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Theoretical Framework and Measurement Scale for Sustainable Tourism Development in the Mekong Delta Region, Vietnam

Nguyen Huynh Phuong Thao[1]
Nguyen Thien Dung[2]
Do Van Quang[3]

[1,2,3]*Thuyloi University, Vietnam.*
Email: dzungngt@tlu.edu.vn
Email: nhpthao.vosco@gmail.com
Email: quangkttl@tlu.edu.vn
(✉ Corresponding Author)

Abstract

This study focuses on developing and validating a measurement scale to assess the factors influencing sustainable tourism development, with Long An province as a case study. Based on theoretical foundations and data collected through qualitative discussions with ten experts and a quantitative survey of 500 tourists, the study identifies six key factors: tourism resources, tourism infrastructure, tourism types, regulatory policies, community participation, and tourism demand. Exploratory Factor Analysis (EFA) reveals a total variance explained of 84.967%, confirming high convergent and discriminant validity of the factors. The measurement scales achieve a Cronbach's Alpha coefficient exceeding 0.9, ensuring reliability and internal consistency. This study contributes to the theoretical understanding of sustainable tourism development by providing a comprehensive framework for future research. Additionally, the developed measurement scales serve as a valuable reference for researchers and practitioners seeking to enhance tourism competitiveness in diverse contexts beyond the study's focal area. The research findings offer essential scientific tools to support strategic planners and tourism enterprises in formulating effective development strategies, thereby strengthening the theoretical foundation of sustainable tourism while providing practical insights to improve the competitiveness and sustainability of tourist destinations.

Keywords: Exploratory factor analysis (EFA), Service quality, Sustainable tourism development.

1. Introduction

Sustainable tourism development is a crucial objective aimed at meeting the current needs of tourists while simultaneously preserving natural and cultural resources for future generations. According to Sen (1999), development is not merely about economic growth but also encompasses improvements in quality of life and social equity. Furthermore, Butler (2019) emphasizes that sustainable tourism must achieve a balance between environmental protection, economic development, and cultural preservation. Innovation in the tourism sector is therefore considered a key factor in enhancing service quality, improving tourist experience, and ensuring long-term sustainability (Ottenbacher & Gnoth, 2005). In this context, the development of reliable and valid measurement scales serves as a fundamental basis for evaluating and refining tourism development strategies. Methods such as Exploratory Factor Analysis (EFA) and Cronbach's Alpha are commonly employed to assess the reliability and validity of these scales, ensuring that research concepts are measured accurately and consistently.

In previous studies, such as that of Binh, N. V. (2021), indicates that tourism demand has a significant impact on tourism resources, exerting considerable pressure on resource exploitation and conservation. The increasing demand for tourism, particularly sustainable tourism, necessitates stringent management measures to safeguard natural and cultural resources. Additionally, Hsu et al. (2009) affirms that tourism demand not only places pressure on resources but also navigates infrastructure development to support the sustainable utilization of resources. Therefore, it is evident that tourism demand not only influences tourism resources but also shapes more effective approaches to resource management and conservation.

According to Weaver (2006), changes in tourist demand serve as the primary driving force behind the development of sustainable tourism forms such as ecotourism, cultural tourism, and community-based tourism. Additionally, Lim et al. (2019) argue that the emergence of new tourism models, such as eco-tourism and luxury retreats, not only enables resource conservation but also supports economic growth. Thus, it can be observed that shifting tourist demands not only drive the expansion of sustainable tourism but also shape the overall development of the tourism industry.

The increasing demand for international tourism, particularly from travelers seeking high-end leisure and luxury experiences, has driven the development and expansion of tourism infrastructure in many countries. Lim et al. (2019) indicate that this growth has generated new demands for tourism-related facilities. Additionally, Hai,

N.Q. (2021) argues that the rising demand for international tourism has encouraged emerging economies to invest heavily in information and communication technology infrastructure to fulfill global travelers. Consequently, tourism demand not only serves as a key motivation for the development of infrastructure but also directly influences the modernization of technological platforms, thereby enhancing the competitiveness of tourism destinations in the global market.

Local community participation plays a crucial role in the development of sustainable tourism infrastructure. Tosun (2000) highlights that such participation not only enhances community acceptance of tourism projects but also ensures the sustainable development of infrastructure. Similarly, Garrod (2003) affirms that collaboration between communities and related parties, including government authorities and businesses, can foster greater consensus and improve the effectiveness of infrastructure development projects. Furthermore, the study by Goodwin and Santilli (2009) in South Africa demonstrates that community involvement can promote sustainable tourism while generating economic benefits for local residents. Thus, community participation is not only a fundamental factor in the development of sustainable tourism infrastructure but also contributes to improving the quality of life for local populations.

According to Scheyvens (2002), local community participation enhances the quality of tourism services by tailoring tourism products to align with cultural characteristics and local resources. Studies by Murphy (1985) and Hung, N.V., (2022) emphasize that community involvement in tourism planning and development contributes to service quality improvement, thereby fostering economic growth and benefits both tourists and local communities. Furthermore, such participation plays a crucial role in preserving the local natural and cultural resources, thereby promoting sustainability in tourism.

Moreover, Lee and Jan (2019) show community participation not only enhances awareness of natural resource conservation but also contributes to economic and socio-cultural aspects. Sharpley (2020) observes that such participation fosters a sense of ownership and responsibility in natural resource management, thereby ensuring long-term sustainability. Supporting this perspective, Nguyen Van Binh (2021) also emphasizes the role of the community in forming managerial policies in substainable tourism. Accordingly, community engagement not only promotes sustainable development but also ensures the benefits of tourism in the long run.

