

# FROM PLATE TO PLANET: REDEFINING THE LOW-CARBON TOURISM EXPERIENCE AND INVESTIGATING ITS INFLUENCE ON GASTRONOMY-BASED TOURISTS' REVISIT INTENTIONS AND ENVIRONMENTALLY RESPONSIBLE BEHAVIORS

Ekkarat Suwannakul<sup>1,\*</sup>, Siriporn Khetjenkarn<sup>2</sup>, Inthawoot Suppavorasatit<sup>3</sup>, and Tansiphorn Na Nan<sup>4</sup>

## ABSTRACT

Gastronomy tourism reflects key sustainability issues and has become an important means of supporting sustainable tourism. Many tourist cities have developed gastronomic and low-carbon travel activities to promote local food through tourism campaigns. However, the concept of low-carbon tourism (LCT) within the gastronomy context has not been explored adequately, and empirical research on the LCT experience from the demand side remains limited. This study employs mixed-methods research. First, the dimensions and attributes of the LCT experience of gastronomy-based tourists were developed and validated. Following the scale development process, a multidimensional LCT experience scale comprising seven dimensions was identified: learning, sensory, escapism, immersive, prestige, affective and sociocultural experience. Second, quantitative data collected from 947 participants were analyzed using structural equation modeling to examine the causal relationships between the LCT experience, experiential satisfaction, destination image, revisit intentions and environmentally responsible behavior among gastronomy-based tourists. The findings offer an extended view of the LCT experience from the perspective of gastronomy-based tourists and contribute to understanding how such experiences shape the tourists' environmentally responsible behaviors and support sustainable tourism.

*Keywords:* Low-carbon tourism, gastronomy, tourist experience satisfaction, revisit intention, responsible behavior

## 1. INTRODUCTION

The tourism sector is currently facing the urgent global issue of climate emergency. Tourism is one of the main causes of global warming, with its activities significantly contributing to around 8% of global greenhouse gas (GHG) emissions (Lenzen et al., 2018).

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<sup>1,\*</sup> Asst. Prof. Dr. Ekkarat Suwannakul is a lecturer in the School of Liberal Arts, King Mongkut's Institute of Technology Ladkrabang, Bangkok, Thailand. He obtained his PhD in Integrated Tourism Management from the National Institute of Development Administration, Thailand. Email: [ekkarat.su@kmitl.ac.th](mailto:ekkarat.su@kmitl.ac.th)

<sup>2</sup> Dr. Siriporn Khetjenkarn, is a lecturer in the International College, Burapha University, Chonburi, Thailand. She obtained her PhD in Integrated Tourism Management from the National Institute of Development Administration, Thailand.

<sup>3</sup> Assoc. Prof. Dr. Inthawoot Suppavorasatit is a lecturer in the Department of Food Technology, Faculty of Science, Chulalongkorn University, Thailand. He received his PhD in Food Science and Human Nutrition from the University of Illinois, USA. He is a member of the Flavor Academy, operating under Food Innopolis in Thailand.

<sup>4</sup> Asst. Prof. Dr. Tansiphorn Na Nan is a lecturer in the School of Agricultural Resources, Chulalongkorn University, Thailand. She obtained her PhD in Environmental Management from Chulalongkorn University, Thailand.

The World Tourism Organization (UNWTO) reported that carbon dioxide emissions from tourism activities are expected to rise by at least 25% from 2016 to 2030 unless the sector accelerates decarbonization (UNWTO, 2019). Therefore, governments worldwide have implemented incentives or punitive schemes to encourage tourism businesses to improve emission efficiencies in their operations and services. Tourism-related bodies also encourage tourists to incorporate sustainability concerns into their travel decision-making and perform environmentally responsible behaviors (ENVBs) when traveling. However, the speed of decarbonization continues to lag behind the speed of tourism growth (Sun, Lin & Higham, 2020).

In 2007, the Davos Declaration acknowledged the necessity of a long-term strategy for the tourism industry to decrease GHG emissions and called for the urgent adoption of policies to promote sustainable tourism and behaviors considering climate responsiveness. In November 2024, more than 50 countries endorsed the declaration on enhanced climate action in tourism during the 29th Conference of the Parties to the UN Framework Convention on Climate Change (UNFCCC COP29). The declaration sought to enhance collaboration and integrate tourism into national climate action plans to reduce emissions and support the development of low-carbon tourism (LCT) worldwide (UNWTO, 2024).

In Thailand, the Designated Areas for Sustainable Tourism Administration (DASTA), a public organization, is responsible for formulating strategic plans and promoting sustainable tourism operations in specific destinations (DASTA, 2021a). The old city of Nan, situated in northern Thailand, is among the forementioned areas, designated and developed as a low-carbon destination. In 2021, it was awarded as one of the top 100 destination sustainability stories by the Green Destinations Foundation for the second consecutive year (DASTA, 2021c). The city is also well-known for gastronomy among tourists. With agriculture as its main economic activity, related stakeholders have jointly developed gastronomic and low-carbon travel activities to promote local food made from locally sourced ingredients (DASTA, 2021b). Since gastronomy tourism is an important means of promoting sustainable tourism (Scarpato, 2002), such campaigns encourage tourists to focus more on low-carbon activities and consume local food, which supports local communities in gaining more tourism-related revenue sustainably.

Many scholars have studied LCT from the supply-side perspective. For example, LCT impact evaluation (Cheng, Su & Tan, 2013; Lenzen et al., 2018), LCT indicator development (Fakfare & Wattanacharoensil, 2022; Lee & Jan, 2019), LCT destination development (Zhang & Zhang, 2020), and measuring suggestions for reducing carbon emissions (Lee, Wu & Li, 2018). However, supply-side LCT studies cannot create well-balanced sustainability for a tourist destination and are insufficient to form marketing strategies and promote tourists' pro-environmental attitudes and behaviors. Additionally, insights from tourists' perspectives are essential in developing strategies to encourage them to visit destinations willingly. Thus, demand-side LCT studies are required to bridge the knowledge gap and provide profound insights into promoting the existence and sustainability of local communities, cultures, and tourism resources and enhance tourists' experiences.

Although previous studies have demonstrated strong relationships between LCT experience, satisfaction, revisit intentions and sustainable behavior (Lee & Jan, 2019; Li, Liu & Soutar, 2021), LCT in the gastronomy context has not been fully explored. Moreover, empirical research on LCT experiences from the perspective of gastronomy-based tourists (demand-side LCT) remains scarce. Hence, this study aims to fill the gaps by developing the underlying dimensions and attributes of LCT experiences using the city of Nan as the focal area of study. This study also investigates the causal relationships between the LCT experience, experiential satisfaction, destination image, revisit intentions and ENVB.

