Ngắt kết nối để nâng cao năng lực cạnh tranh: Vượt qua nghịch lý công nghệ thông minh tại các điểm đến du lịch nông nghiệp mới nổi ở Quảng Bình, Việt Nam

TÓM TẮT

Mục tiêu của nghiên cứu này là làm sáng tỏ vai trò điều tiết của công nghệ thông minh (ST) trong việc chuyển đổi nhận thức ban đầu về điểm đến (IPD) thành lòng trung thành với điểm đến (DL) và năng lực cạnh tranh bền vững (SDC) trong du lịch nông nghiệp. Sự chuyển đổi này diễn ra thông qua các biến trung gian là gắn kết cảm xúc (EA), bản sắc văn hóa (CI) và trải nghiệm phục hồi (RE). Trong lĩnh vực du lịch nông nghiệp đang phát triển, mối quan hệ giữa công nghệ thông minh và tâm lý du khách vẫn là một khoảng trống nghiên cứu, đóng vai trò then chốt để đạt được năng lực cạnh tranh bền vững. Sử dụng dữ liệu từ 367 du khách tại Quảng Bình, phân tích PLS-SEM đã xác nhận vai trò điều tiết chọn lọc của ST trong mô hình tích hợp lý thuyết kích thích – sinh vật – phản ứng (S-O-R) và Đẩy-Kéo. Cụ thể, ST làm tăng tác động của IPD lên EA và CI nhưng không ảnh hưởng đáng kể đến mối quan hệ với RE. Điều này cho thấy du khách có xu hướng "ngắt kết nối" để tìm kiếm sự phục hồi vẻ đẹp tự nhiên của điểm đến. Đáng chú ý, kết quả cũng nhấn mạnh RE là yếu tố dự báo mạnh nhất về DL, thúc đẩy SDC. Ngược lại, tác động của CI lên lòng trung thành lại không có ý nghĩa thống kê trong bối cảnh điểm đến mới nổi này. Những phát hiện này có ý nghĩa đối với các nhà hoạch định chính sách và các nhà nghiên cứu trong tương lai về việc sử dụng công nghệ một cách chiến lược để nâng cao trải nghiệm của du khách và mở ra những nghiên cứu sâu hơn về các động lực cốt lõi của lòng trung thành và khả năng cạnh tranh bền vững tại các điểm đến.

Từ khóa: *Công nghệ Thông minh; Năng lực Cạnh tranh Điểm đến Bền vững; Lý thuyết S-O-R; Lý thuyết Đẩy-Kéo; Du lịch nông nghiệp.*

Disconnect for Competitiveness: Navigating the Smart Technology Paradox in Emerging Agritourism Destinations in Quang Binh, Vietnam

ABSTRACT

This study aims to elucidate the moderating role of smart technology (ST) in transforming initial perceptions of a destination (IPD) into destination loyalty (DL) and sustainable destination competitiveness (SDC) in agritourism. This transformation occurs through the mediating variables of emotional attachment (EA), cultural identity (CI), and restorative experience (RE). In the evolving agritourism sector, the relationship between smart technology and tourist psychology remains a research gap, crucial for achieving sustainable competitiveness. Using data from 367 tourists in Quang Binh, PLS−SEM analysis confirmed ST's selective moderating role in an integrated stimulus–organism–response (S−O-R) and Push-Pull model. Specifically, ST enhances the impact of IPD on EA and CI but does not significantly affect the relationship with RE. This suggests that tourists tend to "disconnect" to seek restoration in the natural beauty of the destination. Notably, the results also highlight RE as the strongest predictor of DL that fosters SDC. In contrast, the impact of CI on loyalty was statistically insignificant in this emerging destination context. These findings have implications for policymakers and future researchers regarding the strategic use of technologies to enhance visitor experiences and open deeper investigations into the core drivers of loyalty and sustainable competitiveness in destinations.

Keywords: Smart Technology; Sustainable Destination Competitiveness; S-O-R theory; Push-Pull theory; Agritourism.

1. INTRODUCTION

Agritourism is essential in revitalizing rural areas, bringing global economic and social potential to the tourism trend.[1,2] With the advancement of ST, its role in modern life has become indispensable, influencing human behavior and emotions.[3-5] For agritourism, ST enhances the tourist experience and shapes the behavior and intention to perform during the trip.[6] Furthermore, these technologies promote agricultural destinations and provide benefits such as conserving natural resources, empowering communities, and supporting sustainable development.[7]

