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The Impact of Low-Carbon Service Operations on Responsible Tourist Behavior: The Psychological Processes of Sustainable Cultural Tourism

Shu-Hsien Chang ¹, R. J. Hernández-Díaz ² and Wei-Shuo Lo ^{3,*} 

¹ Department of Hospitality and M.I.C.E. Marketing Management, National Kaohsiung University of Hospitality and Tourism, Kaohsiung 812, Taiwan; schang@mail.nkuht.edu.tw

² Department of Hospitality Management, Meiho University, Pingtung 912, Taiwan; x00011229@meiho.edu.tw

³ Department of Tourism, Meiho University, Pingtung 912, Taiwan

* Correspondence: x2134@meiho.edu.tw; Tel.: +886-8-779-9821 (ext. 6321)

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Abstract: This paper explores the impact of low-carbon service operations on responsible tourist behavior within sustainable cultural tourism. A proposed conceptual framework is used to examine this largely ignored situation through the case study of Xiao Liuqiu Island. The small island in Taiwan reveals a previously understudied phenomenon in sustainable island tourism. The psychological processes connecting cultural and cross-cultural experiences with sustainable tourism are explored using primary and secondary data collected through in-depth interviews of domestic tourists and online reviews of foreign tourists, respectively. Data analysis reveals the significant result that sustainable island tourism comprises two important elements: a supply and a demand side of a destination. The supply side describes low-carbon service operations—which include food, lodging, and ecological tourist activities—while the demand side reflects tourist behaviors—expressed through cognition, emotion, and motivation as well as authenticity. In addition, this paper makes an important contribution to management by emphasizing the need for careful attention to tourism psychology, particularly in natural and ecological environments that use tourism as a marketing strategy in cultural ecosystems services (CES).

Keywords: cultural tourism; low-carbon operations; psychological process; responsible behavior; small island; sustainable tourism

1. Introduction

In recent years, sustainable tourism has blossomed into several important subtypes, such as ecotourism [1], local food tourism [2], slow travel [3], music festival [4], rural tourism [5], and cultural tourism [6]. The variety of manifestations reveal the adaptability of the principles of sustainable tourism in different social, cultural, and environmental contexts. The context allows sustainable tourism to connect tourists with natural environments and facilitates responsible behaviors in cultural or cross-cultural experiences [7]. Therefore, culture experience has become an important factor for the development of sustainable tourism and in attracting tourists to sustainably managed destinations [8].

Cultural tourism destinations are usually supported by two critical stakeholders: tourists and local tourism service providers. In sustainable tourism, tourism service providers must consider what they provide beyond low-carbon operations, and encourage tourists to behave more responsibly towards the environment so as to minimize human-caused damage. A sustainable tourism service provider's goal is to allow tourists to explore a local culture responsibly, to act in accordance with a cultural context. However, psychologists Markus and Kitayama [9] point out that cultural experience is a psychological process [9] linked to cognition, emotion, and motivation. In cultural experiences, these psychological

processes do not only connect with sustainable tourism, but also support responsible tourist behavior as they interact with low-carbon operations of tourism service providers. The following examples underpin this perspective:

- (1) **Cognition:** refers to ones' personal perception or understanding when faced with the concept of environment conservation in a given situation. For example, in successful heritage tourism, tourists interpret the effective management of the conservation of heritage sites, thus establishing a cognition of the importance of traditional cultures and cross-cultural experiences. This makes sense in a sustainable tourism situation when, upon visiting a heritage site, the visitor experiences the cognition of connectedness and belonging to history [10]. Here, the service provider is an interpreter, whose interpreting service makes heritage tourism more meaningful, and inspires more responsible tourist behaviors in terms of heritage preservation.
- (2) **Emotion:** refers to the incorporated reaction of personal feeling, such as happiness or sadness. Emotion represents people's experience of reality [11] upon traveling to a natural environment in a sustainable manner. For example, slow travel is considered a low-carbon footprint strategy due to concerns about climate change [12]. The tourists (or backpackers) travel by walking, riding bicycles, or riding trains; they often report feelings of "enjoyment" or "happiness," even as others consider their travel mode a hardship. Here, service providers offer transportation tools such as bicycles, trains, or walking. Such responsible behaviors reduce the consumption of energy and CO₂ emissions.
- (3) **Motivation:** a social force [13] that drives people to be responsible for improved well-being and a healthy life. For example, the Olympic Games took place in Beijing in 2008. As a travel destination, Beijing established the Olympic Green [14], which became a symbol of environmental conservation. Structures such as the Bird's Nest, Aquatic Centre, and Water Cube, built according to the principles of green architecture, attracted domestic and international tourists. Here, the local government provides the Olympic Green as a low-carbon service operation. Activities centered on green architecture enable tourists and athletes to minimize the harmful effects on the environment as they engage in cultural experiences within an old city, Beijing.

The cases discussed above provide important evidence that the psychological process can motivate tourists to responsibly interact with low-carbon service cultural experience operations, such as interpreters of heritage tourism, providers of slow travel transportation means, and local governments like Beijing in establishing the Olympic Green. However, sustainable tourism research to date has largely ignored this kind of evidence. A debate has emerged in the study of sustainable tourism regarding these questions. Thus, it is necessary to conduct an in-depth analysis of the social, cultural, and environmental context for psychological processes in cultural experience. Since the socio-cultural context is often shrouded in unknown phenomena and directly related to understanding human behavior, a case study [15] is deemed appropriate for exploring the research questions. Therefore, the present paper asks some crucial questions:

- (1) How can low-carbon operations be implemented within the cultural tourism experience?
- (2) In what ways can low-carbon service operators encourage responsible tourist behavior?
- (3) Which psychological factors support responsible tourist behaviors?
- (4) What does sustainable tourism look like in an Asia-Pacific cultural context at a local destination?