The findings of this study provide insights for policymakers, enabling them to develop

effective action plans focused on promoting tourists' ENVBs and encouraging destination revisits, fostering the sustainability of tourist destinations.

## **2. LITERATURE REVIEW**

### **2.1 The Low-Carbon Tourism Experience**

LCT is a form of tourism that emphasizes reducing carbon emissions from tourism-related activities to advance sustainable development (Zhang & Zhang, 2020). Its main goal is to maximize the tourist experience through activities that use less energy and emit less GHG in transportation, operations of service providers, sightseeing, shopping, dining, etc.

UNWTO plays a crucial role in cooperating with other organizations, member states and the private sector to accelerate the shift toward greater sustainability in the tourism sector and communities. UNWTO encourages stakeholders to make tourism a catalyst for positive changes in policies, business practices and customer behaviors, contributing to the Sustainable Development Goals (Lee et al., 2018). Consequently, policies and concepts of LCT have been employed by countries worldwide in response to climate change problems and accelerating progress towards LCT development.

However, despite these policies, tourism suppliers and service providers hesitate to adopt and actively implement carbon emission reduction practices (Fakfare & Wattanacharoensil, 2022). Moreover, tourists exhibit varying levels of awareness regarding climate change and carbon emission reduction (Lee & Jan, 2019), posing a challenge in promoting sustainable behaviors. The ENVB of tourists is crucial for the sustainability of tourist destinations and has a profound positive or negative effect on environmental issues (John, 2020). Therefore, improving tourists' sustainable behaviors is necessary to reduce carbon emissions in the tourism sector.

Experience is the key factor influencing a change in behavior (Kolb, 2015). Hence, the focus should be given to enhancing the tourist experience in LCT towards destinations to promote ENVBs among tourists, such as opting for low-carbon travel modes, having local food, selecting environment-friendly products and patronizing the green services offered by responsible service providers. This enhancement can be achieved by further exploring the tourist experience.

### **2.2 Gastronomy Tourism Experiences**

The gastronomy experience is developed from the uniqueness of local gastronomy, representing a sense of place and authenticity and enhancing tourists' impressions (Richards, 2002). It offers a sensory experience through taste, sight, smell, touch, and hearing (Lee & Jan, 2019) and a unique experience derived from in-depth knowledge of local cuisine and culture (Kivela & Crofts, 2006).

From a practical perspective, Nan province's local government and related stakeholders collaboratively developed gastronomy and LCT activities to promote local food through tourism campaigns to encourage tourists to focus more on low-carbon activities and to choose to consume local foods (DASTA, 2021b). Empirical studies have affirmed that the gastronomy tourism experience arouses tourists' motivation, satisfaction, loyalty and behavior toward the gastronomy destination (Leong, Ab Karim, Awang, & Abu Bakar, 2017; Lima, Serra, Borges, & Maruj, 2024; Mora, Solano-Sánchez, López-Guzmán & Moral-Cuadra, 2021). Thus, this experience is crucial in enhancing tourists' attitudes and developing a tourist destination sustainably.

### **2.3 Theoretical Framework: Cognitive-Affective-Conative (CAC) Framework**

This study applied the CAC framework to explain the theoretical relationships among the key variables in the context of gastronomic LCT. The framework posits that an individual's behavioral intentions and actions (conative response) emerge from their satisfaction (affective response) which is shaped by emotions and cognitive understanding of the experience, influenced by recent experience-based information (Bagozzi, 1992; Oliver, 2014). Based on this framework, the LCT experience gained by gastronomy-based tourists is expected to influence their satisfaction and perceived destination image, subsequently leading to revisit intentions and ENVBs. Accordingly, the research hypotheses and conceptual model of this study were developed.

### **2.4 The LCT Experience and Its Outcomes**

The tourism experience involves the formation of tourists' positive attitudes which influence their intentions and behavioral outcomes, particularly ENVB. Past studies have identified a close association between tourists' gastronomic experiences and senses and indicated that tourists could enrich the tourism experience through local food (Leong et al., 2017; Mohamed, Hewedi, Lehto & Maayouf, 2020). Experiencing the sensory appeal and authenticity of local food is likely to affect the satisfaction and behavioral intentions of tourists (Mohamed et al., 2020). Affective experience also stimulates tourists' emotions related to the destination's environment, product and service consumption and interactions with local people (Lee & Jan, 2019).

Tourists often perceive tourism as a means to temporarily escape from the routine of everyday life, creating an escapism experience (Ponsignon, Lunardo & Michrafy, 2021). Tourists can learn from engaging in activities and immersive environments that enhance their attitudes and encourage them to behave in environmentally responsible ways (Lee & Jan, 2015). Behavioral experience, formed by participating in environmental learning activities, can also shape an individual's environmental behavior, satisfaction and destination revisit intentions (Lee & Jan, 2015; Mohamed et al., 2020). In the gastronomy tourism context, experiencing local food offers tourists the opportunity to gain knowledge about local cuisine and cultures and develop practical skills (Gössling, 2018).

Prestige is one of the important factors influencing tourists' decisions to engage in local food (Lee & Jan, 2019). Prestige experience arises when tourists' social and interpersonal needs are met while traveling, resulting in feelings of respect, recognition and attention from others (Tsaor & Tsai, 2023). Prior research has demonstrated that immersive experience plays a role in engaging tourists to participate in environmentally friendly tourism activities and contribute to more sustainable behaviors (Seeler, Schänzel & Lück, 2021; Wu, Li, Ma, Wang & Zhu, 2022).

Theoretically, expectations and post-purchase experiences shape an individual's satisfaction, which is an evaluation of positive feelings toward an experience (Oliver, 2014). Previous research has investigated the factors influencing tourist satisfaction, to understand their perception of using tourism products or services, indicating that experiencing the authenticity of local food enhances tourist satisfaction (Kivela & Crofts, 2006; Zhang, Chen & Hu, 2019).

Past studies have affirmed the links between tourist experiences and ENVBs (He, Hu, Swanson, Su & Chen, 2018; Wu et al., 2022). ENVB reflects an individual's concerns about environmental conservation and their willingness and actions to minimize activities that negatively impact the environment, economy or communities (He et al., 2018). ENVB includes various dimensions such as energy conservation, waste reduction, reuse, recycling, choosing

green transportation, selecting eco-friendly services and products and engaging in environmentally friendly social behaviors (Wu et al., 2022). Tourism experience also contributes to the destination, as empirical research has shown that a unique gastronomic experience enhances destination image and increases the likelihood of tourists returning (Kareem & Venugopal, 2024; Kivela & Crotts, 2006; Kladou, Rigopoulou, Kavaratzis & Salonika, 2022).

