, $t = 15.107$, $p < 0.001$). In addition, behavioral intention was indirectly influenced by attitude ($\beta = 0.111$, $t = 2.729$, $p < 0.006$), perceived behavioral control ($\beta = 0.073$, $t = 2.314$, $p < 0.021$), positive anticipated emotion ($\beta = 0.370$, $t = 7.867$, $p < 0.001$), and negative anticipated emotion ($\beta = 0.318$, $t = 9.821$, $p < 0.001$). Thus, attitude, perceived behavioral control, subjective norm, positive and negative anticipated emotion, and desire played mediating roles in the study model. Cohen (1992) recommended that effect sizes (f^2) of 0.02, 0.15, and 0.35 should be small, medium, and large influences, respectively. The results of the study showed that the f^2 values ranged from 0.002 to 2.898, thereby indicating small to large influences.

Insert Table 6 around here

Conclusion and implications

This empirical study used cultural worldview and sustainable intelligence to extend a social psychological model (i.e., MGB) to understand residents' decision-making process better in the preservation of Jeju Batdam as a world agricultural heritage site. Agricultural heritage can be damaged by natural disasters (e.g., typhoons) and animal disturbances. However, human-related behavior has been found to damage agricultural heritage tourism resources, such as changes in farmlands, urbanization, and development of houses and guesthouses (Kwon, 2018). Once

damaged, restoring a site to its original state is difficult or takes a long time. The results showed that attitude, positive and negative emotions, and perceived behavioral control have positive effects on desire, which, in turn, influence the behavioral intention toward preserving the heritage resource of Batdam. This finding suggests that MGB is a valid and useful research framework to explain the preservation of heritage resources. The results of this study also revealed that the cultural worldview and sustainable intelligence role, as extended variables of the original MGB, significantly influence the decision-making process in the preservation behavior of residents toward heritage resources. Furthermore, desire mediates the effects of MGB components on residents' intention to preserve the heritage site. Desire also mediates the sequence of sustainable intelligence cultural worldview with MGB components, leading to the desire and behavioral intention of residents to preserve the heritage site.

Theoretical implications

The study's findings suggest several theoretical implications in terms of broadening knowledge and deepening the theory. First, this study contributes to developing a theory-driven research framework using an extended MGB (EMGB) along with social cognitive theory to understand residents' decision-making process better in preserving the agricultural heritage tourism resource of Jeju Batdam. The current study has proven that EMGB is valid and reliable when predicting how residents decide to preserve agricultural heritage tourism resources. To the best of our knowledge, this study is the first empirical research that helps deepen the theory in the literature of sustainable management of internationally recognized agricultural heritage. Second, this study contributes to identifying the roles of cultural worldview and sustainable intelligence in predicting attitude, subjective norm, positive and negative anticipated emotions,

and perceived behavioral control toward the preservation of agricultural heritage. The finding indicates that cultural worldview and sustainable intelligence are generally significant variables of forming positive attitude, subjective norm, and perceived behavioral control, as well as anticipated emotions. Notably, residents place more value on sustainable intelligence than cultural worldview in predicting the preservation behavior of residents toward heritage resources. As far as the authors know, this finding is the first to be explored, thereby broadening the knowledge in the area of heritage resources. This study reveals that cultural worldview and sustainable intelligence indirectly influence not only desire via attitude, subjective norm, anticipated emotions, and perceived behavioral control but also behavioral intention through desire. The finding highlights that cultural worldview and sustainable intelligence are important variables in MGB by playing direct and indirect roles in predicting the preservation desire and behavior of residents toward persevering heritage resources. This result is in accordance with social cognitive theory that discusses how personal and environmental factors can drive the behaviors of residents to engage in sustainable management of the heritage site. Third, this study highlights that positive and negative anticipated emotions predict strong desire. This finding suggests that residents' appraisal of goal achievement and/or failure (emotions) plays a more important role in predicting desire than response in favorable or unfavorable aspects (attitude) and volitional ability (perceived behavioral control) in the agricultural heritage context. Despite desire being positively affected by subjective norm, this relationship was found to be insignificant. This outcome might be attributable to the suppression effect by other strong variables, such as emotions (Lee et al., 2017). This finding implies that desire is not likely to be strongly affected by subjective norms, which was similarly reported by Song et al. (2012b). Finally, the current study found that desire has a positive effect on behavioral intention. At the

same time, desire mediates the relationships between cultural worldview, sustainable intelligence, and behavioral intention and between MGB components and behavioral intention. This finding contributes to proving that desire plays a significant motivational force not only for predicting behavioral intention but also for mediating the relationships among cultural worldview, sustainable intelligence, attitude, perceived behavioral control, anticipated emotions, and behavioral intention.