A case study methodology has been applied in sustainable tourism research with some success. Two examples have yielded significant results. First, Sims [2] conducted semi-structured interviews with 78 tourists, exploring the values and motivations behind tourists' holiday food choices in two UK regions. In a second study, similar to the present paper, Canavan investigated the small island of the Isle of Man [16]. The study interviewed 21 residents about their understanding of local cultural values in sustainable domestic tourism. Informed by sustainable tourism theory and the research questions stated above, Xiao Liuqiu Island (also known as Little Luyi) was selected as a case study to examine a

practical situation in a local destination for the development of sustainable tourism. The major reasons are as follows:

- (1) Xiao Liuqiu Island is unique in that it is the only coral island of Taiwan's offshore islands, It is one of the few places left in the world where one can closely observe green turtles, a rare animal today. Thus, it is a suitable location to study ecological and wildlife conservation as well as sustainable education.
- (2) Xiao Liuqiu Island not only provides distinctive natural landscapes but also features the local government's effective management of Polyethylene terephthalate (PET) bottle recycling and waste water reduction. Its activities of environmental conservation have shown that Xiao Liuqiu is a suitable destination for the development of sustainable island tourism [16].
- (3) Xiao Liuqiu Island can be compared with the case of the Isle of Man. While the Isle of Man case study is set in a Western context and focuses on domestic tourism, Xiao Liuqiu Island is located in the East and offers cultural and cross-cultural experiences from domestic and international tourists. Its productive fisheries and vibrant local culture can help other small islands learn how to use "culture" as a critical factor for sustainable tourism marketing and product development [17], and according to our contributions, serve as a reference framework to implement in one's own place in an Asia-Pacific cultural context.
- (4) Cultural ecosystems services (CES): reports by the UN's Millennium Ecosystem Assessment [18] emphasize the important relationship between ecosystems and human well-being. Given the impact factor of cultural development on human well-being, low-carbon service operations play a vital role in achieving sustainability at a destination. Local culture, as part of the cultural ecosystem services [19], should form part of the marketing tourism strategy. This means using strategies that promote local culture synergistically with other ecosystem services to successfully enhance tourists' perception of natural landscapes [20].

The rest of this paper is organized as follows. Section 2 is the literature review for a proposed conceptual framework. Section 3 describes the methodology, which includes the case study method, data collection, and data analysis. Section 4 then proposes the case study of a small island: Xiao Liuqiu Island. Section 5 discusses the research results and examines the discussions of crucial questions. Section 6 gives the conclusion and limitations.

2. Literature Review

This paper references some definitions and goals of sustainable tourism issued by the UNWTO (United Nations World Tourism Organization) in order to theoretically orient the discussion exploring the present situation. These points are of such importance that they concern the whole of this investigation.

- (1) The UNWTO [21] provides a clear definition of sustainable tourism: "Sustainable tourism development guidelines and management practices are applicable to all forms of tourism in all types of destinations, including mass tourism and the various niche tourism segments. Sustainability principles refer to the environmental, economic, and socio-cultural aspects of tourism development, and a suitable balance must be established between these three dimensions to guarantee its long-term sustainability. Thus, sustainable tourism should: 1. Make optimal use of environmental resources . . . 2. Respect the socio-cultural authenticity of host communities . . . [and] . . . 3. Ensure viable, long-term economic operations[.]"
- (2) The UNWTO [22] highlighted major goals in 2017 as part of the International Year of Sustainable Tourism for Development which promoted tourism's role in the following five key areas:
 - Inclusive and sustainable economic growth;
 - Social inclusiveness, employment and poverty reduction;

- Resource efficiency, environmental protection and climate change;
 - Cultural values, diversity and heritage; and
 - Mutual understanding, peace and security.
- (3) In its Charter for Sustainable Tourism, which was adopted at a meeting in Vitoria-Gasteiz, the Basque Country, Spain, on 27th November, 2015, the UNWTO [23] called for the following actions for “consumers”:
- Encourage use of local sustainable products and services that generate local employment and benefits;
 - Evaluate the environmental, socio-cultural footprint and economic implications of their decisions;
 - Choose more sustainable products and services over less sustainable options.

Therefore, addressing the crucial questions stated above must begin with a consideration of the process of how to analyze sustainable tourism design through preserving regional identity [24]. In *Tourism Development and the Environment: Beyond Sustainability?* Sharpley [25] explains that sustainable tourism consists of a supply and demand side, with the destination at the center of the upstream, supply side and downstream, demand side processes. Using supply and demand as a framework, the present paper reviews the related literature of sustainable tourism in two parts. The first part considers low-carbon service operations within cultural experiences on the supply side, while the second part discusses how cultural experiences influence tourist behaviors on the demand side. Both parts take a process approach to the construction of regional identity in the development of sustainable tourism from the upstream to the downstream processes of a destination.

2.1. Supply Side: Low-Carbon Service Operations within Cultural Experiences

Sustainable tourism must not only involve a product, but also a service. One important service consists of teaching local residents how to package their specific culture, such as natural landscapes and indigenous food, to tourists, which then becomes part of the regional identity. For example, a case study conducted in Hong Kong [8] examined three local cultural festivals which occurred within a short period of time. These festivals attracted international tourists who experienced the local culture. Local festivals constitute one kind of service communities provide to tourists. Moreover, a region’s culture moves from intangible to tangible through festivals. Thus, Hong Kong attracts international tourists not only through tourism products, but also through the broader service of local cultural festivals. The key point is that services have been delivered to tourists successfully. Services in sustainable tourism focus on protecting the environment and conserving natural resources, including tourist activities that do not damage natural landscapes, historical heritage sites, ecological environments, or local customs. The concept of low-carbon tourism [25,26] has been proposed and implemented into service operations as a strategy for sustainable tourism. For example, Sims [2] conducted a case study in the UK which revealed that local food plays an important role in sustainable tourism. Local food contributes to low-carbon operations in a few service areas: the local economy (through agricultural products) and the consumption of low-carbon footprint food in restaurants, resorts, airport, and hotels (accommodations). Those service areas all connect to “authentic” cultural experiences of local food within low-carbon operations.

“Low-carbon”, as used here specifically, means the reduction of the waste of limited resources (such as water and energy), the conservation of the natural environment, and an absence of damage to the local culture of a community. Low-carbon service operations have a huge impact on the economic, environmental, and the socio-cultural context, especially as they provide an appropriate strategy for addressing climate change in a number of ways [27]. First, the low-carbon service operations can be a resource for cultural tourism [28] at a destination. Low-carbon service operations use less energy, as well as recycle or reuse limited resources, approaching the requirements of

sustainable development goals [29]. Secondly, low-carbon service operators reside close to local community residents. Since sustainable development depends on human beings, residents and their community must participate to make progress towards the goal of sustainability. Taiwan's eco-museums, which preserve cultural heritage and natural landscape in situ [30], provide one significant example. Third, the low-carbon service operations can form part of a cultural experience. This is a critical perspective derived only from outside of the local destination. While low-carbon service operations provide a specific service to tourists, local communities can change traditional cultures of difference, such as one case study in Hong Kong demonstrates [8]. Rather than spoil the original culture or environment, the imperative is to consider integrating more interesting or creative ideas into the traditional culture. In these ways, low-carbon service providers can operate within cultural experiences.