Tourism resources including natural and cultural ones, serve as fundamental factors in attracting visitors and forming conservation policies. Bramwell and Lane (1993) emphasize that high-quality tourism resources not only sustain the appeal of a destination but also contribute to long-term conservation efforts. Similarly, Hunter (1997) highlights the crucial role of tourism resources in establishing sustainable policies and alleviating the negative impacts of tourism activities. Therefore, tourism resources not only enhance destination attractiveness but also serve as a determining factor for long-term development when they are managed and utilized appropriately.

Hall and Page (1999) explain that high-quality infrastructure, including transportation, accommodation, and public utilities, not only enhances the visitor experience but also supports resource conservation and sustainable tourism development. Similarly, the study by N.V. Hung (2022) indicates that well-developed infrastructure enables to minimize negative environmental impacts and enhances the competitiveness of tourist destinations. Thus, sustainable infrastructure is a fundamental factor in achieving balanced and long-term tourism development.

There are several sustainable tourism models such as eco-tourism, community-based tourism, and cultural tourism which have emerged as significant trends in maintaining a balance between economic development and resource conservation. Weaver (2006) highlights that evolving tourist demands serve as a driving force behind developing these tourism models. Lim et al. (2019) further confirm that the advancement of green tourism and high-end resorts contributes to the balancing of resource conservation and economic growth. Additionally, the studies conducted by Ha, N.T.T., (2021) indicate that sustainable tourism not only meets tourist demands but also plays a crucial role in environmental protection and the preservation of local culture. Therefore, the development of sustainable tourism models is essential for maintaining harmony between conservation efforts and economic growth.

Finally, service quality is an indispensable factor in enhancing tourist satisfaction and promoting sustainability in the tourism industry. Masrurul (2019) asserts that service quality intensifies tourist's experiences, thereby developing sustainability. He also emphasizes that environmental friendliness and professional courtesy are fundamental elements in ensuring tourist satisfaction. The study by Alsiehemy (2023) in Saudi Arabia indicates that service quality not only increases tourist satisfaction but also stimulates their likelihood of returning which leads to the contribution to sustainable growth in the tourism industry.

The study also identifies several gaps needing to be addressed to promote sustainable tourism development. One of these gaps is that previous researches have primarily considered regulatory policies as independent factors influencing sustainable tourism, without analyzing their moderating role. This omission has led to a limited understanding of how managerial policies can either enhance or minimize the impact of other factors. The studies by Smith et al. (2020) demonstrate that policy interventions can induce significant shifts in the effectiveness of sustainable development measures. Additionally, existing researches have predominantly focused on direct relationships among factors such as tourism demand, tourism resources, and service quality, while overlooking more complex interactions. The absence of mediating and moderating variables in research models has prevented the real reflex of tourism development. Therefore, this study aims to develop a comprehensive measurement framework to assess the factors influencing sustainable tourism development, including the relationships among independent, mediating, moderating, and dependent variables to ensure a more accurate and holistic representation of these dynamics.

2. Research Process and Model

2.1. Research Process

The research process consists of two carefully designed phases to ensure methodological rigor and reliability, as shown in Figure 1. In the preliminary phase, data were collected from 150 tourists through direct interviews and online surveys to develop and refine the measurement scale. Cronbach's Alpha was employed to assess reliability, while exploratory factor analysis (EFA) was used to examine convergent and discriminant validity, removing any

non-compliant variables. The main survey involved 500 tourists in Long An, a province in Vietnam's Mekong Delta, selected through stratified random sampling to ensure representativeness. Reliability was further assessed using Cronbach's Alpha, while EFA confirmed the validity of the factors. The total variance extracted and factor loadings met the required thresholds, reinforcing the strong association between the measurement scale and its respective factors.