Policy implications

This study develops three implementable implications for managing Batdam as a sustainable agricultural heritage site. First, our findings suggest that when residents have stronger cultural worldview and sustainable intelligence, they demonstrate more positive attitude, anticipated emotions, and perceived behavioral control, as well as desire and intention, to preserve Batdam as an agricultural heritage site. Therefore, the importance of cultural values and beliefs to preserve Batdam as an agricultural heritage tourism resource should be promoted. To do this, policy makers should collaborate with the education community to make systematic and continuous education programs, including textbooks and audio and video materials, such that residents can understand the history and values of Batdam from childhood as a future subject of sustainable management. In addition, arranging field visits for local communities, including students, is an effective tactic to enhance cultural worldview and sustainable intelligence of Batdam visitors. We recommend policy makers to organize festivals and events where residents have an opportunity to participate in the conservation of Batdam. These activities will enable residents to enhance their awareness of Batdam. They can also help residents strengthen their cultural worldview and sustainable intelligence, which contributes to creating an affirmative

attitude and evoke desire, thereby ultimately driving the locals to be willing to behave toward the preservation of agricultural heritage tourism resources sustainably.

Second, according to our findings, positive and negative anticipated emotions are the most important determinants of the residents' desire. Residents' emotions can be stimulated by artistic and cultural activities. Policy makers can develop a marketing communication plan to emotionally influence residents by promotional materials (e.g., short videos and social media contents). Recruiting influencers who can stimulate residents' emotions toward Batdam can enhance their desire and intention to engage in conservation plans. Third, policy makers should be aware that desire not only leads to motivational impetus directly for residents' behavioral intention to preserve the agricultural heritage tourism resources of Batdam, it also mediates the relationships among cultural worldview, sustainable intelligence, attitude, anticipated emotions, perceived behavioral control, and behavioral intention to preserve the heritage site. Thus, policy makers should be creative and use novel approaches to increase residents' desire to support conservation plans in Batdam. We suggest using digital innovations, such as virtual reality (VR) to stimulate the desire of the residents toward the site prediction. These VR and augmented reality should be designed in a creative way to strengthen positive attitude, perceived behavioral control, and anticipated emotional state of residents, which can turn to desire and intention of the residents to engage in sustainable management of agricultural heritage tourism resources.

Limitation and recommendations for future research

Although this study contributes to theory deepening by extending the original MGB, it is limited to one agricultural heritage site. Therefore, this study recommends conducting research on other

agricultural heritage sites using the proposed research framework to strengthen the generalizability of the current study's findings. Given that the linkage of subjective norm and perceived behavioral control with desire was found to be insignificant in this study, future researchers should explore whether this finding is attributable to the generic characteristics of agricultural heritage or suppression effect among other factors. Future researchers are also recommended to extract a cultural worldview unique to agricultural heritage tourism resources, further using in-depth interviews. As MGB is a theory-deepening approach, future researchers should identify more extended variables to increase explanatory power. For instance, sustainable intelligence may contribute to residents' behavior to preserve agricultural heritage resources (López-Sánchez & Pulido-Fernández, 2016).

Although an online survey for the COVID-19 pandemic was used, an offline survey for older people was also used because older people are not familiar with online survey. Thus, future study should use one type of survey technique, such as on-site survey, to avoid the potential drawback from the combined types of sampling techniques in the post-pandemic. This study also did not include residents who are not concerned with the heritage protection since they were unfavorable of heritage protection. Thus, future research should explore why residents are not interested in preserving the heritage conservation and how this will affect the decision-making process in their conservation. Preservation and economic development should be balanced. In this sense, sustainable intelligence may be also considered in the economic perspective. Thus, future research may include sustainable intelligence in terms of heritage preservation sentiment and economic consideration when conducting a survey. Finally, old people are dominant compared with young people in the population of Jeju Island. Thus, future research is recommended to test any difference in the two age groups in the structural relations

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of the research model.