The above analysis suggests that the low-carbon service operations can deliver meaningful sustainable services for tourists on the supply side. Proposed services such as local food, lodging, and ecological activities can be organized as low carbon while creating meaningful cultural and profitable experiences.

2.2. Demand Side: Cultural Experience and Responsible Tourist Behavior

While low-carbon service operations play an important role for a destination on the supply side, responsible tourist behaviors play a parallel role on the demand side. Sustainable tourism seeks to encourage tourists to behave more responsibly. "Responsible" here means that tourists do not damage the natural local environment or historical heritage sites, which especially includes the violation of the traditional norms of a given local culture. Cultural experiences tend to provoke tourists, however, the research of on cultural experience is complex since it connects with multiple disciplines. The application of psychology's methods for analyzing human behaviors and sense making is particularly relevant. The psychological process illuminates the relationship between the destination and the tourist behaviors. Those same tourist's behaviors can also be explained through the lens of personal authenticity.

2.2.1. Psychological Process Reflections on Tourist Behavior

Šimková [31] proposed a network to explain the relationships between the destination and experience in tourist psychology. Figure 1 [31] (p.318) details the psychological processes of the network that forms a tourist's mental image of a destination. The following examines each element of the network in turn:

- (1) Mental image: a complex psychological process which connects a tourist's psychology with destination and experiences.
- (2) Motivation: the stimulus for travel, influenced by the mental image and previous experiences of the destination. It in turn shapes expectation and decision choice.
- (3) Expectation: a set of anticipated outcomes that in part determines a tourist's sensation of satisfaction or dissatisfaction. Accumulated memories of past personal travel experiences form expectations, even if dissatisfactory.
- (4) Decision choice: names the psychological process which leads to a selected course of action. Along with expectation, decision choice forms the sense of satisfaction or dissatisfaction and has a dialogical relationship with experience.
- (5) (Dis)satisfaction: reflects the travel's degree of emotional enjoyment or contentment. Stored as a travel experience, the emotion then becomes part of the feedback process which informs the next decision choice.
- (6) Experience: the direct sense data arising from observation and participation which are affected by feelings of (dis)satisfaction associated with the previous travel experience. Experience also influences motivation and the formation of the mental image of a destination which completes the network of psychological actions.

All processes are concerned with the tourist's psychology with regards to the mental image of the destination. Cognition refers to the mental image, emotion of satisfaction or dissatisfaction, and finally the motivation to reasons which support decision and shapes expectation. This network explains the tourist's psychological process as it relates to the travel experiences of a destination.

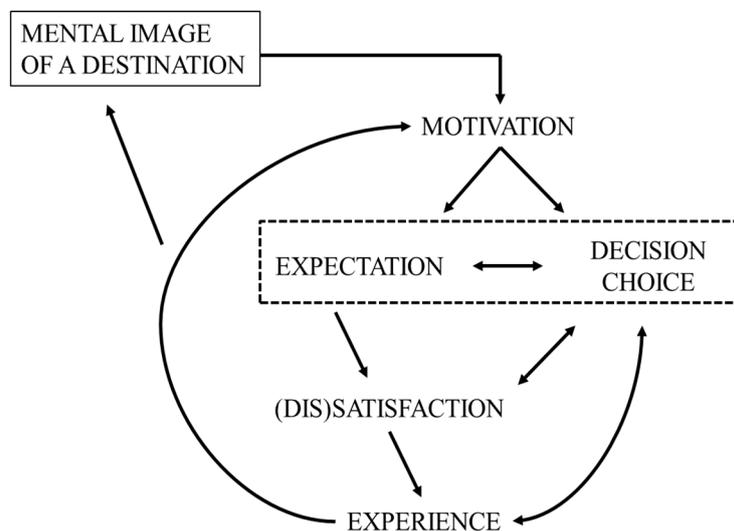


Figure 1. Network of the relationships that form a mental image of a tourist destination [31] (p. 318).

2.2.2. Tourist Behaviors Explained by Personal Authenticity

While tourists within a cultural context undergo continuous psychological processes (understood as cognition, emotion, and motivation or as a network of relationships underpinning the formation of a tourist's destination image), tourist behaviors also reflect a desire for personal authenticity. The perception of having had an authentic, genuine encounter, determines whether a tourist experience in a cultural context feels meaningful. Wang's proposed theory of authenticity in the tourist experience [32] segments authenticity into two parts: intra-personal authenticity and inter-personal authenticity. Both forms of authenticities are critically important and help explain why tourists behave in sustainable ways, as the following explains.

- (1) Intra-personal authenticity: functions on the level of self making and on the level of bodily sensations. For example, in slow travel, the choice to travel in a manner that reduces greenhouse gas emission results in a state of mind [3] that enhances personal self-identity. Bodily sensations explain why tourists can feel relaxed even when undertaking exciting recreational activities, such as music festivals [4], rural tourism [5], or cultural tourism [6].
- (2) Inter-personal authenticity: more concerned with the societal level, related either to family tourism or to "touristic communitas." Most people first travel with others in family groups. Children who travel with parents often retain impressions of travel destinations and experiences long afterwards. Family tourism provides an opportunity for environmental education as well as family interaction. Touristic communitas refers to the spontaneous relationships created among fellow travelers. Travel activity not only strengthens the bond between those who journey together, but also can forge new relationships at the destination with local residents or tourism service providers. Ecotourism offers one powerful communitas in which ecological activities and experiences facilitate relationships and the recognition of the importance of ecological conservation.

That is why slow travel, music festival, rural tourism, and cultural tourism, based on the foundation of low-carbon service operations, can all enhance responsible tourist behavior during cultural experiences in an existing environment [33]. Personal authenticity can help explain how tourists think, feel, and behave from a psychological perspective [34] during cultural experiences.

Personal socio-psychological [35] cognition underpins the tourist experience of a cultural destination. Psychological processes as well as intra-personal and inter-personal forms of personal authenticity interact to shape tourist behavior and environmental perceptions, perceptions molded by the designs of low-carbon service operations.

2.3. A Proposed Conceptual Framework

The review of the literature on sustainable tourism as well as the application of psychological insights into tourist behavior can now be used to formulate a conceptual framework. The proposed framework concerns a destination of sustainable tourism from the supply side to the demand side; it is a practical view through which to examine the upstream as well as the downstream processes of a destination. The destination lies at the center, though whether sustainable tourism is possible at this site is yet undetermined. The framework presents how a mechanism for evaluating sustainable tourism through the consideration of a low-carbon service operation's impacts on the responsible tourist behavior of a destination image [36] within a cultural experience. Figure 2 illustrates the proposed framework.