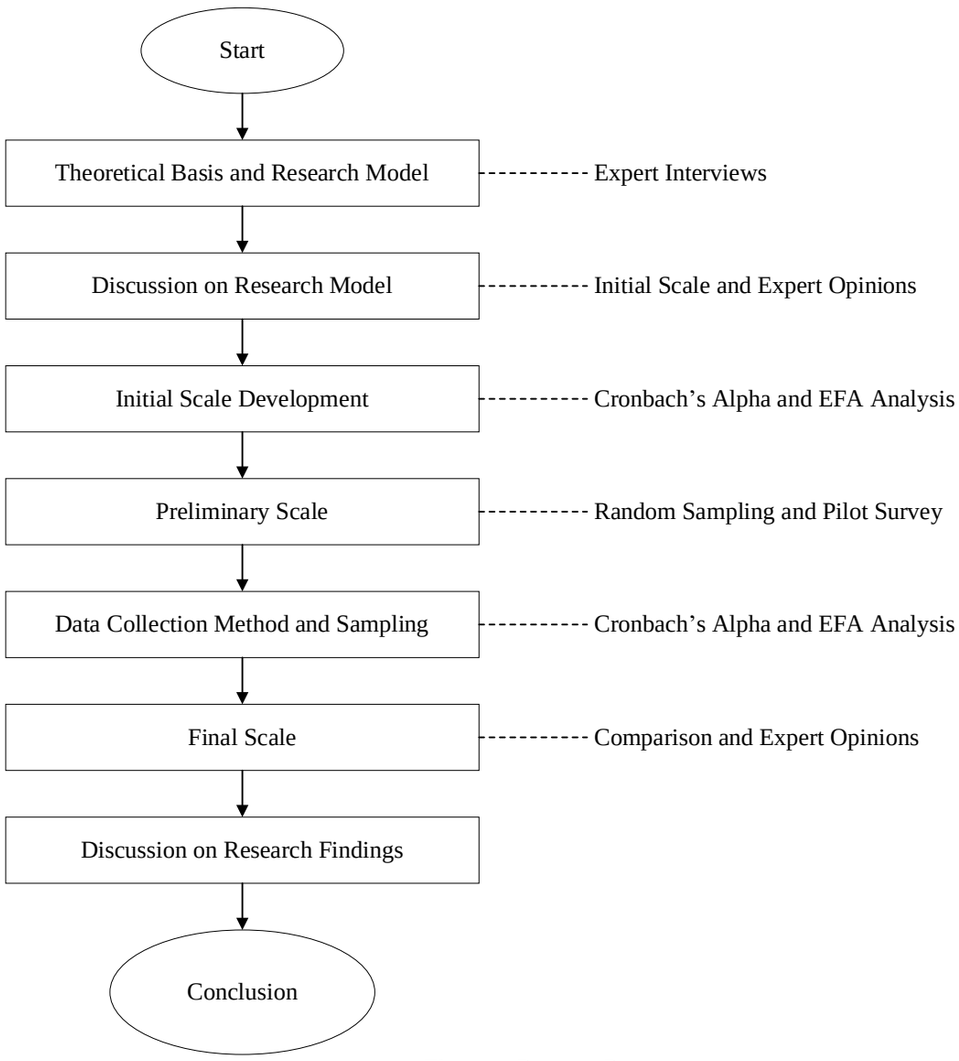

Figure 1. Research Process.

2.2. Development of the Research Model

2.2.1. Hypothesis Development

Tourism demand is driven by various factors, including cultural and natural exploration, mental well-being enhancement, and high-quality service experiences (Hsu et al., 2009; Moutinho, 2011). Accordingly, travelers are increasingly interested in tourism activities that are environmentally and socially responsible (Tosun, 2006). These demands play a crucial role in shaping sustainable travel behaviors. Based on this foundation, the following hypotheses are proposed:

- Hypothesis 1 (H1a): Tourism demand has a positive influence to the sustainable utilization of tourism resources (Hsu et al., 2009; Tosun, 2006).
- Hypothesis 2 (H1b): Tourism demand has a positively impact the development of sustainable tourism types (Moutinho, 2011; Swarbrooke, 1999).
- Hypothesis 3 (H1c): Tourism demand positively contributes to the upgrading and improvement of tourism infrastructure (Dwyer et al., 2004; Lee & Chang, 2008).

The participation of local comunity is a fundamental factor in sustainable tourism development, encompassing the conservation of cultural and natural resources as well as the enhancement of service quality (Murphy, 1985; Tosun, 2000). Previous researches indicate that active community involvement not only contributes to resource protection but also enhances the effectiveness of sustainable tourism policies (Garrod, 2003). Based on this premise, the following hypotheses are proposed:

- Hypothesis 4 (H2a): Community participation has a positive impact on sustainable tourism infrastructure (Murphy, 1985; Tosun, 2000).
- Hypothesis 5 (H2b): Community participation positively influences the quality of tourism services (Garrod, 2003; Goodwin & Santilli, 2009).
- Hypothesis 6 (H2c): Community participation contributes positively to sustainable tourism development (Tosun, 2006; Scheyvens, 1999).

Tourism resources, both natural and cultural, serve as the foundation for sustainable tourism development. Previous researches have found that managing the resources effectively not only preserves cultural values but also

fosters long-term economic growth (Bramwell & Lane, 1993). Building upon this theoretical framework, the following hypothesis is proposed:

- Hypothesis 7 (H3): Tourism resources have a positive impact on sustainable tourism development (Bramwell & Lane, 1993; Hunter, 1997).

Regulatory policies play a crucial role in ensuring the sustainable development of tourism (Hall & Page, 1999; Dwyer & Edwards, 2009). These policies not only support infrastructure development but also navigate the advancement of sustainable tourism models, contributing to the preservation of natural and cultural resources. Based on this foundation, the following hypotheses are proposed:

- Hypothesis 8 (H4a): Regulatory policies moderate the relationship between tourism infrastructure and sustainable tourism development (Hall & Page, 1999).
- Hypothesis 9 (H4b): Regulatory policies moderate the relationship between sustainable tourism types and sustainable tourism development (Dwyer & Edwards, 2009).

Tourism infrastructure plays a crucial role in sustainable development, including both physical facilities and technological support. Previous studies have pointed out that investments in high-quality infrastructure enhance tourist experiences, optimize the management of destination, and mitigate negative impacts to environment (Ali & Frew, 2014; Hall & Page, 1999). Based on this foundation, the present study proposes the following hypothesis:

• Hypothesis 10 (H5): Tourism infrastructure has a positive influence on sustainable tourism development (Hall & Page, 1999; Ali & Frew, 2014).

Sustainable tourism models include ecotourism, community-based tourism, and cultural tourism play a crucial role in maintaining a balance between economic development and resource conservation (Weaver, 2006). Previous researches have indicated that the development of these tourism models can enhance the overall quality of the tourism experience (Swarbrooke, 1999). Based on these findings, the following hypothesis is proposed:

- Hypothesis 11 (H6): Sustainable tourism models have a positive influence on the development of sustainable tourism (Weaver, 2006).