Lee, Choong-ki, Hossein Olya, Yae-Na Park, Yu-Jin Kwon, and Myung Ja Kim. 2022. "Sustainable Intelligence and Cultural Worldview as Triggers to Preserve Heritage Tourism Resources." Tourism Geographies: 1–21. https://doi.org/10.1080/14616688.2021.2016934

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Lee, Choong-ki, Hossein Olya, Yae-Na Park, Yu-Jin Kwon, and Myung Ja Kim. 2022. "Sustainable Intelligence and Cultural Worldview as Triggers to Preserve Heritage Tourism Resources." Tourism Geographies: 1–21. https://doi.org/10.1080/14616688.2021.2016934

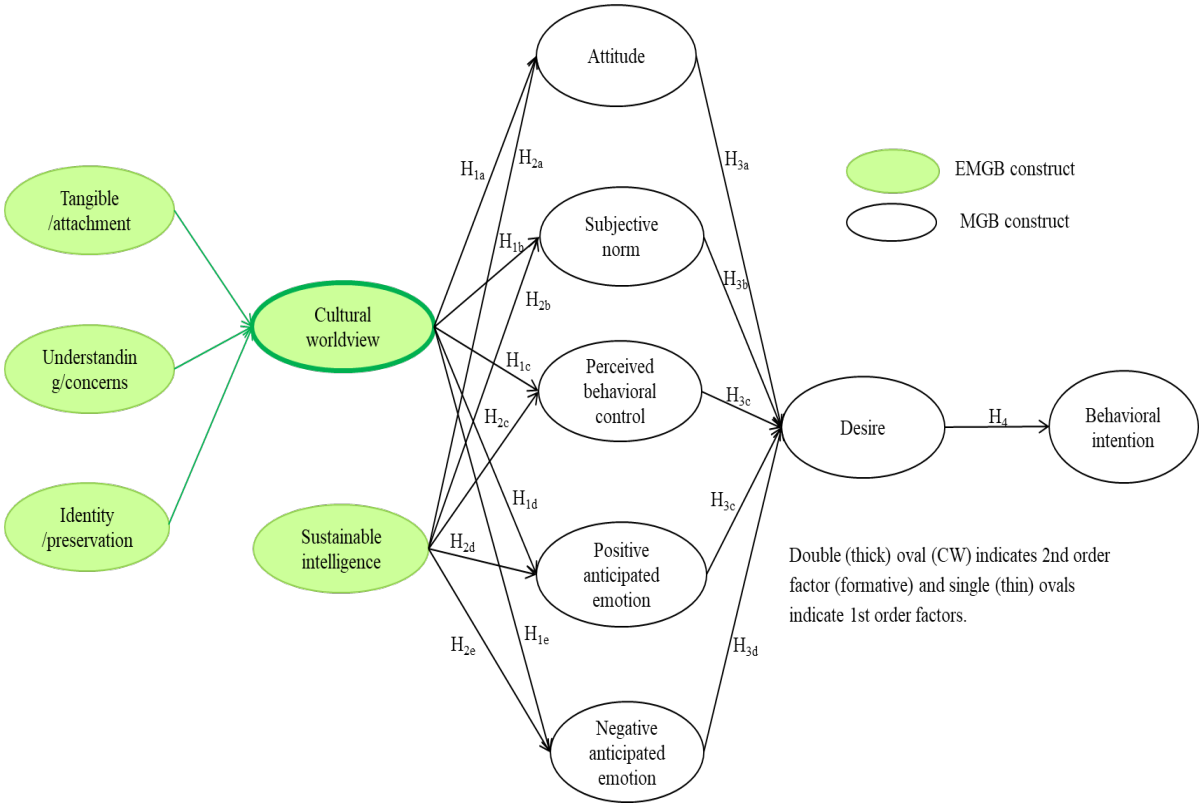

Figure 1. Proposed research model.