In today's competitive, sustainability-focused market, adopting ST is vital for ensuring the long-term development of agritourism destinations, improving visitor satisfaction, and promoting DL [8,9]. According to a report by Data Reportal (2024), the number of Internet users in Vietnam is rapidly growing to 78.44 million, accounting for 79.1% of the total population. The number of Internet users in Vietnam will increase by 502,000 (+0.6%) by the end of 2024, with 96.6% accessing it via smartphones, highlighting the immense potential to leverage digital tourism services. This trend offers an immense opportunity for businesses to enhance competitiveness on digital platforms. With a rich and diverse agricultural heritage, Vietnam is considered to have great potential for agritourism development, but it has not been thoroughly and professionally researched and explored. This study investigates the interaction between IPD, ST, DL, and SDC through EA, CI, and RE experiences based on the Stimulus-Response-Outcome (S-R-O) model and the pull and push factor theory. Prior studies, for instance [1,2,5,8] have focused on destination image, culture, and demographics affecting tourist satisfaction and loyalty. In a similar vein, other works[10,11,12] have examined the relationship between behavior and loyalty based on EA and familiarity. However, the moderating role of ST in the relationship between cognition, behavior, and emotions has not been adequately addressed. The approach from previous studies, while valuable, often views the tourist experience as a process that begins with destination image and often goes through initial pre-trip cognitive influences. In this study, we demonstrated that IPD is not only an independent factor but also acts as a cognitive and affective anchor. This perception shapes an expectation frame, acting as a lens through which all interactions and stimuli at the destination are interpreted and evaluated, which is something that previous studies have rarely addressed. This opens up a deep understanding and basis for self-transformation for EA, CI, and RE. These complex relationships need to be clarified from a more comprehensive perspective.

Moreover, this study applies the theoretical framework of push and pull factors, along with the S-O-R theory, to address current gaps. This research contributes to the extant literature in many ways; first, this study provides deeper insights into how tourists' expectations and first impressions influence EA, CI, RE, DL, and the creation of SDC, an aspect that previous studies have not fully explored. Second, our research has examined the combination of sustainability and competitiveness factors in a unified analytical framework to evaluate sustainable development and optimize sustainable strategies to create competitive advantages and long-term competition for agritourism destinations. Moreover, it examined the impact of DL as a mediator of SDC. Finally, this study explores ST's potential to establish sustainable competitive advantages for destinations entirely, rather than merely viewing it as a supporting tool, as the previous studies have carried out. This study enriches the understanding of ST's moderating role in the relationship between tourists' initial perceptions of destination image and their emotional and behavioral connections, mediated by various factors. This understanding can help stakeholders identify the best tourism management practices and enhance destination competitiveness.

2. THEORETICAL UNDERPINNING AND HYPOTHESES DEVELOPMENT

2.1. Push–pull theory and the Stimulus–Organism–Response (S–O–R) framework

The Push and Pull factor theory has expanded, demonstrating its influence on shaping tourist behavior through causal factor relationships.[13,14] This study uses the push-pull theory to examine the relationship between factors influencing DL and SDC. A well-known idea in tourism states that travelers' decisions are driven by two main types of motivators—internal and external influences.[13] In this framework, internal, psychological reasons trigger the desire to travel, while external features of destinations help guide the choice of a specific place. Push factors create the motivation to travel, while pull factors draw visitors to destinations that fulfill their needs.[14] S–O-R theory looks at how environmental, destination image stimuli impact human thoughts and feelings, which then affect behavior.[15,16] This theory proposes that stimuli (S) in the environment trigger changes in a person's internal or physiological state (O), ultimately leading to a behavioral response (R). This study combines push–pull logic within the S–O–R framework to clarify the causal pathway toward SDC. Pull is regarded as the stimulus of exogenous destination attributes perceived initially, operationalized by IPD and ST. Push is considered the organism's internal states triggered by these stimuli, captured by EA, CI, and RE. The response, DL, is viewed as a system-level outcome resulting from DL and potentially arising directly from ST to SDC. Additionally, ST moderates the transmission from IPD to EA, CI, and RE, strengthening the stimulus–organism link in this agritourism context.

The novelty of this study lies in adopting a "pull-first, push-second" sequence. Unlike the traditional view that considers push as pre-trip motives, we define push as internal states experienced during and after exposure to EA, CI, and RE, which are organismic reactions that arise following exposure to stimuli from IPD and ST. Since push is defined as post-exposure states, exogenous destination attributes, specifically pull (IPD and ST), must come first to activate and influence these states, aligning with the causal logic of the S–O–R framework. In this sequence, pulling with IPD and ST leads to the development of push states such as EA, CI, and RE, which then give rise to behavioral responses represented by DL and the systemic outcome of SDC. This approach maintains a clear distinction between external attributes and internal states and aligns with the experiential process observed in agritourism. Within this framework, ST serves a dual purpose: it acts as a direct catalyst that enhances transparency, accessibility, and personalization in destination perceptions, while also moderating the strength of the connection between IPD and internal states. At the same time, ST may directly impact SDC by improving information flow, operational efficiency, and stakeholder involvement.