Service quality plays a crucial role in enhancing tourists' experiences and promoting sustainable tourism. Previous studies have indicated that comfortable accommodations, safe culinary experiences, and professional service attitudes not only increase tourist satisfaction but also contribute to forming a sustainable destination image (Alsiehemy, 2023; Masrurul, 2019). Furthermore, high-quality service promotes economic growth, improves the income rate of local communities, and facilitates further investments in sustainable tourism projects (Khan et al., 2017). Based on this foundation, the study proposes the following hypothesis:

- Hypothesis 12 (H7): Service quality have a positive impact to sustainable tourism development (Masrurul, 2019; Alsiehemy, 2023).

2.3. Research Model

Based on the hypotheses relating to the above-presented relationships, the research model outlines the factors influencing sustainable tourism development in Figure 2.

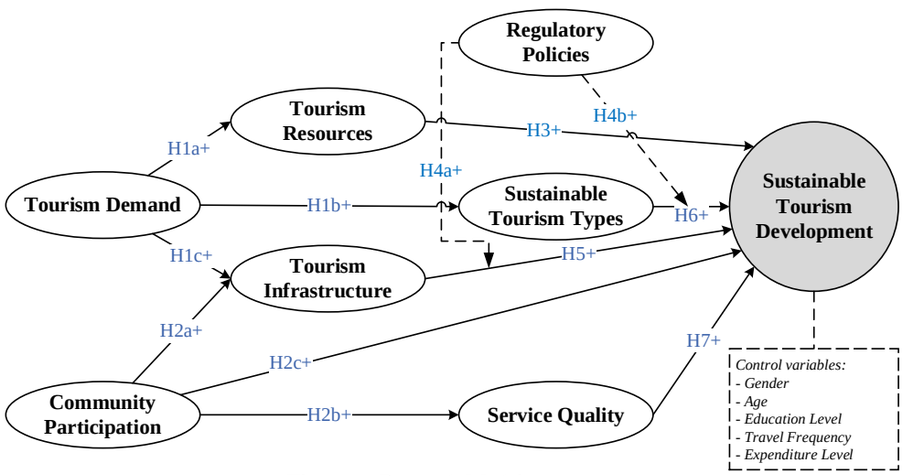

Figure 2. Research Model.

The study proposes hypotheses and a research model, refined through feedback from ten experts with over five years of experience in tourism management and development. These experts provided insights on theoretical foundations, hypotheses, the research model, and criteria for evaluating sustainable tourism.

Firstly, there was a high level of consensus among the experts regarding the proposed model for sustainable tourism development. The model was deemed to accurately reflect economic, social, and environmental factors, demonstrating strong potential for practical application. Secondly, fundamental theories, including those on sustainable development, sustainable tourism management, community participation, and tourism demand, were considered both relevant and essential. This consensus not only strengthens the validity and reliability of the research but also affirms the applicability of the model in managing and promoting sustainable tourism development.

Based on expert feedback, the hypotheses and research model were finalized and maintained as illustrated in Figure 2.

2.4. Characteristics of the Research Model

The survey respondents, summarized in Table 1, consist of 500 tourists, including both local residents and international visitors, who participated in tourism activities in Long An Province from 2022 until the survey period

(September–December 2023). Data was collected through both direct and online methods, yielding a total of 526 responses, of which 500 were deemed valid after screening. The results indicate that most tourists were young females (aged 25–34) with high educational attainment. These individuals frequently engaged in travel (2–3 trips per year) and exhibited moderate to high expenditure levels, ranging from 2 to 10 million VND per trip. This demographic profile suggests a strong inclination toward investing in high-quality travel experiences.

Table 1. Summary Statistics of the Official Sample.

Subject		Frequency	Percentage	Accumulative Percentage
Genders	Male	199	39.8	39.8
	Female	301	60.2	100.0
	Total	500	100.0	
Age	18 - 24	112	22.4	22.4
	25 - 34	214	42.8	42.8
	35 - 44	112	22.4	22.4
	Above 45	62	12.4	12.4
	Total	500	100.0	
Education background	Post-graduated	387	77.4	77.4
	other	113	22.6	22.6
	Total	500	100.0	
Frequency of travelling	At least once a year	157	31.4	31.4
	2 - 3 times a year	182	36.4	36.4
	4 - 5 times a year	113	22.6	22.6
	More than 5 times a year	48	9.6	9.6
	Total	500	100.0	
Expenditures	2 million/ time	122	24.4	24.4
	2 - 5 million/ time	169	33.8	33.8
	5 - 10 million/ time	152	30.4	30.4
	More than10 million/ time	57	11.4	11.4
	Total	500	100.0	

2.5. Original Scale

Based upon the original scale or conceptual framework, the author has adjusted align with the specific context of the current study. The detailed content has been developed as outlined in Table 2. This draft scale will undergo refinement by experts before the establishment of a preliminary measurement scale for the study.

Table 2. Forming and developing preliminary scale of the study.