Lee, Choong-ki, Hossein Olya, Yae-Na Park, Yu-Jin Kwon, and Myung Ja Kim. 2022. "Sustainable Intelligence and Cultural Worldview as Triggers to Preserve Heritage Tourism Resources." Tourism Geographies: 1–21. https://doi.org/10.1080/14616688.2021.2016934

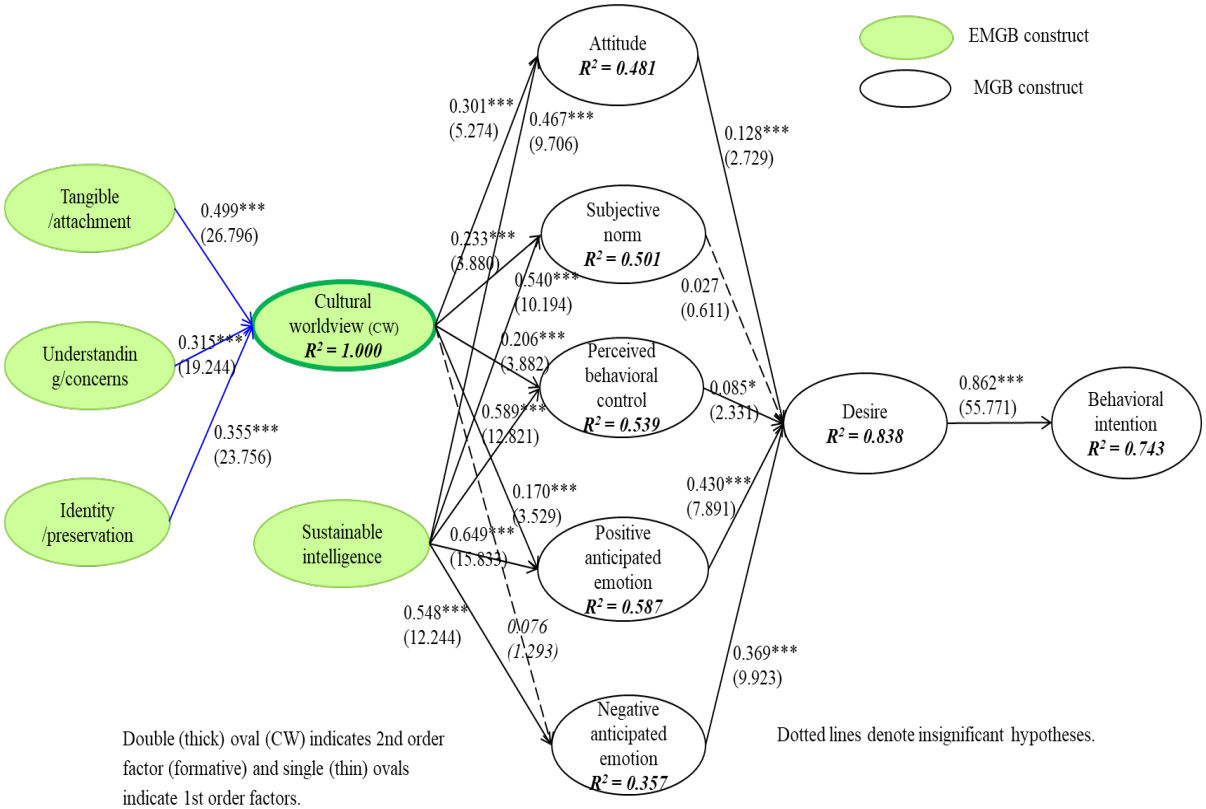

Figure 2. Results of path analysis.

Lee, Choong-ki, Hossein Olya, Yae-Na Park, Yu-Jin Kwon, and Myung Ja Kim. 2022. "Sustainable Intelligence and Cultural Worldview as Triggers to Preserve Heritage Tourism Resources." Tourism Geographies: 1–21. https://doi.org/10.1080/14616688.2021.2016934

Table 1. Past research on MGB.