Based on the empirical evidence, the following hypotheses are proposed.

*H1a*: LCT experiences directly affect experiential satisfaction.

*H1b*: LCT experiences directly affect ENVB.

*H1c*: LCT experiences directly affect destination image.

*H1d*: LCT experiences directly affect destination revisit intentions.

## **2.5 Experiential Satisfaction and Its Influences**

In this study, experiential satisfaction refers to the overall evaluation of a tourist's LCT experience at the destination. Theoretically, satisfaction influences individuals' attitudes and subsequent intentions (Oliver, 1980). Several studies have reported that experiential satisfaction influences destination image and tourists' behavioral intentions (De Nisco, Mainolfi, Marino & Napolitano, 2015; Wu & Li, 2017). Prior studies have also identified a positive link between destination image and revisit intentions (Gim, 2018; Wu & Li, 2017) and between experiential satisfaction and ENVBs (He et al., 2018). Accordingly, tourists' cumulative experiential satisfaction toward a destination could cause them to engage in more ENVBs. Accordingly, the following hypotheses are posited.

*H2a*: Experiential satisfaction directly affects destination image.

*H2b*: Experiential satisfaction directly affects ENVB.

*H2c*: Experiential satisfaction directly affects destination revisit intentions.

*H3*: Destination image directly affects destination revisit intentions.

Satisfaction has been shown to play a mediating role in past tourism studies (Durmaz, Çayırbaş & Çopuroğlu, 2022; Kladou et al., 2022). Ćulić et al. (2021) reported that destination attractiveness affected Serbia's destination image through tourist satisfaction. Durmaz et al. (2022) revealed that destination satisfaction mediated the relationship between perceived gastronomy tourism and tourist behavior. Kim (2018) found that tourist satisfaction mediated the relationship between the tourism experience and behavioral intentions. Kim, Park and Kim (2016) also investigated the mediating role of destination image in linking experiential satisfaction and revisit intentions. Thus, the hypotheses are posited as follows.

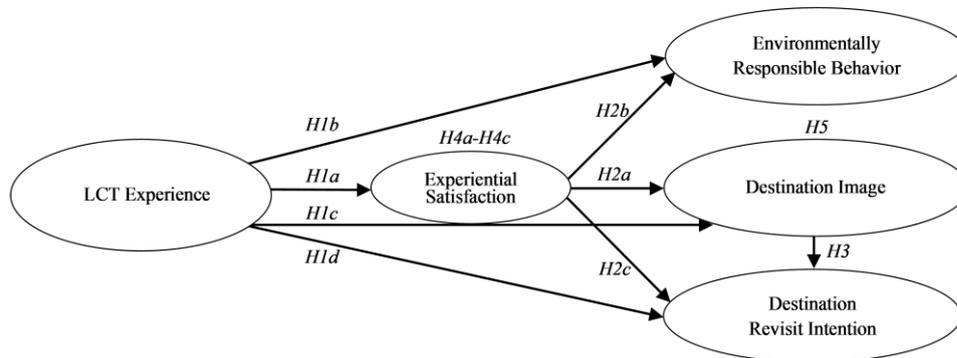
*H4a*: LCT experiences indirectly affect destination image through experiential satisfaction.

*H4b*: LCT experiences indirectly affect ENVB through experiential satisfaction.

*H4c*: LCT experiences indirectly affect destination revisit intentions through experiential satisfaction.

*H5*: Experiential satisfaction indirectly affects destination revisit intentions through destination image.

**Figure 1.** Conceptual Model



### 3. METHODOLOGY

#### 3.1 Stage 1: Measurement Development

Identifying the attributes of tourism experience is essential to tourism studies (Fakfare & Lee, 2019). A scale development procedure recommended by Churchill (1979) and Hinkin (1995) was applied to develop a measurement scale for the LCT experience of gastronomy-based tourists. This multi-stage procedure has been used in previous tourism research (Fakfare & Lee, 2019; Li, Deng, Peng & He, 2023). In Stage 1, item (attribute) generation was conducted, followed by scale purification, reliability and validation in Stage 2.

Potential domains and 66 attributes of the LCT experience were identified from an extensive literature review on tourism experiences, LCT and gastronomy tourism (see Table 1). A qualitative research method was also used to identify additional attributes and develop a more comprehensive scale for this context.

**Table 1.** Potential Domains for the LCT Experience

Domains of Construct	Relevant Sources
Sensory experience	Kastenholz, Carneiro, Marques and Loureiro (2018); Kivela and Crofts (2006); Lee and Jan (2019); Mohamed et al. (2020); Mora et al. (2021); Wu et al. (2022)
Affective experience	Kumar and Kaushik (2020); Lee and Jan (2019); Mohamed et al. (2020); Wu et al. (2022)
Learning experience/education	Kastenholz et al. (2018); Kumar and Kaushik (2020); Lee and Jan (2019); Mohamed et al. (2020); Seeler et al. (2021); Wu et al. (2022)
Socio-cultural experience	Lee and Jan (2019); Seeler et al. (2021)
Behavioral experience	Kivela and Crofts (2006); Kumar and Kaushik (2020); Lee and Jan (2019); Mohamed et al. (2020); Seeler et al. (2021)
Immersive experience/aesthetics	Kastenholz et al. (2018); Lunardo and Ponsignon (2020); Seeler et al. (2021)
Escapism experience	Kastenholz et al. (2018); Seeler et al. (2021); Wu et al. (2022)
Prestige experience	Lee and Jan (2019); Tsaur and Tsai (2023)

In the first stage, an interview form and an attribute review form were designed and validated. The interview form was used to collect qualitative data from in-depth interviews, while the attribute review form was used for interviewees to evaluate the potential attributes and suggest new attributes. The content validity of both forms was assessed by five experts, and the results showed that all interview form questions exceeded the threshold value suggested by Turner and Carlson (2003) ( $\geq 0.750$ ). For the attribute review form, the scores of 59 items also exceeded the threshold value, while seven items with scores below the threshold value were eliminated. Some items were adjusted slightly according to experts' suggestions. To ensure the reliability of the revised form, a pilot test was carried out by distributing thirty forms to target respondents. The Cronbach's alpha ( $\alpha$ ) coefficient value for each dimension was greater than 0.700 (Hair, Black, Babin & Anderson, 2010).