	Scale	Original scale
Tourism demand scale *(Khalid et al., 2019)*		
NCDL1	Tourists increasingly seek not only experiences of exploration, entertainment, and adventure but also prioritize responsible tourism activities and services that contribute to environmental conservation, cultural preservation, and sustainable socio-economic development at their chosen destinations.	Having an interest in engaging in tourism activities that have the least possible impact on the natural environment.
NCDL2		Exploring and acquiring knowledge about local culture and heritage while traveling, with a strong inclination toward their preservation.
NCDL3		Experience tourism services that adhere to sustainability criteria.
NCDL4		Expenditure on tourism services contributes to the economic development of local communities.
Local community participation scale *(Khalid et al., 2019)*		
STGCD1	Local communities pro-actively participate in decision-making and tourism-related activities to ensure that they not only benefit economically from tourism but also contribute to the preservation of cultural heritage and environmental resources.	The local community is involved in decision-making processes regarding tourism development in their area.
STGCD2		Local communities pro-actively support and engage in tourism projects.
STGCD3		Local communities have an important role in conserving natural and cultural resources related to tourism.
STGCD4		Economic benefits from tourism are equitably distributed within the local community.
STGCD5		Local communities participate in the monitoring and management of tourism activities to ensure sustainability.
Tourism resources scale *(Masrurul, 2019)*		
TNDL1	Tourism resources comprise of all natural and cultural elements that hold value in supporting the development of tourism products and services.	The natural resources of a locality possess significant potential for fostering sustainable tourism development.
TNDL2		Local festivals, cultural heritage, and traditional customs play a crucial role in sustainable tourism.
TNDL3		The natural and cultural resources of a locality are preserved and effectively utilized in tourism activities.
TNDL4		Tourism resources make a substantial contribution to promoting the economic development of the locality.
TNDL5		The exploitation and management of tourism resources at the local level are conducted in a rational manner, ensuring long-term sustainability.
Tourism infrastucture scale *(Nguyen Quang Hai, 2021)*		
HTDL1	Tourism infrastructure comprises of the entirety of physical facilities	The transportation system at tourist destinations should be easily accessible and convenient for mobility.

HTDL2	and essential support services required for tourism activities, including transportation networks, hotels, entertainment areas, and other public amenities.	The quality of hotels, resorts, and lodging facilities at a tourist destination plays a crucial role in enhancing visitor experiences.
HTDL3		Entertainment facilities, amusement parks, and supporting services should be well-planned and environmentally friendly.
HTDL4		The quality of electricity, water supply, and sanitation services at tourist destinations is a fundamental factor influencing the overall tourist experience.
HTDL5		The application of information technology (e.g., smart tourism applications, digital maps) facilitates easier navigation and enhances the overall travel experience.
Regulatory policies scale *(Khan et al., 2020)*		
CSQL1	The policies, regulations, and strategies implemented by local governments, authorities, and relevant organizations aim to ensure that tourism development progresses in harmony with the objectives of conserving natural, cultural, and environmental resources while maintaining economic and social benefits for local communities.	Local tourism management policies are clearly defined and highly feasible in practical application.
CSQL2		Local tourism management policies play a crucial role in protecting the natural environment.
CSQL3		Tourism management policies are designed to align with the characteristics of local natural and cultural tourism resources.
CSQL4		Local tourism management policies are enforced consistently and effectively.
Subtainability tourism types scale *(Holden, 2020)*		
LHBV1	The development of tourism types is based on the integration of tourism resources, development objectives, and visitor demands. Tourism types can comprise of activities such as recreation, exploration, learning, or relaxation at the destination.	The local offers a diverse range of tourism types that align with my preferences.
LHBV2		The tourism types are developed in the local aim to contribute to the preservation and promotion of cultural and natural values.
LHBV3		Local tourism activities are characterized by sustainability and environmental friendliness.
LHBV4		The tourism types facilitate community involvement in the tourism development process.
Tourism quality scale *(Masrurul, 2019)*		
CLDV1	The level of tourist satisfaction towartd the torism services are provided throughout the travel experience to ensure that these services not only meet their current needs but also do not pose any harm to environmental and social resources.	The level of friendliness and professionalism of the staff in local tourism services.
CLDV2		The provision of tourism services in the local area adheres to environmental protection standards.
CLDV3		The delivery of tourism services that are culturally and local community-friendly
CLDV4		The quality of tourism services offered in this region aligns with sustainability principles and environmental friendliness.
Subtainability development scale *(Cao Tan Binh et al., 2023)*		
PTDLBV1	The development and management of tourism activities must be conducted in a manner that prevents the depletion of natural resources, ensures the preservation and respect of cultural heritage, and simultaneously promotes economic and social benefits for local communities.	Local tourism plays a pivotal role in the economic development of the region, growth of the Gross Regional Domestic Product (GRDP).
PTDLBV2		The expansion of the tourism sector has created numerous stable employment opportunities for the local.
PTDLBV3		Tourism activities in the area do not have negative impacts on the natural environment.
PTDLBV4		These activities actively support the conservation and sustainable development of natural resources.
PTDLBV5		Tourism contributes to the enhancement of local communities' livelihoods through various economic and social engagements.
PTDLBV6		Local tourism initiatives have facilitated the preservation and promotion of traditional cultural values.

2.6. Scale Content Discussion

In general, experts acknowledge that the scale content covers a broad range of aspects related to the studied factors. However, after collecting the discussion inputs, experts suggested that several elements require adjustments to refine the scale. The researchers also agreed with these modifications, and the results are presented in Table 3 below:

Table 3. Adjusted content of scale.