Author	MGB constructs → DE					DE→BI
	AT	SN	PAE	NAE	PBC	
Kim et al. (2012)	o	o	o	o	x	o
Lee et al. (2012)	o	o	o	o	x	o
Song et al. (2012a)	o	o	o	X	x	o
Song et al. (2012b)	o	x	o	o	x	o
Fry et al. (2014)	x	o	o	X	x	o
Song et al. (2017)	x	o	o	o	o	o
Holevová et al. (2018)	o	x	o	o	x	o
Lee et al. (2018)	x	o	o	o	o	o
Kim and Hall (2019)	o	x	o	o	x	o
Lee et al. (2020)	o	o	o	o	o	o
Bui and Kiatkawsin (2020)	o	x	o	x	o	o
Chiu and Choi (2020)	o	o	o	x	o	o
Jin et al. (2020)	o	x	o	x	o	o
Kim et al. (2020)	o	o	x	o	o	o
Wang et al. (2020)	x	x	o	o	x	o
Present study hypothesizes that	o	o	o	o	o	o

Note: AT=Attitude; SN=Subjective norm; PAE=Positive anticipated emotion; NAE=Negative anticipated emotion; PBC=Perceived behavioral control; DE=Desire; BI=Behavioral intention.

o means significant effect on desire; x means insignificant effect on desire.

Lee, Choong-ki, Hossein Olya, Yae-Na Park, Yu-Jin Kwon, and Myung Ja Kim. 2022. "Sustainable Intelligence and Cultural Worldview as Triggers to Preserve Heritage Tourism Resources." Tourism Geographies: 1–21. https://doi.org/10.1080/14616688.2021.2016934

Table 2. Quota sampling based on gender and age.

Age	Gender				Total	
	Male		Female			
	Quota	Actual	Quota	Actual	Quota	Actual
<30	70	70	63	63	133	133
30–39	28	28	26	26	54	54
40–49	35	35	34	34	69	69
50–59	34	34	32	32	66	66
60<	38	38	48	48	86	86
Total	205	205	203	203	408	408

Note: "Quota" refers to the proportion of population, and "Actual" indicates quota sampling based on gender and age (Jeju Special Self-governing Province, 2020).

Lee, Choong-ki, Hossein Olya, Yae-Na Park, Yu-Jin Kwon, and Myung Ja Kim. 2022. "Sustainable Intelligence and Cultural Worldview as Triggers to Preserve Heritage Tourism Resources." Tourism Geographies: 1–21. https://doi.org/10.1080/14616688.2021.2016934

Table 3. Demographics and general information.

Characteristics	N (368)	%
Gender		
Male	185	50.3
Female	183	49.7
Age		
18–29 years old	104	28.2
30–39 years old	51	13.9
40–49 years old	65	17.7
50–59 years old	62	16.8
60 years old and over	86	23.4
Educational level		
≤High school	103	28.0
University	224	60.9
Graduate school	41	11.1
Monthly personal income (KRW*)		
<2.00 million	61	16.6
2.00–2.99 million	109	29.6
3.00–3.99 million	115	31.2
4.00–4.99 million	51	13.9
5.00–5.99 million	28	7.6
≥6.00 million	4	1.1
Length of residence		
<30 years	142	38.5
30–59 years	149	40.8
≥60 years	77	20.7

Note: *US$ 1 = 1,113 KRW (Korean Won) as of May 2021.

Lee, Choong-ki, Hossein Olya, Yae-Na Park, Yu-Jin Kwon, and Myung Ja Kim. 2022. "Sustainable Intelligence and Cultural Worldview as Triggers to Preserve Heritage Tourism Resources." Tourism Geographies: 1–21. https://doi.org/10.1080/14616688.2021.2016934

Table 4. Results of CFA and descriptive statistics.