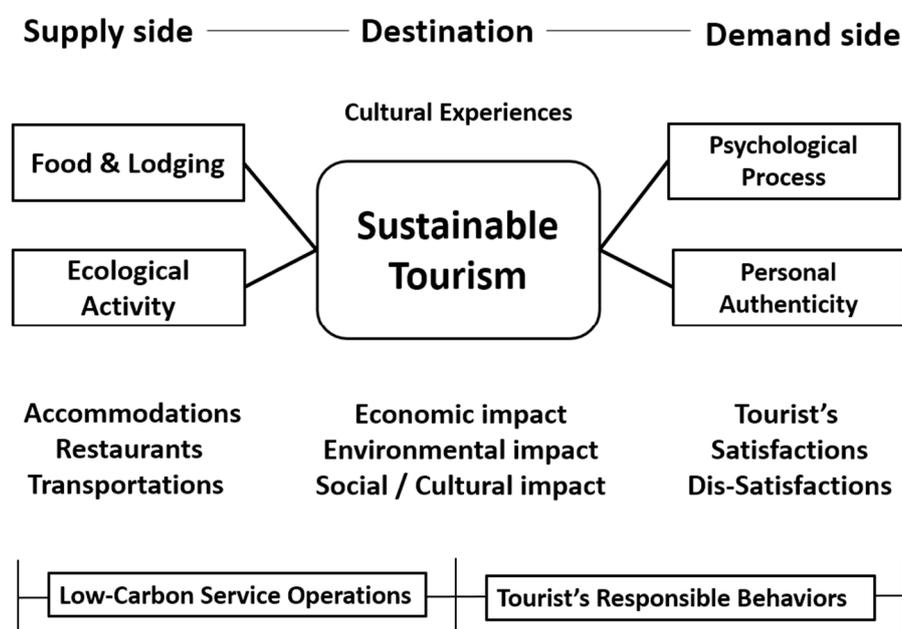


Figure 2. A proposed conceptual framework for examining the impact of low-carbon service operations on responsible tourist behavior within a psychological process for the cultural experiences of sustainable tourism.

The proposed framework examines how a place (destination) can develop sustainable tourism, from the upstream, supply side (low-carbon service operations) to the downstream, demand side (responsible tourist behavior). A description and evaluation of each component of the framework follows:

- (1) Destination (to develop sustainable tourism): the location should be analyzed first. We must know how the place endeavors to construct a destination image of a sustainable cultural experience for the tourist. A good destination image creates a positive impact from the economic, environmental, and socio-cultural perspectives. A successful destination must undergo effective management by service providers of the supply side while considering the different psychological factors contributing to responsible tourist behavior on the demand side.
- (2) Supply side (low-carbon service operations): the supply side's goal is to provide different services. In sustainable tourism, low-carbon operations provide services for the destination, tourists, and residents. Services include food (restaurants), lodging (accommodations), transportation,

and ecological activities. Service operators must consider local residents' attitudes [37], whose participation is a critical indicator for evaluating a place endeavoring to develop sustainable tourism.

- (3) Demand side (responsible tourist behavior): this component emphasizes responsible tourist behavior. It consists of psychological processes and personal authenticity (both intra-personal and inter-personal authenticity). Intra-personal authenticity is concerned with the tourist's self-making (or self-identity) and bodily sensations, and evaluates the complex psychological process that determines the personal mental images of how to act, and explains how a tourist can feel relaxed when undertaking recreational or exciting travel. Inter-personal authenticity is concerned with family tourism and touristic communities. It evaluates tourists on the societal level, how they interact with family and form new relationships with locals at a destination.

3. Methodology

For examining the proposed crucial questions, the method of a case study was adopted in this paper. The data were collected through a qualitative method from in-depth interviews conducted with domestic and foreign tourists in the case of Xiao Liuqiu Island. The data were then analyzed in a process of corroboration and validation.

3.1. Case Study Method

Case studies, which analyze collected data through a qualitative method, are suitable to explore unknown phenomena in socio-cultural contexts [15]. The method of a case study has been broadly applied in sustainable tourism research. For example, Sim's [2] case study used semi-structured interviews with tourists to understand the value and motivations behind tourists' holiday food choices. Sim [2] notes that the interview approach has two advantages: first, it allows the researcher to obtain a wide range of background from a tourist's experiences, and second, the interview approach offers interviewees a more relaxed mode of exchange, thus allowing researchers to obtain a "greater depth" in the content of answers. Sim's two advantages [2] suggest the case study as the best investigative method approach for the present paper. In addition, this paper's focus on sustainable tourism in its economic, environmental, and socio-cultural contexts renders it especially suitable for a case study, which facilitates the exploration of the how and why of situations. The qualitative data and the method of analysis were utilized for the discovery of how to successfully establish sustainable tourism in a small island context.

3.2. Data Collection

In order to compare the differences between cultural and cross-cultural experiences, various personal data were collected through direct and indirect strategies. Primary data related to understanding cultural experiences were collected from domestic tourists through a direct strategy, whereas secondary data for exploring cross-cultural experiences were collected from foreign tourists via an indirect strategy. Table 1 presents the data collection methods and sources.

Table 1. Data source and collection methods used to obtain tourists' travel experiences.

Characteristic	Date Source	Number	Data Collection
Cultural experience	Domestic tourists	18	Face-to-face interviews
Cross-cultural experience	Foreign tourists	10	Online reviews

- (1) Domestic tourists: the data were directly collected through several semi-structured, face-to-face interviews with 18 students at Meiho University's Tourism Department. They were the present author's (Wei-Shuo Lo) cultural tourism students. The students participated in a service and an in-depth cultural experience trip over three days and two nights. They travelled in small groups

of 4, 6, or 8 in 2016, 2017, and 2018, respectively. The students were aged 17 and 18. For most students, it was their first trip to Xiao Liuqiu Island.

- (2) Foreign tourists: the data were collected through online reviews written by international tourists from 2018 to 2019 on the travel website Tripadvisor.com.tw. Foreign tourist data were used to compare the different perspectives of cross-cultural experiences. There were 10 records of foreign tourists collected from Hong Kong, Singapore, Japan, USA, Germany, Switzerland, and others who did not indicate their country of origin. Online reviews were selected according to the author's subjective perspective, not through random sampling. This is because the author sought to extract an in-depth understanding of the emotions experienced by tourists during their cross-cultural experience on the Xiao Liuqiu Island.