	Oringinal scale	**Adjustments**
Tourism demand scale *(Khalid et al., 2019)*		
NCDL1	Having an interest in engaging in tourism activities that have the least possible impact on the natural environment.	[Adjusted] Tourism activities do not cause harm to the natural environment.
NCDL2	Exploring and acquiring knowledge about local culture and heritage while traveling, with a strong inclination toward their preservation.	[Adjusted] Exploration of local cultures and the aspiration for their preservation.
NCDL3	Experience tourism services that adhere to sustainability criteria.	[Adjusted] Utilization of tourism services that contribute to environmental and community protection.
NCDL4	Expenditure on tourism services contributes to the economic development of local communities.	[Adjusted] Expenditure aimed at supporting local communities.
Local community participation scale *(Khalid et al., 2019)*		
STGCD1	The local community is involved in decision-making processes regarding tourism development in their area.	[Adjusted] Local community participate in the importants decision of tourism development.
STGCD2	Local communities pro-actively support and engage in tourism projects.	[Adjusted] Local community pro-actively participate in tourism projects.
STGCD3	Local communities have an important role in conserving natural and cultural resources related to tourism.	[Remained]
STGCD4	Economic benefits from tourism are equitably distributed within the local community.	[Remained]
STGCD5	Local communities participate in the monitoring and management of tourism activities to ensure sustainability.	[Remained]
Tourism resources scale *(Masrurul, 2019)*		
TNDL1	The natural resources of a locality possess significant potential for fostering sustainable tourism development.	[Remained]
TNDL2	Local festivals, cultural heritage, and traditional customs play a crucial role in sustainable tourism.	[Adjusted] Local festivals, cultural heritage, and traditional customs play a crucial role in the preservation and sustainable development of tourism.
TNDL3	The natural and cultural resources of a locality are preserved and effectively utilized in tourism activities.	[Adjusted] The natural and cultural resources of local communities are preserved and utilized appropriately in tourism activities.
TNDL4	Tourism resources make a substantial contribution to promoting the economic development of the locality.	[Remained]
TNDL5	The exploitation and management of tourism resources at the local level are conducted in a rational manner, ensuring long-term sustainability.	[Adjusted] The exploitation and management of local tourism resources are conducted in a planned manner, ensuring long-term sustainability.
Tourism infrastucture scale *(Ng. Quang Hai, 2021))*		
HTDL1	The transportation system at tourist destinations should be easily accessible and convenient for mobility.	[Remained]
HTDL2	The quality of hotels, resorts, and lodging facilities at a tourist destination plays a crucial role in enhancing visitor experiences.	[Remained]
HTDL3	Entertainment facilities and supporting services are reasonably constructed and environmentally friendly.	[Adjusted] Entertainment facilities, amusement parks, and supporting services are designed with reasonable placement and environmental friendliness.
HTDL4	The quality of electricity, water supply, and sanitation services at tourist destinations is a fundamental factor influencing the overall tourist experience.	[Remained]
HTDL5	The application of information technology (e.g., smart tourism applications, digital maps) facilitates easier navigation and enhances the overall travel experience.	[Remained]
Regulatory policies scale *(Khan et al., 2020)*		
CSQL1	Local tourism regulatory policies are clearly defined and highly feasible in practical application.	[Remained]
CSQL2	Local tourism regulatory policies play a crucial role in protecting the natural environment.	[Remained]
CSQL3	Local tourism regulatory policies are designed to align with the characteristics of local natural and cultural tourism resources.	[Adjusted] Local tourism regulatory policies are consistent with the conservation and development of local natural and cultural tourism resources.
CSQL4	Local tourism management policies are enforced consistently and effectively.	[Remained]
Subtainability tourism types scale *(Holden, 2020)*		

	Oringinal scale	Adjustments
LHBV1	The local offers a diverse range of tourism types that align with my preferences.	[Remained]
LHBV2	The tourism types are developed in the local aim to contribute to the preservation and promotion of cultural and natural values.	[Remained]
LHBV3	Local tourism activities are characterized by sustainability and environmental friendliness.	[Remained]
LHBV4	The tourism types facilitate community involvement in the tourism development process.	[Adjusted] The tourism types facilitate community involvement in the tourism management and development process.
Tourism quality scale *(Masrurul, 2019)*		
CLDV1	The level of friendliness and professionalism of the staff in local tourism services.	[Remained]
CLDV2	The provision of tourism services in the local area adheres to environmental protection standards.	[Remained]
CLDV3	The delivery of tourism services that are culturally and local community-friendly	[Adjusted] The delivery of tourism services that show respect to local customs, cultures and local heritage conservation.
CLDV4	The quality of tourism services offered in this region aligns with sustainability principles and environmental friendliness.	[Remained]
Subtainability development scale *(Cao Tan Binh et al., 2023)*		
PTDLBV1	Local tourism plays a pivotal role in the economic development of the region, growth of the Gross Regional Domestic Product (GRDP).	[Adjusted] Local tourism plays a pivotal role in the economic development of the region, growth of the Gross Regional Domestic Product (GRDP) through investment incentives and expenditures from the touristss.
PTDLBV2	The expansion of the tourism sector has created numerous stable employment opportunities for the local.	[Remained]
PTDLBV3	Tourism activities in the area do not have negative impacts on the natural environment.	[Adjusted] Tourism activities in the area do not operate any polluting activities and contribute to the reservation of the natural environment.
PTDLBV4	These activities actively support the conservation and sustainable development of natural resources.	[Remained]
PTDLBV5	Tourism contributes to the enhancement of local communities' livelihoods through various economic and social engagements.	[Remained]
PTDLBV6	Local tourism initiatives have facilitated the preservation and promotion of traditional cultural values.	[Remained]

3. Results and Analysis

3.1. Assessment of the Reliability of the Official Measurement Scales

The reliability analysis of the measurement scales (Table 4) was conducted using Cronbach's Alpha coefficient over three iterations.