Before collecting data, the research tools were submitted to the Ethical Review Committee for Human Research of King Mongkut's Institute of Technology Ladkrabang and received ethical approval in August 2022 (No. EC-KMITL\_65\_112). In-depth interviews were conducted in November 2022, using the interview form with 13 experts to provide opinions and insights on the LCT experience. The experts include three government officials in charge of the sustainable tourism administration in the city of Nan, two scholars in the field of environmental management from Thailand's leading universities, five entrepreneurs from local sustainable tourism entrepreneur networks, two officials from food and ecotourism associations and one local tour guide with 10 years of experience.

The 59 initial attributes were modified and confirmed using expert and tourist ratings. The 13 experts were asked to rate the attributes as measures of the LCT experience using a five-point bipolar rating scale (totally agree – totally disagree) and to suggest new related attributes. Target tourists were also invited to participate in this process, which was carried out from December 2022 to January 2023. All participants were informed that their responses to the survey were voluntary, anonymous and confidential. A total of 112 cases were obtained, and 11 cases with missing data were excluded. Subsequently, 101 valid data were subjected to factor analysis using the principal components analysis technique to purify initial attributes. Fifteen correlated attributes with factor loading coefficients below 0.550 were dropped to strengthen the scale's construct validity (Hinkin, 1995), resulting in 44 items remaining.

Content analysis was employed to analyze the data collected from the in-depth interviews. The results revealed that one attribute should be revised by incorporating a 'charming presentation of local cuisine'. Four new attributes were generated, including 'feeling proud to contribute to the local community', 'feeling comfortable or unforced when consuming low-carbon products or services', 'learning carbon reduction methods and applying them to daily life' and 'participating in and taking responsibility for environmental change'. Subsequently, a pool of 48 items was incorporated to measure the LCT experience.

## **3.2 Stage 2: Quantitative Research**

### **3.2.1 Research Tools and Measurements**

In Stage 2, a questionnaire was designed to collect quantitative data. An informed consent form was attached to each questionnaire. Two screening questions were also included to ensure the qualification of samples: 'Tasting beverages and foods made from local ingredients is one of the main activities during your visit' and 'You had the opportunity to drink local beverages or eat local foods prepared with local ingredients while traveling in the city'.

The first part of the questionnaire comprised 48 items derived from Stage 1 for measuring the LCT experience. The second part measured experiential satisfaction using five items adapted from Wu, Ai and Cheng (2016) and Wu and Li (2017). The third part included

six items derived from Cheng et al. (2013) and He et al. (2018) to measure ENVB and eight items adapted from Li et al. (2021) to measure destination image. Four items from Huang and Hsu (2009) and Kusumawati, Utomo, Suharyono and Sunarti (2020) were adapted to measure destination revisit intentions. Items in the first three parts were rated on a five-point bipolar rating scale. The final part consisted of questions on demographics and travel behaviors.

Five content experts were requested to assess the questions' validity. The results found that all item-objective congruence scores exceeded the threshold of 0.750 (Turner & Carlson, 2003). As suggested by the experts, several questions were slightly modified for better clarity in the context of this study. A pilot test was carried out by distributing the revised questionnaires to 30 target respondents. The Cronbach's  $\alpha$  coefficient of all individual constructs surpassed the cut-off value (Hair et al., 2010). The revised questionnaire was resubmitted to the Ethical Review Committee for Human Research and received amendment approval in March 2023 (No. EC-KMITL\_65\_112).

### **3.2.2 The sample and data collection**

The stage 2 survey was conducted in the city of Nan, Thailand, from June to December 2023. Convenience sampling, a non-probability sampling method, was employed. The target population was domestic tourists aged 18 and above who had experienced gastronomic LCT. Data collection for stage 2 was performed at Nan Nakhon Airport's departure hall, Kad Khuang Mueang Nan night market, and local cafés and restaurants participating in the sustainable tourism entrepreneur network of Chulalongkorn University.

The questionnaires were distributed to members of the target population willing to participate in the survey. Participants were informed that their data would remain anonymous and confidential. The definition of LCT was briefly explained in the questionnaire. Those who answered 'Yes' to both screening questions and agreed to the written informed consent were included in the survey. In total, 1,026 responses were collected. However, 79 incomplete responses were ultimately excluded, resulting in a total of 947 usable responses.

The research hypotheses were examined using structural equation modeling (SEM). The recommended sample size for this technique is 10 times the number of observed variables (Schumacker & Lomax, 2016). As the proposed model in this study had 71 observed variables, the sample size should be at least 710. Therefore, the 947 complete responses obtained were adequate for further analysis.

## **4. RESULTS**

### **4.1 Sample Profile**

Among the 947 respondents, the majority were female (54.0%), 36.2% were aged between 21 and 30 years, 68.5% held a bachelor's degree, and 61.8% were single. 32.1% of respondents were private business employees, and 47.9% reported an average monthly income of 10,001–30,000 THB (47.9%). The majority (67.7%) spent two to three nights in the city. Most respondents (37.8%) described their travel lifestyle as slow travel and immersion in the local community's way of life. Most (53.1%) travelled by private car, primarily for leisure (75.5%).

Nonresponse bias was assessed using the test for mean differences. By comparing two groups of data drawn from the first and last 10% of cases, no significant differences were found between the groups ( $p = 0.070$ ), indicating no nonresponse bias in this study.

## 4.2 Exploratory Factor Analysis (EFA)

The data (n = 947) were randomly divided into two sets. The first set of data (n<sub>1</sub> = 200) was examined using EFA to purify the scale. The second set of data (n<sub>2</sub> = 747) was examined using confirmatory factor analysis (CFA).

Stage 1 yielded 48 essential items, which were grouped to identify underlying patterns among the measured items. Four items with a factor loading below 0.500 and exhibiting cross-loading were removed from the independent constructs (Hair et al., 2010). Consequently, the remaining 44 items were categorized into seven constructs of LCT experience.

Results of the principal component analysis with varimax rotation revealed that nine items should be chosen for the learning experience construct, six for the prestige experience construct, seven for the escapism experience construct, eight for the sensory experience construct, six for the immersive experience construct, five for the affective experience construct, and three for the socio-cultural experience construct. The eigenvalues of all constructs were higher than 1. The cumulative percentage was 72.457%. The KMO values ranged from 0.740 to 0.931, and the Bartlett's test of sphericity was found to be significant ( $p < 0.050$ ).