3.3. Data Analysis

A data triangulation [38] strategy was used to enhance the data reliability and validity. Although the data exploring the differences between the cultural experience and cross-cultural experience were limited by collection methods, a rigorous analysis process was supported and underpinned by different data sources, improving research limitations. The process of the data analysis was conducted by the following steps. Step one involved cleaning the data. The data collected by different sources, i.e., interviews and online review data, were combined before separating out a dataset of unnecessary and unused data. Step two was coding each set of collected data into different databases, such as students' photographs, PowerPoint presentations, videos, reflective reports, interview records, and online review records. In step three, the researchers printed interview records and reviewed them with the participating students. This step enhanced the internal validity, and minimized the errors and misunderstandings in any information that was collected. However, online review data made this internal validation step difficult to achieve, since the online reviewers did not provide any contact information on the web site. Step four entailed organizing each collected data set in the same format for analysis to facilitate the mining of word patterns. In this step, a meaningful word pattern was subjected to sentiment classification, and was then analyzed by mapping positive and negative opinions related to the psychological processes or provided services. Step five required an external validation of the research results. The results were compared with the cultural experience in the Western context on the Isle of Man [16] and scrutinized for differences with the Eastern context of Xiao Liuqiu Island. Finally, a data triangulation strategy was used for the data analysis in the process of corroboration and validation.

4. A Case Study of a Small Island: Xiao Liuqiu Island

4.1. Unique Characteristics and Brief Background

The Asia-Pacific area offers a plentiful number of destinations for analyzing sustainable tourism. However, Xiao Liuqiu Island has some distinguishing characteristics that recommend it as a locus of analysis: the island's ecological features render it suitable as a model for animal conservation and sustainable ecology education.

According to the information from Liuqiu Shiang's official tourism website [39], Xiao Liuqiu Island looks like a boot floating in the Taiwan Strait. It measures 6.801 square kilometers (Figure 3 shows the map of Xiao Liuqiu Island). In recent years, an increasing number of tourists have been drawn to this destination as the island has been promoted as a tourism destination. Its growing popularity has led to several critical economic effects on this small island [34], including the increased consumption of local food, agricultural products, accommodations, and transportation. Other notable social, cultural, and environmental effects have been recognized, and have resulted in greater effort and attention for sustainability oversight.



Figure 3. The map of Xiao Liuqiu Island (revised from Google map).

4.2. An Analysis of Destination: The Environmental, Economic, and Socio-Cultural Contexts

Similar to other destinations, Xiao Liuqiu Island has experienced specific effects due to its environmental, economic, and socio-cultural context. Owing to its small size and proximity to Taiwan, Xiao Liuqiu Island has some advantages regarding environmental development and ecological travel. Firstly, the island is covered in limestone. Tourist attractions have been developed around some of the more distinct limestone geographic features, including the Black Dwarf Cave, Beauty Cave, and the Lobster Cave. Moreover, such places facilitate a variety of activities, such as exploring the tidal zone, wedding tours, aquatic activities, experiencing a zero-carbon island, and observing bright stars at night.

Second, in addition to the geographical landscape, a rich ecological environment of various animals, plants, and birds also provides travel resources for tourism development. The environmental conditions offer ideal conditions to host a diverse ecosystem. Being surrounded by ocean waters presents different opportunities and challenges for survival. Some traditional folk activities thus comprise local culture and life skills. Residents fish because they have access to the plentiful ocean resources of the Taiwan Strait. Its proximity to Taiwan attracts various species of fish to the waters surrounding the island, which greatly contribute to the residents' diet. However, this also brings about challenges for residents who face risks while working on boats and living on the sea. Many resident lives are still centered around fishing.

In the face of uncertainty from fishing, residents have built approximately 60 to 70 temples in which they pray to their gods for protection and good fortune when their families are fishing and living on boats. Thus, until recently, the residents have reserved their religious festivities for appreciating their gods. Fishing is not only an important economic activity, but also part of the locals' lifestyle and culture. In fact, the social values of the community are also based on this fishing culture; although their work is difficult, cooperation with each other is vital. Local residents also farm agricultural products such as mango and other fruits. However, farming is not a major economic activity because the island's

climate is not conducive to agricultural endeavors. In typhoon season, during the summer and fall, all of Taiwan's islands are at a high risk [40]. In the winter season, the island's strong winds and large waves damage agricultural products. These are difficult conditions to control and maintain farming. Therefore, some basic resources, such as energy and water, are supplemented by the main island of Taiwan. This has become another problem as residents now desire more advanced economic activity for tourism development.

Tourism brings many tourists and allows the small island access to a new method of sustainable survival. However, tourism has also led to various types of damage to this small developing island, such as pollution and animal abuse by tourists. Thus, more attention should be paid when considering the further development of this destination.

5. Research Results and Discussions

5.1. How Can Low-Carbon Operations be Implemented within a Cultural Tourism Experience?

The Liuqiu Township Office's open report of tourist statistics [41] revealed that the number of visitors to Xiao Liuqiu Island increased from 2015 to 2019. The report also stated that low-carbon service operations both directly and indirectly support local culture as part of the tourist's travel experiences. Several newspapers discussed this report, asking in various ways: how did this small fishing island become such a popular tourist destination?

Table 2 shows the differences between the inhabitants and visitors. In 2015, the number of inhabitants living on the island was 12,517, but in 2019 it slightly decreased to 12,232. Over the same time period, the number of visitors to the island increased, although not in a straightforward, linear fashion. Still, the number of visitors received was huge compared to the number of inhabitants.

Table 2. Number of people (inhabitants/visitors).

People\Year	2015	2016	2017	2018	2019
inhabitants	12,517	12,423	12,337	12,364	12,232
visitors	409,546	408,713	444,245	426,408	441,588

Data source: Liuqiu Township Office [41], and it was also cross-referenced with the Pingtung County data and the Tourist Bureau (Tourism Statistic, Visitors to the Principal Scenic Spots in Taiwan).

The reasons drawn from this study's research break down into three main responses, all underlying the idea that the destination provides different tourism services that support the development of the island. The first response relates to residents' attitudes toward the contribution of cultural tourism [37], which is based on the history of the small island. Historically, the island's economy was based on fishing—residents worked on the ocean whether the weather conditions were good or poor. Before the development of tourism, they did not believe that they could sustain themselves on anything but fishing. Today, however, with the help of local governments, they are experiencing more development than before, and find that they can make money from tourism. Residents have established small businesses which provide services for tourists such as bed and breakfasts (B&Bs), restaurants, and bicycle, motorcycle, or electric bicycle rental shops. Most tourists travel without a tour group and stay at B&Bs run by local residents. Residents invest their money into building additional guest-houses, equipment for preparing food, and sometimes fishing gear as well. In doing so, tourists operate differently from others who obtain food from the ocean. Tourists report enjoying the company of B&B owners, their friendliness and hospitality, and kindness in sharing their seafood and stories with tourists. Since the island is small, the residents treasure their histories and futures.