In the first iteration, the NCDL scale (Cronbach's Alpha = 0,939), The item-total correlation values for variables NCDL1, NCDL2, NCDL3, and NCDL4 ranged from 0.777 to 0.937, indicating a high level of fair consistency. Similarly, the STGCD scale (Cronbach's Alpha = 0,855) exhibited high reliability; however, the variable STGCD3 showed a significantly low item-total correlation (0.045), need to remove for the enhancement the scale's reliability. The TNDL scale (Cronbach's Alpha = 0,940) also demonstrated high reliability, with a item-total correlation values ranging from 0.785 to 0.965. Likewise, the CSQL scale (Cronbach's Alpha = 0,945) achieved strong reliability, as all observed variables displayed high item-total correlation values (ranging from 0.812 to 0.920), reflecting strong consistency. The LHBV scale (Cronbach's Alpha = 0,918), was also highly reliable, with item-total correlation values ranging from 0.742 to 0.944. However, the CLDV scale (Cronbach's Alpha = 0,755) with the CLDV4 variable showing a low item-total correlation (0.308), indicating removal to improve reliability. Similarly, for the PTDLBV scale (Cronbach's Alpha = 0.848), the variable PTDLBV1 recorded the lowest item-total correlation (0.487), indicating removal to improve reliability. Finally, the HTDL scale (Cronbach's Alpha = 0,970) with item-total correlation values ranging from 0.863 to 0.945, indicating exceptionally high consistency. Overall, in this initial iteration, it was necessary to eliminate variables with excessively low item-total correlation values—such as STGCD3, CLDV4, and PTDLBV1—to ensure reliability.

In the second run, the NCDL scale achieved Cronbach's Alpha coefficient of 0.939, with item-total correlation values ranging from 0.777 to 0.937 for variables NCDL1 to NCDL4, indicating high reliability and strong consistency. Similarly, the STGCD scale (Cronbach's Alpha = 0,941), with item-total correlation values exceeding 0.8 for STGCD1, STGCD2, STGCD4, and STGCD5, reflecting a strong consistency. The TNDL scale (Cronbach's Alpha = 0.940) also demonstrated strong reliability, with item-total correlation values ranging from 0.785 to 0.965. Meanwhile, the CSQL (Cronbach's Alpha = 0,945) with item-total correlations between 0.812 and 0.920, reflecting a strong consistency

Similarly, the LHBV scale (Cronbach's Alpha = 0.918) demonstrated high reliability, with item-total correlation values ranging from 0.742 to 0.944 for variables LHBV1 to LHBV4. The CLDV scale attained Cronbach's Alpha of 0.921, with item-total correlations between 0.804 and 0.888, reflexting a strong reliability. However, in the PTDLBV scale (Cronbach's Alpha = 0.872), the variable PTDLBV2 exhibited a low item-total

correlation of 0.461, which needs to be removed to enhance overall reliability. Lastly, the HTDL scale achieved an outstanding Cronbach's Alpha of 0.970, with item-total correlations ranging from 0.863 to 0.945, indicating excellent reliability and high internal consistency. Overall, the scales demonstrated high reliability, except for PTDLBV2, which needs to be excluded to maintain consistency and appropriateness in the measurement scales.

After eliminating unsuitable variables in the third iteration, the measurement scales significantly improved, achieving Cronbach's Alpha coefficients ranging from 0.918 to 0.970 and item-total correlations exceeding 0.7. These results indicate a high degree of reliability and internal consistency.

Table 4. Results of the Scale Reliability Assessment.

Cronbach's Alpha	Variable	Item-total correlation	Cronbach's Alpha	Variable	Item-total correlation
NCDL: 0,939	NCDL1	0,924	LHBV: 0,918	LHBV1	0,792
	NCDL2	0,777		LHBV2	0,742
	NCDL3	0,801		LHBV3	0,944
	NCDL4	0,937		LHBV4	0,780
STGCD: 0,941	STGCD1	0,848	CLDV: 0,921	CLDV1	0,804
	STGCD2	0,911		CLDV2	0,830
	STGCD4	0,837		CLDV3	0,888
	STGCD5	0,845			
TNDL: 0,940	TNDL1	0,849	PTDLBV: 0,944	PTDLBV3	0,857
	TNDL2	0,821		PTDLBV4	0,883
	TNDL3	0,793		PTDLBV5	0,863
	TNDL4	0,965		PTDLBV6	0,859
	TNDL5	0,785			
CSQL: 0,945	CSQL1	0,871	HTDL: 0,970	HTDL1	0,934
	CSQL2	0,839		HTDL2	0,914
	CSQL3	0,852		HTDL3	0,951
	CSQL4	0,913		HTDL4	0,914
				HTDL5	0,863

The results indicate that the measurement scales achieved high reliability after the removal of variables with low item-total correlation values, specifically STGCD3, CLDV4, PTDLBV1, and PTDLBV2. The revised scales are now ready for further analysis, facilitating the accurate measurement of factors influencing sustainable tourism development.

3.2. Analysis of Convergent and Discriminant Validity

3.2.1. Analysis of Convergent and Discriminant Validity of Independent Variables

The analysis of convergent and discriminant validity for the independent variables (NCDL, STGCD) indicates that the dataset is suitable for Exploratory Factor Analysis (EFA), with a Kaiser-Meyer-Olkin (KMO) coefficient of 0.839 and a Bartlett's test significance level of **Sig. = 0.000**. A single factor was extracted, with an eigenvalue greater than 1, accounting for **82.817%** of the total variance explained. Factor loadings exceeding **0.5** confirm convergent validity, ensuring that the observed variables are strongly related to their respective factors. Furthermore, the absence of cross-loadings validates discriminant validity. The factor matrix presented in **Table 5** demonstrates that all factor loadings are above **0.5**, affirming the convergent validity, which indicates that the measurement variables are closely associated with their respective constructs.