## 4.3 Confirmatory Factor Analysis

In this process, the second set of data (n<sub>2</sub> = 747) was used to examine the reliability and validity of the developed scale using CFA. The measurement model's fitness was assessed using the criteria recommended by Hair et al. (2010):  $\chi^2/df < 3$ , CFI > 0.900, TLI > 0.900, RMSEA < 0.070, and SRMR < 0.080.

The measurement model (shown in Table 2) was found to fit the data according to the following criteria:  $\chi^2 = 2,610.650$ ,  $df = 1,070$ , CFI = 0.932, TLI = 0.925, RMSEA = 0.044, and SRMR = 0.040. In this process, ten items were eliminated from the independent constructs, while 34 items were confirmed. The remaining items were identified as dimensions of the LCT experience, comprising learning, sensory, escapism, immersive, prestige, affective and socio-cultural experience. The dependent constructs comprised four items representing experiential satisfaction, three items representing ENVB, four items representing destination image, and four items representing revisit intentions. Thus, 49 items were incorporated into the model.

The results exhibited in Table 2 confirm the scales' unidimensionality. Cronbach's  $\alpha$  coefficient values exceeded the threshold of 0.700, indicating the reliability of the observed variables. All composite reliability (CR) scores exceeded the threshold value ( $\geq 0.600$ ). The average variance extracted (AVE) for the individual construct indicated convergent validity ( $\geq 0.500$ ).

**Table 2.** Results of CFA. (n<sub>2</sub> = 747)

Construct item	Factor loadings	t-value	CR	AVE
<b>Learning experience</b> ( $\alpha = 0.908$ )			0.908	0.526
1) This LCT experience is exploratory.	0.778	47.747**		
2) This LCT experience is a new cultural experience.	0.773	46.860**		
3) You gain new perspectives in life from LCT.	0.765	45.220**		
4) This LCT experience makes you more knowledgeable, and you learn a lot	0.749	41.910**		

through the experience.				
5) This LCT experience allows you to learn about the stories of the tourist cities and attractions you visit.	0.739	40.254**		
6) You are educated and informed through this LCT experience.	0.729	38.544**		
7) Participating in LCT makes you engage in a lot of thinking.	0.676	31.459**		
8) You learn carbon reduction methods from this trip and want to apply them in your daily life.	0.657	29.120**		
9) This LCT experience initiates self-reflection, such as ENVB and being socially conscious.	0.647	28.141**		
<b>Sensory experience</b> ( $\alpha = 0.846$ )			0.845	0.522
1) Engaging in LCT activities, such as tasting local food and beverages, can arouse interests.	0.751	39.838**		
2) This LCT experience allows you to associate all your senses.	0.724	35.898**		
3) This LCT experience offers the chance to taste exceptional local food and beverages made from fresh, locally sourced ingredients.	0.714	34.316**		
4) LCT is interesting because it provides a tourism experience in a sensory way, stimulating all five senses (sight, hearing, smell, taste, touch).	0.712	34.091**		
5) This LCT experience provides an impressive experience through tasting, sight, and smell of local food and drinks.	0.711	34.027**		
<b>Escapism experience</b> ( $\alpha = 0.879$ )			0.880	0.552
1) LCT leads to an involving tourism experience.	0.786	48.664**		
2) Experiencing this LCT experience and actively participating in activities helps you forget worries in your normal daily life.	0.776	46.124**		
3) This LCT experience provides you with an experience that is different from traditional tourism.	0.755	42.099**		
4) This LCT experience makes you feel like you have escaped from your daily routine.	0.728	37.747**		
5) Participating in tourism activities promotes your association with others.	0.704	34.467**		
6) You feel you have done something important that saves energy and reduces carbon emissions.	0.703	34.131**		

<b>Immersive experience</b> ( $\alpha = 0.878$ )			0.878	0.644
1) This LCT experience provides you with an interesting experience.	0.828	58.676**		
2) This LCT experience provides you with a passionate experience.	0.809	53.346**		
3) This LCT experience provides you with peaceful and calm experience.	0.790	48.713**		
4) You feel amazed by the LCT experience.	0.782	47.009**		
<b>Prestige experience</b> ( $\alpha = 0.864$ )			0.866	0.618
1) Tourists with LCT experience often feel proud to have contributed to the local community.	0.812	50.792**		
2) Tourists with LCT experience often feel proud of their dedication to environmental issues.	0.811	50.676**		
3) Experiences from LCT convey tourists' social status, such as being recognized as environmentally conscious and responsible.	0.797	47.960**		
4) Low-carbon tourists are impressive in the eyes of others.	0.722	35.210**		
<b>Affective experience</b> ( $\alpha = 0.734$ )			0.748	0.500
1) LCT provides you with an experience that reflects your care for the environment and local communities.	0.773	39.252**		
2) Experiencing LCT makes you feel cheerful and you can enjoy the experience.	0.735	34.940**		
3) Tasting local food allows you to experience and harmonize with the local culture.	0.603	22.986**		
<b>Sociocultural experience</b> ( $\alpha = 0.791$ )			0.793	0.561
1) You have good impressions of the local people.	0.783	42.709**		
2) The local people at the destination are friendly.	0.736	35.624**		
3) You experience the local culture closely.	0.727	35.424**		
<b>Experiential satisfaction</b> ( $\alpha = 0.857$ )			0.859	0.605
1) It is worthwhile visiting this tourist city.	0.812	51.620**		
2) I really like traveling to this tourist city.	0.797	49.091**		
3) This trip has been a great experience.	0.760	41.603**		
4) You feel that you have contributed to environmental protection and sustainable development.	0.741	37.926**		
<b>Environmentally responsible behavior</b> ( $\alpha = 0.765$ )			0.764	0.519

1) You try to convince others to protect the natural environment in the city of Nan.	0.743	30.790**		
2) If there are environmental clean-up activities at the tourist site, you would be willing to attend.	0.724	29.293**		
3) When you see garbage on the ground, you will pick it up and put it in the trash.	0.695	27.411**		
<b>Destination image</b> ( $\alpha = 0.849$ )			0.850	0.587
1) The city of Nan offers a pleasant LCT destination.	0.817	51.409**		
2) Nan is an exciting tourist city.	0.776	43.570**		
3) The city of Nan has a good balance between environment and infrastructure.	0.757	40.418**		
4) The city of Nan has attractive tourism resources.	0.712	33.896**		
<b>Destination revisit intention</b> ( $\alpha = 0.906$ )			0.908	0.712
1) You will likely revisit this tourist city.	0.880	78.983**		
2) You desire to visit this tourist city again.	0.843	64.509**		
3) You intend to revisit this tourist city.	0.828	60.069**		
4) You plan to revisit this tourist city.	0.823	58.788**		

Notes: \*\*  $p < 0.001$

CICFA(sys) and  $\chi^2$ (sys) were utilized to assess the constructs' discriminant validity. The threshold value of 0.900 was used to classify the level of discriminant validity issues (Rönkkö & Cho, 2022). Table 3 exhibits a high correlation between the constructs of affective and sensory experience, with the upper bound of the correlation based on CFA ( $\rho$ CFA) being 0.912. This correlation fell within the moderate level ( $0.900 \leq$  upper limit of  $\rho$ CFA  $< 1$ ), indicating that the problem of discriminant validity was not severe. These two constructs were theoretically well-supported and have been extensively used in previous research (Kumar & Kaushik, 2020; Lee & Jan, 2019; Mohamed et al., 2020); thus, the high correlation was unlikely due to a systematic problem with the constructs.