Constructs	Factor loading	Mean	SD[a]
Identify/preservation of cultural worldview (ICW)			
1. We must protect our cultural heritage.*	-	-	-
2. We must learn about our traditional culture.	0.839	4.723	0.551
3. Our traditional culture has a special meaning to me.	0.911	4.454	0.793
4. Our culture helps my identity.	0.902	4.546	0.768
5. Our traditional houses, buildings, and museums should be preserved.*	-	-	-
Tangible/attachment of cultural worldview (TCW)			
1. I want to know about traditional clothes.	0.913	4.215	0.821
2. I want to know about traditional food.*	-	-	-
3. Traditional clothing is important to me.	0.937	4.152	0.893
4. Traditional food is important to me.	0.886	4.356	0.788
Understanding/concern of cultural worldview (UCW)			
1. Our cultural heritage continues to disappear.	0.860	4.598	0.689
2. If we do nothing, then our heritage will be lost.	0.870	4.766	0.505
3. Our traditional culture continues to disappear.	0.886	4.647	0.634
4. Traditional culture will be lost if we do nothing.	0.817	4.758	0.535
5. Our culture helps us live with people from other cultures.	0.835	4.625	0.656
Sustainable intelligence (SI)			
1. I recognize Jeju Batdam as a sustainable tourism resource.	0.787	4.220	0.852
2. I know how the sustainability of Jeju Batdam is important.	0.846	4.082	0.955
3. I believe that activities for sustainability in Jeju Batdam are imperative.	0.818	4.389	0.803
4. I understand a need for financial support to preserve Jeju Batdam.	0.803	3.799	1.062
5. I will do responsible activities to preserve Jeju Batdam.	0.824	4.179	0.912
Attitude (AT)			
1. Preserving Jeju Batdam is an affirmative action.	0.955	4.592	0.657
2. Preserving Jeju Batdam is a beneficial action.	0.969	4.573	0.688
3. Preserving Jeju Batdam is a valuable action.	0.974	4.617	0.641
4. Preserving Jeju Batdam is a necessary action.	0.950	4.603	0.664
Subjective norm (SN)			
1. Those who are important to me will approve of preserving Jeju Batdam.	0.937	4.424	0.783
2. Those who are important to me will support preserving Jeju Batdam.	0.964	4.361	0.802
3. Those who are important to me will understand preserving Jeju Batdam.	0.955	4.389	0.790
4. Those who are important to me would recommend preserving Jeju Batdam.	0.895	4.264	0.859
Positive anticipated emotion (PAE)			
1. If I help preserve Jeju Batdam, then I will feel excited.	0.954	4.166	0.908
2. If I help preserve Jeju Batdam, then I will feel glad.	0.957	4.234	0.872
3. If I help preserve Jeju Batdam, then I will feel satisfied.	0.974	4.226	0.873
4. If I help preserve Jeju Batdam, then I will feel happy.	0.933	4.168	0.881
Negative anticipated emotion (NAE)			
1. If I can't help preserve Jeju Batdam, then I will be angry.	0.904	3.269	1.038
2. If I can't help preserve Jeju Batdam, then I will be disappointed.	0.919	3.334	1.058
3. If I can't help preserve Jeju Batdam, then I will be worried.	0.910	3.66	1.089
4. If I can't help preserve Jeju Batdam, then I will be sad.	0.926	3.481	1.086
Perceived behavioral control (PBC)			
1. Preserving Jeju Batdam or not doing it is entirely up to me.*	-	-	-
2. I can help preserve Jeju Batdam whenever I want.	0.847	4.052	0.933
3. I have the knowledge to help preserve Jeju Batdam.	0.873	3.497	1.193
4. I have the physical strength to help preserve Jeju Batdam.	0.861	3.704	1.030
5. I have time to help preserve Jeju Batdam.	0.828	3.410	0.988
6. I have the economic power to help preserve Jeju Batdam.	0.841	3.674	1.138
Desire (DE)			
1. I want to help preserve Jeju Batdam.	0.942	4.193	0.920
2. I hope to help preserve Jeju Batdam.	0.959	4.171	0.962
3. I aspire to help preserve Jeju Batdam.	0.851	3.688	1.057
Behavioral intention (BI)			
1. I will make a real effort to preserve Jeju Batdam as a heritage resource.	0.942	4.019	1.033
2. Whenever an opportunity arises, I will help preserve Jeju Batdam.	0.945	4.071	0.995

Lee, Choong-ki, Hossein Olya, Yae-Na Park, Yu-Jin Kwon, and Myung Ja Kim. 2022. "Sustainable Intelligence and Cultural Worldview as Triggers to Preserve Heritage Tourism Resources." Tourism Geographies: 1–21. https://doi.org/10.1080/14616688.2021.2016934

3. I will participate in the Jeju Batdam Conservation Project in the future.	0.845	3.649	1.055

Note: *Items are deleted, as factor loadings were below then 0.7. [a]: standard deviation

Lee, Choong-ki, Hossein Olya, Yae-Na Park, Yu-Jin Kwon, and Myung Ja Kim. 2022. "Sustainable Intelligence and Cultural Worldview as Triggers to Preserve Heritage Tourism Resources." Tourism Geographies: 1–21. https://doi.org/10.1080/14616688.2021.2016934

Table 5. Correlation matrix, reliability, and discriminant validity.