The second response centers on the experiences with local food [42], which enhances tourists' cultural experiences. Taiwan has a reputation for offering a wide diversity of food, but in the small island, the greater variety of food experiences provide vast cultural and cross-cultural experiences. Most study participants reported that it was their first time on the island; therefore, they did not know

which local foods were different. However, after the tourists tasted local foods such as cheesecakes, noodles, and mango ice, they had other images raised for this island. Some foreign tourists can enjoy fresh seafood cheaper than what is available in their country, even those from Japan or Singapore.

The third response deals with a religious festival, the burning of King Boat, which represents the residents' beliefs and is an important community activity. Some residents who work overseas return home to participate. The religious festival does not take place each year but once every three years. Some guesthouses provide this information for tourists to allow them to participate in the community's activity. Although many Chinese people have similar religious beliefs and activities, this small island's celebration has a distinct practice and meaning.

5.2. In What Ways Can Low-Carbon Service Operators Encourage Responsible Tourist Behavior?

In this case study, we observed positive resident attitudes and low-carbon operations, suggesting the tourism potential of this small island [43]. Low-carbon contributions are made at the local level through the use and sharing of resources with tourists. Services such as B&Bs, preparing local food (restaurants), fishing and serving seafood, renting bicycles and electric scooters (transportation), and conducting local religious festivals (cultural events) all constitute tangible and intangible resources that become cultural experiences for tourists. These low-carbon tourism services also facilitate the connection between stakeholders in sustainable tourism.

Low-carbon service operations encourage responsible tourist behaviors through policies on the use, reuse, and recycling of local materials. Even when the environmental conservation rules, such as reducing water consumption, are established by local governments, tourists contribute to sustainability through their participation in local environmental conservation activities. One critical problem may be observed; many residents are providing the same low-carbon services. Providers offering identical or nearly identical services increase competition and provide strong bargaining power to the buyers (tourists). This depresses the prices for tourism services and products, potentially negatively affecting the quality of responsible tourist behavior. Service providers may respond by cutting corners, including by not following environmental conservation rules, rendering their tourist activities illegal. That is a trade-off local residents face when they trying to run a business.

Xiao Liuqiu Island potential entrants are less than another islands. One of the advantages of the island's ecological characteristics is that it is the only place in Taiwan where one can snorkel with sea turtles. Therefore, ecological conservation efforts are necessary as residents develop different tourism services within their cultural contexts, and increasingly provide consciously or otherwise ecological education for tourists. In short, the small island is suitable for the development of sustainable tourism, and varied low-carbon services can become community-based cultural resources [28] to support tourist's experiences.

5.3. Which Psychological Factors Support Responsible Tourist Behavior?

Xiao Liuqiu provides particular natural landscapes and ecological activities [44]. These ecological activities facilitate cultural experiences which in turn offer psychological incentives for tourists to act responsibly [45]. Study participants frequently mentioned the keyword "snorkeling" in their feedback, suggesting a particular interest and participation in the activity. This raises the question of why residents provide this kind of water activity. The primary reason driving the popularity of snorkeling is that the natural environment provides a way for residents to make money and survive. An increasing number of residents provide snorkeling instruction and equipment rental. Local resident's enthusiasm for the sport and the desire to conserve the natural beauty affects tourist's attitudes and behavior towards environmental conservation. As an island-based tourism site [46], Xiao Liuqiu provides low-carbon service operations for tourists, and through different cultural experiences, encourages responsible tourist behaviors which reflect personal authenticity.

5.3.1. Responsible Tourist Behaviors within Cross-Cultural Experiences (Foreign Tourists)

We found that foreign tourists in online reviews mostly reflected on their intra-personal authenticity (self-making and bodily feelings) with regards to responsible behaviors, and less on inter-personal authenticity. The example below constitutes important evidence:

The wonderful scenery and peaceful atmosphere catch my mind deeply . . . The water here is clear, and you must try to go snorkeling!! Maybe you'll see a lot of green turtles fortunately (March 2018. The reviewer did not mark their nationality.)

This enthusiastic response has at its core a clear concern for the ecology. The reviewer's interest in underwater activities gushes forth, encouraging others to pursue the same. The connection with the natural environment, both reefs and water, is clear, suggesting the suitability of the island for sustainable development and ecological tourism [22]. Based on the analysis of reviews such as the one mentioned above, we conclude that ecological experiences promote responsible attitudes, including both positive perceptions of environmental conservation and negative attitudes towards despoiling the environment.

Moreover, psychological processes also reveal an affinity for ecological experiences. For example, the motivation towards environmental interaction is indicated by *"water here is pretty clear"* and *"you must try to go snorkeling."* The words *"wonderful scenery and peaceful atmosphere catch my mind deeply"* express the emotion resulting from positive experiences with the environment. This fits with the theory that ecotourism can enhance tourists' conceptions of sustainability with regards to individual values, beliefs, attitudes, and actions, both about the place they visit and elsewhere [47] (p.1175). Such is explicitly acknowledged by another foreign tourist's online review:

Snorkeling around the Vase rock isn't a must at all, may be because I'm used to dive in much better sea environment "the red sea" I find the corals in the vase rock beach so damaged and all dead. (Dec. 2018. This reviewer marked their nationality as Egyptian.)

This response exposes the increasing damage in ecological environment due to human underwater activity. The reference to "the red sea" reflects the connection between the Vase rock and a similar place in the tourist's memory in their country, Egypt. The psychological process not only relates to ecological experience, but also to destination. One foreign tourist said that:

This is a great break for locals, and tourists. The island is small, it takes about 10 min to scooter from one side to the other. There are many free (or super cheap) natural attractions, as well as great snorkeling, diving, and sunsets. (April 2019. The reviewer marked their nationality as American.)