**Table 3.** Confidence Intervals (CI) for the Correlations Derived from CFA ( $n_2 = 747$ ).

	LEARN	SENSE	ESC	IMME	PRES	AFFE	SOC	EXPSAT	ENVB	DI	DRI
LEARN	1										
SENSE	[.719,.802]	1									
ESC	[.755,.827]	[.666,.761]	1								
IMME	[.748,.822]	[.740,.822]	[.714,.796]	1							
PRES	[.576,.682]	[.452,.582]	[.640,.737]	[.534,.649]	1						
AFFE	[.692,.804]	[.831,.912]	[.731,.826]	[.795,.878]	[.524,.653]	1					
SOC	[.712,.803]	[.709,.806]	[.776,.858]	[.734,.824]	[.573,.692]	[.753,.856]	1				
EXPSAT	[.616,.717]	[.571,.685]	[.703,.790]	[.606,.710]	[.606,.712]	[.659,.769]	[.710,.806]	1			
ENVB	[.393,.537]	[.335,.491]	[.449,.588]	[.372,.520]	[.470,.606]	[.358,.521]	[.487,.630]	[.548,.677]	1		
DI	[.477,.600]	[.504,.628]	[.555,.668]	[.440,.570]	[.485,.609]	[.512,.645]	[.592,.708]	[.672,.768]	[.548,.675]	1	
DRI	[.311,.449]	[.359,.497]	[.391,.521]	[.348,.484]	[.291,.433]	[.369,.515]	[.454,.585]	[.528,.641]	[.454,.589]	[.653,.747]	1

Note: Values enclosed within square brackets = the correlation values at the lower and upper bounds of 2.5%; LEARN = learning experience; SENSE = sensory experience; ESC = escapism experience; IMME = immersive experience; PRES = prestige experience; AFFE = affective experience; SOC = sociocultural experience; EXPSAT = experiential satisfaction; DI = destination image; and DRI = destination revisit intentions

Table 4 shows that the  $\chi^2(\text{sys})$  technique confirmed discriminant validity; the difference between the  $\chi^2$  values of the constrained and unconstrained (original) models was 6.241 ( $p = 0.012, df = 1$ ), exceeding the critical value of 3.840 (Rönkkö & Cho, 2022). This result indicates that the model was satisfactory, allowing the analysis to proceed without combining factors.

**Table 4.** Discriminant validity.

Construct	Sensory experience
<b>Affective experience</b>	Estimated $\rho_{\text{CFA}}$
	0.872
	CI $\rho_{\text{CFA}}$
	[0.831, 0.912]
	$p$ -value
	0.000
	Degree of problem
	Moderate
a. constrained model:	
$\chi^2 = 2,616.891^{***}, df=1,071, CFI = 0.931, TLI = 0.925, RMSEA = 0.044, SRMR = 0.040$	
b. unconstrained model	
$\chi^2 = 2,610.650^{***}, df=1,070, CFI = 0.932, TLI = 0.925, RMSEA = 0.044, SRMR = 0.040$	
<i>Note:</i> $^{***} p = 0.000; \chi^2(0.920) - \chi^2(\text{unconstrained model}) > 3.840$	

The factor loadings and model fit values of the second-order CFA were examined. The model fit indices were:  $\chi^2 = 1,469.896, df = 517, CFI = 0.937, TLI = 0.932, RMSEA = 0.050, SRMR = 0.042$ . The factor loadings of each construct varied between 0.692 and 0.911, along with their corresponding significant values. All components have been confirmed as the constructs of LCT experience.

#### 4.4 Structural Model

The structural model exhibited a satisfactory fit, with index values of  $\chi^2 = 2,845.537, df = 1,109, CFI = 0.923, TLI = 0.918, RMSEA = 0.046, \text{ and } SRMR = 0.046$ . The results indicated that LCT experience strongly affected experiential satisfaction ( $H1a: \beta = 0.800^{**}$ ) and destination image ( $H1c: \beta = 0.200^*$ ). However, no significant direct effects of LCT experience on ENVB ( $H1b: \beta = 0.134, p = 0.076$ ) and destination revisit intentions ( $H1d: \beta = -0.044, p = 0.478$ ) were found. The results showed direct effects of experiential satisfaction on destination image ( $H2a: \beta = 0.575^{**}$ ), ENVB ( $H2b: \beta = 0.530^{**}$ ) and destination revisit intentions ( $H2c: \beta = 0.225^*$ ). The result of  $H3$  testing showed that destination image directly affected destination revisit intentions ( $\beta = 0.552^{**}$ ).