Construct	Correlation of the constructs								
	1	2	3	4	5	6	7	8	9
1. Cultural worldview	**0.750**								
2. Sustainable intelligence	0.615	**0.816**							
3. Attitude	0.588	0.652	**0.962**						
4. Subjective norm	0.565	0.683	0.756	**0.938**					
5. Positive anticipated emotion	0.569	0.754	0.726	0.709	**0.955**				
6. Negative anticipated emotion	0.412	0.594	0.478	0.590	0.695	**0.915**			
7. Perceived behavioral control	0.569	0.716	0.548	0.611	0.770	0.680	**0.850**		
8. Desire	0.569	0.711	0.684	0.699	0.864	0.803	0.754	**0.919**	
9. Behavioral intention	0.576	0.748	0.613	0.677	0.862	0.752	0.801	0.862	**0.912**
Cronbach's alpha $\geq$ 0.7	0.922	0.876	0.973	0.954	0.968	0.935	0.905	0.906	0.898
Rho_A (reliability coefficient) $\geq$ 0.7	0.925	0.885	0.974	0.959	0.968	0.939	0.911	0.916	0.914
Composite reliability $\geq$ 0.7	0.934	0.909	0.980	0.967	0.976	0.953	0.929	0.942	0.936
AVE $\geq$ 0.5	0.563	0.666	0.926	0.880	0.911	0.837	0.723	0.844	0.831
Effect size (Q^2) > 0	-	-	0.439	0.435	0.530	0.292	0.379	0.699	0.611

Note: All boldfaced diagonal elements appearing in the correlation of construct matrix indicate the square roots of AVEs. -: Exogenous variables give effects to endogenous variables; thus, only endogenous variables have an effect size in causal modeling.

Table 6. Mediating effect.

Sequential path	Coefficient	t-value
Cultural worldview→ Attitude, subjective norm, perceived behavioral control, positive and negative anticipated emotions → Desire	0.164***	3.713
Cultural worldview → Attitude, subjective norm, perceived behavioral control, positive and negative anticipated emotions, and desire→ Behavioral intention	0.141***	3.730
Sustainable intelligence → Attitude, subjective norm, perceived behavioral control, positive and negative anticipated emotions → Desire	0.606***	16.485
Sustainable intelligence → Attitude, subjective norm, perceived behavioral control, positive and negative anticipated emotions, and desire → Behavioral intention	0.522***	15.107
Attitude → Desire→ Behavioral intention	0.111**	2.729
Subjective norm → Desire→ Behavioral intention	*0.024*^{ns}	*0.611*
Perceived behavioral control → Desire→ Behavioral intention	0.073*	2.314
Positive anticipated emotion → Desire→ Behavioral intention	0.370***	7.867
Negative anticipated emotion → Desire→ Behavioral intention	0.318***	9.821

Note: ***p < 0.001; **p < 0.01; *p < 0.05. ns = nonsignificant.

Appendix
Table A. Results of EFA.

Factor	Variable	λ	C	EV	VE	α
Sustainable intelligence (SI)	I recognize Jeju Batdam as a sustainable tourism resource.	0.860	0.739			
	I understand a need for financial support to preserve Jeju Batdam.	0.839	0.703			
	I believe that activities for sustainability in Jeju Batdam are imperative.	0.822	0.675	3.11	62.218	0.839
	I will do responsible activities to preserve Jeju Batdam.	0.709	0.503			
	I know how the sustainability of Jeju Batdam is important.	0.700	0.490			

Note: KMO = 0.816, Bartlett's test of sphericity x^2=786.154 ($p < 0.001$), Total variance explained = 62.22

λ = Factor loadings, C = Communality, EV = Eigenvalue, VE = Variance explained, α = Cronbach's alpha.