This response exhibits environmental cognition in the psychological process. What happens on *"a great break"*? The answer lies in the accessibility of the island and a landscape which is *"free (or super cheap)"* as well as the *"great"* feelings associated with *"snorkeling, diving, and sunsets."* The feelings described suggest a cognition of place for this foreign tourist, in part because cognition is a psychological status associated to some degree with satisfaction or dissatisfaction. The phrase *"a great break,"* and again *"great"* associated with *"snorkeling, diving, and sunsets,"* all represent a psychological status of satisfaction. This also indicates intra-personal authenticity [31] in response to environmental psychology. The environment thus affects the tourists' psychological process regarding emotions. One last example of an online review revealing emotions is:

We spend 3 days 2 nights here. Maybe a bit too much for many people, but we just want to relax and enjoy the time here. (July 2019. The reviewer marked their nationality as from the Hong Kong Special Administrative Region, China.)

The phrase “*relax and enjoy*” are meaningful insofar as they measure the tourist’s environmental psychology. It also locates the self [48] even with nothing to do; it is an individual psychology that relates to intra-personal authenticity. Although the reviewer thought “*many people*” would arrange less than 3 days of travel, they felt that their time changed them, as it offered a chance for the reviewer to “*just . . . relax*” [49]. Additionally, the phrase in the response “*3 days 2 nights . . . Maybe a bit too much,*” offers an abstraction that reveals how the tourist conceives of the meaning of time as a cultural experience [50].

Our results have shown that the tourist’s cross-cultural experiences exhibit different images related to a destination when tourism psychology (including intra-personal and inter-personal personal authenticity) is considered. Particularly, the above analysis connects cross-cultural experience with sustainable tourism through complex psychological processes, including cognition, emotion, motivation, and personal authenticity.

5.3.2. Responsible Tourist Behaviors within Cultural Experiences (Domestic Tourists)

Compared with the cross-cultural experiences of foreign tourists, the cultural experiences of domestic tourists offered more reflections on their inter-personal authenticity than intra-personal authenticity (self-making and bodily feelings) vis-à-vis responsible behaviors. For example, two student tourists said:

Long time ago, I really do not remember how old of me, my parent brought us (me and my young sister) to Xiao Liuqiu Island. It was my first time traveled to this small island. But I did remember my family said here was quite near Pingtung city, we can ride public or private ferry boats from Tonggang to Liuqiu not over 1 h. (May 2019. The tourists were interviewed and living Pingtung County, Taiwan)

My first time in Xiao Liuqiu was with my parent and some relatives, they said Xiao Liuqiu was interesting place where you can watch green turtles closely. (June 2017. The tourists were interviewed and living Pingtung County, Taiwan)

This demonstrates a cultural difference between the East and West, which may be more revealing for Taiwanese (tourists), since for them Xiao Liuqiu Island is a domestic destination. The theory of tourism experience [32] strongly supports our proposed concept that inter-personal authenticity is more concerned with the societal level, related either to family tourism or to touristic *communitas*. The touristic *communitas* refers to the spontaneous relationships created among fellow travelers, which not only strengthens the bond between those who journey together, but also can forge new relationships at the destination with local residents or tourism service providers. The student tourist groups explained what happened as follows:

We arranged 3 days 2 nights travel to Xiao Liuqiu Island. We have different experiences such as: (June 2017, May 2018, and May 2019. Three student-tourist groups were interviewed and some of them living Pingtung County and Kaohsiung City, Taiwan)

- This was my first time traveling to Xiao Liuqiu. Even though the ferry ride from Tonggang to Liuqiu lasted over 1 hour, I didn’t get seasick. I was so impressed with the landscapes here, the snorkeling, the green turtles, and I especially liked the cheesecake . . . an unforgettable experience. (May 2018)
- It wasn’t my first time going to Xiao Liuqiu. Still, I got very excited when I began organizing our trip. Arranging for the B&B was a challenge for me, because I had to handle making the reservations myself. When I’ve been before on any trip my family did everything and I was always just a tag-along. The B&B owner was a nice person. Although he said he couldn’t provide a room discount, he did give us a cheaper price when we rented motorbikes. He also provided fresh seafood on the night we arrived, which was so delicious! Generally, it was a

beautiful trip that I'll always remember my dear roommates with whom I got so close. (June 2017. Students' group 1 in Figure 4.)

- The snorkeling was interesting because it was the first time I got to see fish up close and also sea turtles! I could almost touch the turtles, that's how close we got. It's a very popular place so there were a lot of people snorkeling, so many that some of the visitors damaged the environment. The local snorkeling instructor said it was OK, but my classmates and I thought that it wasn't good if the island continued to receive so many tourists without control regulations. (May 2019. Students' group 2 in Figure 4.)



Group 1



Group 2

Figure 4. Two student tourist groups photographs (by student groups 1 and 2).

The collective evidence also demonstrates reflections on intra-personal authenticity (self-making and bodily feelings) of responsible behaviors. First, domestic travel for sustainable tourism has a huge impact, especially represented by the growing of the local economy. In this case, we found that even student groups can contribute to the Xiao Liuqiu Island. They demonstrated a willingness to face challenges by themselves: *"I did very exciting when I beginning to organize our trip."* This not only constitutes touristic communitas, but also shows the role they played in self making. Second, local residents play an important role by providing different low-carbon services. They exhibited hospitality by providing local food, such as cheesecake and fresh seafood, and by treating domestic tourists like close friends. Third, residents not only played the role of service providers, but also educators. Residents (service providers) explained to tourists the history behind local food, as well as where to find the most beautiful landscapes and attractions.

The analysis of the results establishes that domestic tourists construct social relationships during local travel with local people. Although the Taiwanese are sometimes hesitant to present their inter-personal authenticity, we found that it was also true among foreign tourists. This was especially manifested in different bodily feelings such as personal psychological processes, such as those of cognition of environmental conservation. Emotions expressed through words and phrases such as *"exciting," "I really like," "delicious," "interesting,"* and so forth, enhance the motivation of the self-regulated responsible tourist behaviors, which can work in concert with reforms reflected by the sentiment *"so many people came and snorkeling, people may cause environmental damages."*

5.4. What Does Sustainable Tourism Look Like in an Asia-Pacific Cultural Context at a Local Destination?

Nowadays, Jeju Island in Korea, Okinawa in Japan, Pattaya/Phuket in Thailand, or MINI Island near Nha Trang in Vietnam, all small islands, have become popular destinations in the Asia-Pacific area. As the Asia-Pacific region becomes more important as a tourist destination, it becomes necessary to explain how the cultural context at a local destination can influence responsible tourist behaviors in sustainable tourism.