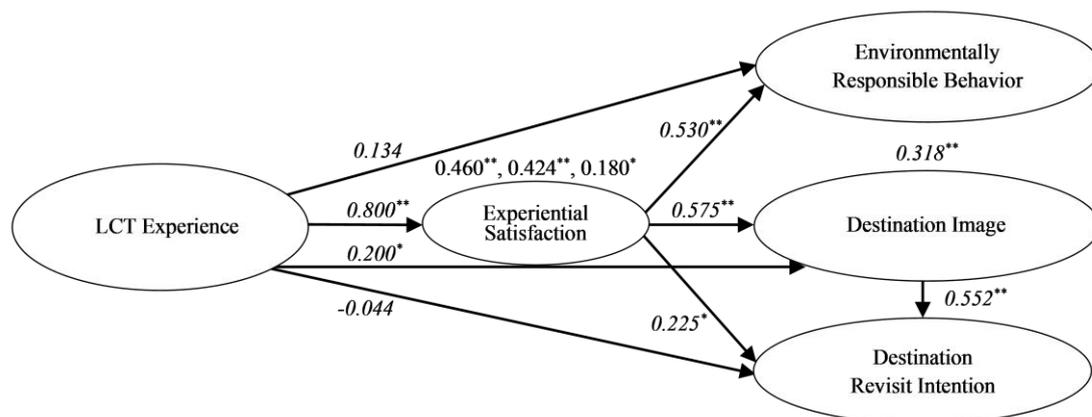
The results of  $H4$  testing revealed indirect effects of LCT experience on destination image ( $H4a: \beta = 0.460^{**}$ ), ENVB ( $H4b: \beta = 0.424^{**}$ ), and destination revisit intentions ( $H4c: \beta = 0.180^*$ ) through experiential satisfaction. Moreover, experiential satisfaction was found to have an indirect effect on destination revisit intentions through destination image ( $H5: \beta = 0.318^{**}$ ). These results affirm the mediating role of experiential satisfaction and destination image. To validate the mediating roles, the bootstrap technique was employed with 10,000 resamples (Preacher & Hayes, 2008). The consequent results affirmed that experiential satisfaction acted as a mediator linking LCT experience and ENVB ( $\beta = 0.424^{**}, 97.5\% \text{ CI} = [0.242, 0.606]$ ), LCT experience and destination image ( $\beta = 0.460^{**}, 97.5\% \text{ CI} = [0.304, 0.616]$ ), and LCT experience and destination revisit intentions ( $\beta = 0.180^*, 97.5\% \text{ CI} = [0.011, 0.348]$ ). Destination image was also identified as a key factor linking experiential satisfaction and destination revisit intentions ( $\beta = 0.318^{**}, 97.5\% \text{ CI} = [0.189, 0.447]$ ). The results of the hypothesis testing are summarized in Table 5.

**Table 5.** Results of Hypothesis Testing ( $n_2 = 747$ ).

Hypotheses	Path coefficient	<i>t</i> -values	Results
<i>H1a</i> : LCTEXP → EXPSAT	0.800	43.165**	accepted
<i>H1b</i> : LCTEXP → ENVB	0.134	1.777	rejected
<i>H1c</i> : LCTEXP → DI	0.200	3.135*	accepted
<i>H1d</i> : LCTEXP → DRI	-0.044	-0.709	rejected
<i>H2a</i> : EXPSAT → DI	0.575	9.213**	accepted
<i>H2b</i> : EXPSAT → ENVB	0.530	7.059**	accepted
<i>H2c</i> : EXPSAT → DRI	0.225	3.071*	accepted
<i>H3</i> : DI → DRI	0.552	10.496**	accepted
<i>H4a</i> : LCTEXP → EXPSAT → DI	0.460	8.678**	accepted
<i>H4b</i> : LCTEXP → EXPSAT → ENVB	0.424	6.763**	accepted
<i>H4c</i> : LCTEXP → EXPSAT → DRI	0.180	3.047*	accepted
<i>H5</i> : EXPSAT → DI → DRI	0.318	6.904**	accepted

Note: \*\* $p < 0.001$ ; \* $p < 0.010$ ; LCTEXP = low-carbon tourism experience

**Figure 2.** Model of Relationships in the LCT Experience of Gastronomy-Based Tourism and Its Effects



Note: \*\* $p < 0.001$ ; \* $p < 0.010$ ; the significant values above the experiential satisfaction construct identify the path coefficients of *H4a*, *H4b*, and *H4c*, respectively; the value above the destination image construct identifies the path coefficient of *H5*.

## 5. DISCUSSION

Although numerous studies have explored and discussed LCT from the supply side perspective, understanding of the demand side is limited. Moreover, scholars have not addressed the full understanding of LCT in the context of gastronomy. Thus, to establish well-balanced sustainability for a tourism destination and fill this research gap, this study developed and validated a scale for measuring the LCT experience and investigated the causal relationships between the LCT experience, experiential satisfaction, destination image, destination revisit intentions, and ENVB of gastronomy-based tourists using a mixed-method approach.

First, 48 items were initially identified to measure the tourists' LCT experiences by following the multi-stage procedure for scale development. EFA, CFA, reliability, and validity analyses were also used to analyze and validate the data using a questionnaire survey. Subsequently, a multidimensional LCT experience scale with 34 measurement items was developed. The scale comprises seven dimensions: learning, sensory, escapism, immersive, prestige, affective and sociocultural experiences. These dimensions were verified as essential

experiences for LCT, likely to determine the satisfaction of gastronomy-based tourists engaging with the experience. This study provides an extended view of the LCT experience from the tourists' perspective, which contributes to shaping tourists' ENVBs and supporting sustainable tourism.

To the best of our knowledge, the study is among the first to develop and validate a multidimensional scale for measuring LCT from a gastronomy-based perspective and examining its influences on tourism outcomes. In previous literature on the tourism experience, some scholars revealed various dimensions of the tourism experience that significantly shape tourists' attitudes, perceptions, behavioral intentions and behaviors (Lee & Jan, 2019; Y. Li et al., 2023; Tsaur & Tsai, 2023). In this study, seven dimensions, which together reflect the LCT experience, particularly from the viewpoint of gastronomy-based tourists, were identified in line with past studies. For instance, Mohamed et al. (2020) reported that the sensory, affective, intellectual (referred to as learning experience in this study) and behavioral dimensions of food experiences contributed to shaping the overall Egyptian food experience in Cairo, Egypt. Lee and Jan (2019) developed a scale to measure the LCT experience of tourists in forest-based destinations, comprising dimensions of sensory, affective, learning, sociocultural, behavioral, escapism and prestige experiences. Kastenholz et al. (2018) demonstrated that passive immersion (referred to as aesthetics), education and escapism were involved in the realm of rural experience. Additionally, Seeler et al. (2021) found that experienced tourists were more likely to engage in immersive experiences, which can lead to more sustainable travel patterns.

Second, causal relationships between gastronomy-based tourists' LCT experiences, experiential satisfaction, destination image, destination revisit intentions and ENVBs were identified. The results are consistent with previous studies affirming that tourist experiences gained from tourism activities significantly shaped their attitudes, destination perceptions and behavioral revisit intentions (Kareem & Venugopal, 2024; Kumar & Kaushik, 2020; Lee & Jan, 2015; Mohamed et al., 2020; Wu & Li, 2017).