Table 5. Factor Matrix and Factor Loadings of Independent Variables.

	Factor	
	1	2
STGCD2	0,924	
STGCD1	0,923	
STGCD5	0,912	
STGCD4	0,905	
NCDL1		0,954
NCDL4		0,953
NCDL2		0,860
NCDL3		0,834

3.3. Analysis of Convergent and Discriminant Validity of Mediating Variables

An examination of the convergent and discriminant validity of the mediating variables (TNDL, LHBV, HTDL, CLDV) reveals that the data aligns well with the exploratory factor analysis (EFA). The Kaiser-Meyer-Olkin (KMO) coefficient is 0.851, and Bartlett's test of sphericity has Sig. = 0,000. The EFA extracts four factors with eigenvalues greater than 1, accounting for 84.209% of the total variance (surpasses the 50%), thereby demonstrating strong explanatory power of the data in relation to the observed variables. The factor matrix, as presented in Table 6, shows that all factor loadings exceed 0.5, ensuring convergent validity, while loadings below 0.3 have been excluded from the analysis.

Table 6. Factor Matrix and Loading Coefficients of Mediating Variables.

	Factor			
	1	2	3	4
HTDL3	0,942			
HTDL1	0,939			
HTDL4	0,910			
HTDL2	0,898			
HTDL5	0,869			
TNDL4		0,955		
TNDL1		0,882		
TNDL2		0,854		
TNDL3		0,844		
TNDL5		0,838		
LHBV3			0,943	
LHBV1			0,862	
LHBV4			0,835	
LHBV2			0,821	
CLDV3				0,944
CLDV2				0,916
CLDV1				0,911

3.4. Analysis of Convergent and Discriminant Validity of the Moderator Variable

The Kaiser-Meyer-Olkin (KMO) coefficient was 0.858, and Bartlett's test had Sig= 0.000, confirming the suitability of the data for Exploratory Factor Analysis (EFA). A single factor was extracted with an Eigenvalue greater than 1, dthe total variance is at 86.804%. Factor loadings exceeding 0.5 ensured convergent validity, whereas those below 0.3 were excluded, thereby confirming discriminant validity. The findings suggest that the measurement scale is appropriate for evaluating the factor of sustainable tourism development. The factor matrix presented in Table 7 demonstrates that all factor loadings surpass the threshold of 0.5, reinforcing convergent validity.

Table 7. Factor Matrix and Moderator Variable Loadings.

	Factor
	1
CSQL4	0,953
CSQL1	0,925
CSQL2	0,925
CSQL3	0,923

3.5. Analysis of Convergent and Discriminant Validity of the Dependent Variable

The Kaiser-Meyer-Olkin (KMO) coefficient was determined to be 0.861, and Bartlett's test yielded a significance value of 0.000, confirming the appropriateness of the dataset for Exploratory Factor Analysis (EFA). A single factor was extracted, with an Eigenvalue exceeding 1, accounting for 82.944% of the total variance. Factor loadings above 0.5 ensured convergent validity, with no cross-loadings observed, thereby confirming discriminant validity. The scale exhibited a robust structure, making it suitable for measuring sustainable tourism development. The factor matrix presented in Table 8 demonstrates that all factor loadings exceed 0.5, further reinforcing convergent validity.

Table 8. Factor Matrix and Dependent Variable Loadings.

	Factor
	1
PTDLBV4	0,918
PTDLBV5	0,910
PTDLBV3	0,908
PTDLBV6	0,907

The study confirms the high consistency of the scales, with Cronbach's Alpha coefficients ranging from 0.918 to 0.970, thereby affirming the reliability and suitability of the measurement instruments. Exploratory Factor Analysis (EFA) indicates a total variance explained of 84.967%, a Kaiser-Meyer-Olkin (KMO) coefficient of 0.861, and a statistically significant Bartlett's test ($p < 0.001$). All factor loadings exceed 0.5, ensuring both convergent and discriminant validity. The study identifies six key factors influencing sustainable tourism development: tourism demand, community participation, resources, infrastructure, sustainable models, and service quality. These findings align with previous research by Murphy (1985) and Bramwell & Lane (1993). The results contribute to the establishment of a reliable measurement scale, facilitating the assessment and planning of sustainable tourism development. This framework aids policymakers in optimizing strategies, enhancing management effectiveness, and promoting community engagement to ensure balanced development.

4. Conclusion

The study has developed a comprehensive measurement scale to assess the factors influencing sustainable tourism development, evaluating the relationships among independent, mediating, moderating, and dependent variables in sustainable tourism development. Additionally, the research proposes a model and a comprehensive scale for assessing the impact of sustainability on sustainable tourism development, emphasizing environmental conservation, community engagement, infrastructure, and service quality. A survey was conducted with 500 domestic and international tourists participating in tourism activities in the Mekong Delta region to validate the

reliability and validity of the measurement scales. Using Cronbach's Alpha coefficient, the measurement scales demonstrated high reliability, with coefficients exceeding 0.7. the variables that did not meet the standard, with item-total correlations lower than 0.3, were eliminated. The findings of this study not only reinforce theoretical foundations but also provide a practical basis for implementation, offering tourism managers and businesses a scientific tool to deploy sustainable solutions that meet the growing demands of tourists and local communities.

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