Xiao Liuqiu Island is located in the East and offers cultural and cross-cultural experiences for domestic and international tourists in contrast with the Isle of Man case study which is set in a Western context and focuses solely on domestic tourism. Still, the question remains: what does sustainable tourism look like in an Asia-Pacific cultural context at a local destination? An in-depth exploration of the case of Xiao Liuqiu Island presents an answer to this concerned problem. Below we offer some insights from the critical evidence of our research findings:

- (1) Sustainable tourism offers no difficulty in enhancing and emphasizing the concept of environmental conservation, whatever the research on cultural or cross-cultural content might say.
- (2) Cultural differences between the East and West remain, even when Western tourists travel east or Eastern tourists travel west. It is the perennial question on “culture and the self [9].” Western tourists usually easily identify themselves by their self-making (or self-identifying) status more than typically diffident Eastern tourists. Here we do not pass judgment on which way is better; our only concern is the impact of cultural difference on sustainable tourism and how it affects responsible tourist behaviors.
- (3) While the case of the Isle of Man focused on domestic tourism, its cultural context also became an important issue for attracting local and foreign travelers to the small island [16].
- (4) Therefore, we theorized that the cultural context at a local destination plays an important role. Culture, at least partially, accounts for attracting local and foreign tourists, as well as local food, transportation, and living conditions, and what makes local residents interact with outsiders (whether domestic or foreign tourists). The culture of a destination thus facilitates economic, environmental, and socio-cultural cooperation and interactions.
- (5) Asia-Pacific destinations have a specific context which belongs to Eastern culture. Many places in the Asia-Pacific region have low-carbon service operations, making it suitable for sustainable tourism development. Xiao Liuqiu Island is one of those islands, but is rarely considered using a systematic conceptual framework.
- (6) The proposed conceptual framework was successful in examining how local, low-carbon service operations can impact responsible tourist behavior. This case study especially demonstrates the effect of cultural experiences on domestic or foreign tourists under the theory of sustainable tourism [2,32,42].
- (7) While the psychological processes in an “Asia-Pacific cultural context at a local destination” is not a popular research topic, we still put our best effort in undertaking this area of investigation. The Xiao Liuqiu Island case fits the theory of a “network of relationships that form a mental image of a tourist destination” [31] (p.318), shown in Figure 1. We also claimed personal authenticity (both intra-personal and inter-personal authenticity) is actually influenced by local, low-carbon service operations.
- (8) The local, low-carbon service operations can determine tourist’s (dis)satisfactions at a travel destination, and can influence responsible tourist behaviors under psychological processes (cognition, emotion, and motivation). Local governments and authorities should reflect on these psychological processes when considering environmental conservation policy. As the student tourists put it: *“I and my classmates thought that was not good if here continue received many tourists without control regulations.”* Business management professionals should also consider psychological factors when formulating best business practices.

As the Asia-Pacific emerges as a popular travel destination, we must become more considerate and pay greater attention to cultural context in order to create sustainable tourism. Boracay, the famous and beautiful small island in the Philippines, had to be shut down for more than six months due to mass pollution caused by too many tourists overwhelming the island’s infrastructure. Boracay serves as a negative case to warn us of what happens when we neglect low-carbon service operations and responsible tourist behavior. Without attention to both of these crucial areas, sustainable cultural tourism will not be successful.

6. Conclusions and Limitations

This case study of the small island of Xiao Liuqiu attempted to bridge an often ignored gap between theory and practice. This paper connects the social, cultural, and environmental contexts of a destination with the how and why tourists are attracted to sustainable cultural small-island tourism. A proposed conceptual framework suggested the analytic scope and problem, including the both supply and demand sides of the destination.

6.1. Implications

The practical problems were addressed by examining the experience data, collected through in-depth interviews (domestic tourists) and online reviews (foreign tourists). The data analysis identified several significant results for sustainable island tourism research. The destination evaluation examined environmental, economic, and socio-cultural effects. The supply side involves low-carbon services, such as cultural resources to support tourist's experiences, while the demand side includes psychological processes of ecological experiences that enhance responsible attitudes. Notably, the connection between the cultural experience of sustainable tourism and the psychological processes of cognition, emotion, and motivation was discussed and explored.

It is useful to solve practical and managerial problems, but these are less frequently discussed in the field of tourism psychology. For example, in one foreign tourist's online review, it was discovered that the lack of effective management of extensive tourist underwater activity (snorkeling) led to environmental damage. This finding elucidates another contribution to management: the results of tourism psychology research can be used to determine managerial practices and tourism marketing strategies for tourism destinations that emphasize natural environments [17]. The natural landscapes, ecological environments, resident architecture, traditional cultural festivals [8], and even communicated languages are all tourism resources. Resource-based strategies aim to advance development as much as possible for residents. However, the market-based strategies allow a destination to provide successful market opportunities to a tourism market. As a result, the place not only attracts more tourists, but resident's lives are increasingly interrupted by tourists and the ecological environment is damaged as well. The managerial issues raised by sustainable tourism should develop strategies from both market-based and resource-based perspectives, even though this constitutes a trade-off problem.

6.2. Limitations and Future Research

Although this study constitutes a potential contribution to cultural ecosystems services (CES) [19] research, it still has practical limitations. First, this research is a case study of a small island in South East Asia, and the results thus only represent a small slice of the overall picture. We do not think that our study can stand-in for all situations on other small islands. Additionally, this research is conditioned by the collected data, both in the student sample and in the sample of online reviews. The students have only so much social awareness, and simply presented their reflections on their direct experience. It may amount to a bias through contemplations. While the online comments obtained through TripAdvisor represent the perspective of foreign tourists, their reviews were not verified externally, which may impact the content's reliability and validity. For our part, we made some efforts to address these biases. In terms of the student sample, we contacted a student who was on the team in 2018. She interned in Xiao Liuqiu from 2019 to 2020. Through video interviews, we obtained additional, different perspectives and evidence from her local living experience. Now, she is not only a student, but has also become an island resident. Through her participant observations, we verified that our study was along the right lines. The second method of double-checking our data was concerned with verifying the perspective of foreigners. Fortunately, one of the authors (R. J. Hernández-Díaz) of the current paper was not only an American professor, but also a foreign tourist who has travelled to the island of Xiao Liuqiu on a number of occasions.

We encourage researchers to conduct more studies on this topic and focus more on the emotional and cultural experiences in sustainable tourism, as the field has a long and complex road ahead in determining the best form of development for small islands in the Asia-Pacific context. Although tourism psychology is not a new area for tourism research, its analysis and applications in small islands remains rarely discussed, in part because the psychological field is more concerned with individual intra-personal authenticity. Addressing issues of management strategy is also encouraged, because it is possible to develop sustainable tourism based on a low-carbon services system.

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