This study suggests that the LCT experience is crucial to the development of the experiential satisfaction of a gastronomy-based tourist (*H1a*), consistent with several studies that revealed the influences of authentic local food experiences on tourist satisfaction (Kivela & Crotts, 2006; Rodríguez-Gutiérrez, González Santa Cruz, Pemberthy Gallo, & López-Guzmán, 2020; Zhang et al., 2019). Mora et al. (2021) established a positive effect of the gastronomic experience on gastronomic satisfaction. In this study, the direct effect of LCT experience on destination image was also found (*H1c*), similar to that reported in past studies. For instance, Iordanova and Styliadis (2019) found that tourists experiencing local events and attractions in Linz, Austria, were likely to develop a cognitive and affective image of the destination. Kim (2018) revealed that memorable tourism experiences significantly enhanced the positive image of Taiwan and tourists' satisfaction. In the case of gastronomy tourism, Kareem and Venugopal (2024) found that when a tourist gains a gastronomic experience (e.g., tasting authentic foods), their destination image is strengthened, which subsequently attracts more tourists to revisit the destination.

Lunardo and Ponsignon (2020) noted that the tourism experience, particularly the immersive aspect, is not only a key driver of tourist satisfaction but also encourages desirable behaviors. Although experience theoretically plays a key role in shaping tourist behavior (Kolb, 2015), the direct effects of LCT experience on ENVB (*H1b*) and destination revisit intentions (*H1d*) were not revealed in this study. The findings imply that such an experience of gastronomy-based tourism alone is not adequate to drive a tourist's ENVBs and intentions to revisit. The empirical results showed that the LCT experience indirectly affected ENVB (*H4b*) and the destination revisit intentions (*H4c*) of tourists through experiential satisfaction. These results are in line with the cognitive model of Oliver (1980), which showed the influential role of satisfaction in changing an individual's attitude and behavioral intentions. Additionally, an

empirical study by He et al. (2018) found that tourist satisfaction fully mediated the link between the value perceptions of a destination in central China and ENVB. Moreover, the mediating role of experiential satisfaction in linking LCT experience and destination image was also identified (*H4a*), which is consistent with Ćulić et al. (2021). Thus, experiential satisfaction plays an important mediating role in linking tourists' experiences and tourism outcomes, supporting previous tourism research (Durmaz et al., 2022; He et al., 2018; Kim, 2018; Li et al., 2021).

This study also affirms the direct effects of experiential satisfaction on key tourism outcomes and ENVBs. The result shows that tourists' experiential satisfaction significantly enhances their positive image of the city of Nan (*H2a*), which is in line with previous studies. Wu and Li (2017) found that the experiential satisfaction of heritage tourists positively influenced their destination image. De Nisco et al. (2015) indicated that a higher degree of satisfaction with the tourism experience strongly improved tourists' image of the destination. Furthermore, a direct effect of experiential satisfaction on the ENVBs was revealed (*H2b*). He et al. (2018) found that the experiential satisfaction of tourists with Yuelu Mountain in central China positively influenced their ENVBs. Sahabuddin et al. (2021) also indicated that tourists' satisfaction with a destination in Bangladesh influenced their ENVBs. Su et al. (2020) affirmed that tourist satisfaction could improve tourists' ENVBs.

The relationship between experiential satisfaction and destination revisit intentions was also revealed in this study (*H2c*), which has also been identified in previous studies. Wu and Li (2017) found that the higher the degree of a tourist's experiential satisfaction, the higher the likelihood of returning to the same destination. They also identified the positive effect of destination image on intentions to revisit. Palacios-Florencio, Santos-Roldán, Berbel-Pineda and Castillo-Canalejo (2021) found the influence of tourists' experiential satisfaction on intentions to select sustainable tourism destinations in the post-COVID-19 situation. Moreover, the results revealed that perceived destination image is a predictor of intentions to revisit the destination (*H3*), similar to the findings of Wu and Li (2017). Thus, these results support the significant role of experiential satisfaction and its influences on destination image, behavioral intentions, and subsequent behaviors, as well as the strong link between destination image and revisit intentions.

Lastly, this study demonstrates that tourists are more inclined to return to a destination when they hold a favorable perception of its image, influenced by their satisfaction with the experience they received (*H5*). This result supports previous findings on the mediating role of destination image in linking satisfaction and intentions to revisit (Gim, 2018; Kim et al., 2016).

## **6. CONCLUSION**

This study offers an extended view of the LCT experience from the perspective of gastronomy-based tourists. The key findings reveal that the multidimensional LCT experience, comprising learning, sensory, escapism, immersive, prestige, affective, and sociocultural dimensions, is a significant driver of destination image and plays a crucial role in shaping tourists' environmentally responsible behaviors and their intentions to revisit the destination when they derive experiential satisfaction from their visit. Furthermore, such experiences contribute to the promotion of sustainable tourism.

### **6.1 Theoretical Implications**

This study makes a significant contribution to the tourism literature as one of the first empirical investigations to propose a multidimensional gastronomic LCT experience scale. It extends the application of the CAC framework to the context of gastronomic LCT. By

employing the LCT experience (cognitive component), experiential satisfaction, and destination image (affective components), along with destination revisit intentions and ENVB (conative components), this study provides an extensive theoretical framework that enhances understanding of the limited studies in similar contexts.

## **6.2 Practical Implications**

Destination management organizations (DMOs) and government agencies can benefit from the attributes identified in this study. The findings enable a deeper understanding of what gastronomy-based tourists prioritize, guiding resource allocation to enhance memorable experiences toward a low-carbon destination. Additionally, these findings can help identify the destination's strengths and areas for improvement by using the developed attributes as a measurement scale to conduct tourist surveys and self-assessments.

This study also provides policymakers with invaluable insights for developing strategic approaches to sustainable development through gastronomy-related LCT. The seven dimensions can serve as a reference for developing effective marketing strategies to promote local cuisine and educational programs that highlight actionable low-carbon practices. Relevant organizations can create marketing activities that showcase local cuisine and low-carbon activities as key attractions, emphasizing the destination's commitment to sustainable development practices.

## **6.3 Limitations and Future Research**

This study was conducted in an area designated as a low-carbon destination. Thus, the results may have limited generalizability, and some attributes of the gastronomic LCT experience may be reflected only in a specific context. Hence, future research could apply the scale developed in this study to generalize the scale or identify additional dimensions in other destinations and cultures. Furthermore, the moderating effects of tourist characteristics can be examined further considering that tourists with different characteristics may have varying perceptions of LCT experiences and degrees of experiential satisfaction. Finally, other antecedents (e.g., travel motivation) and consequences of the LCT experience (e.g., willingness to recommend, willingness to pay for sustainable tourism and destination loyalty) could be explored further to gain greater insight.

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