The novelty of our analysis lies in examining how push and pull factors interact through the moderating influence of ST, which enhances the tourists' IPD and contributes to creating cultural and spiritual experience values. Moreover, the role of ST is also analyzed for its essential impact on SDC, a strategic goal in a globally competitive market. The interaction between push and pull factors and ST's influence

forms the foundation of the regulatory relationship that this study seeks to build.

2.2. Building research hypotheses

2.2.1. Initial perceptions of destination, emotional attachment, and loyalty

Initial perception, or tourists' fascination with a destination, plays a crucial role in creating emotional responses and attachment to the destination.[17,18] Research shows that the initial impression of tourism resources, the environment, and culture generates positive emotions, attachment, and nostalgia for memorable experiences. Furthermore, they emphasize that when the initial perception of a destination image aligns with expectations, it fosters more positive experiences and emotional attachment, leading to DL. According to the research of Anil [19], the focus is on factors such as cleanliness, safety, facilities, and the friendliness of local people. These critical initial perceptions of the destination contribute to EA and satisfaction and eventually influence DL. Shen & Wang[18] argue that the emotional connection stems from the cultural and aesthetic appeal of the destination, as initially perceived, which enhances tourists' satisfaction and intention to revisit. Research by Anil [19] supports this view by asserting that positive initial perceptions enhance satisfaction and positive EWOM, thereby prompting the intention to revisit- a key indicator of loyalty. Based on the above, the following hypotheses are established:

H_1: Initial Perception of Destination is positively associated with tourists' Emotional Attachment.

H_4: Tourists' Emotional Attachment positively influences Destination Loyalty.

2.2.2. The Relationship Between Initial Perceptions of Destination, Cultural Identity, and Destination Loyalty

Tourists' IPD is significant in shaping and influencing behavior, emotions, and cultural connections.[9,17,18] In agritourism, characterized by agricultural cultural heritage, tourists often seek a deep cultural experience as an integral part of the trip. CI creates a sense of belonging, transforming tourists from outsiders into supporters of the culture and values , which ultimately influences loyalty through attachment and familiarity.[20-22] This identity plays a decisive role in whether tourists return to the destination or recommend it to others to visit.[18,20] Osti & Cicero[23] and Xu et al. [20] emphasized that a positive IPD enhances tourists' EA, which fosters curiosity and exploration of cultural values, practices, and interaction with the local community, promoting a sense of belonging to the destination. Tian et al.[24] have also demonstrated that tourist loyalty is influenced by respect for the cultural values of the destination and is expressed through revisiting or recommending the destination to friends and relatives. Based on this, the following hypotheses are constructed:

H_2: Initial Perceptions of the Destination positively influence tourists' Cultural Identity.

H_5: Cultural Identity positively influences tourists' Destination Loyalty

2.2.3. Initial Perceptions of Destination, Restorative Experience, and Destination Loyalty

Positive perceptions of a destination enhance its image's cognitive and affective components, leading to a more enjoyable and relaxing experience.[25,26] The emotional impact of visual content, such as photos shared on social media, strengthens the affective image by portraying the destination positively.[27] .Furthermore, emotional connections with residents and the cultural warmth of a destination further enrich this affective image, making the experience more emotionally satisfying.[28,29] The natural environment of rural tourism destinations offers significant restorative effects, promoting psychological well-being for visitors. Restorative experience positively correlated to place perception and attachment, forming a feedback loop that enhances tourists' psychological well-being and loyalty to the destination. Based on this, the following hypotheses are proposed:

H_3: Initial Perceptions of the Destination positively influence tourists' Restorative Experiences

H_6: Restorative Experiences positively influence tourists' Destination Loyalty

2.2.4. Destination loyalty and sustainable destination competitiveness

Loyalty reflects the likelihood of repeat visits, which helps establish a stable customer base and increases revenue. Importantly, returning tourists often become voluntary promoters, enhancing the trust, brand image, and resilience of

the destination.[30,31] Loyal tourists typically form deep emotional attachments, familiarity, and intense physical and mental connections to the destination.[11,32] They not only engage in environmental protection and responsible tourism practices but also show respect for the local culture, fostering a sense of pride within the community.[33,34] According to Antón et al. (2017)[35] and Prayag (2012)[36], building a relationship between tourists and destinations catalyzes increased tourists' participation in economic and cultural development. The intimate connection between tourists and the community promotes a sense of stewardship and encourages tourists to support local businesses and cultural preservation efforts, thereby boosting the economy. Research by Campón-Cerro et al.[37] indicates that loyal tourists reduce promotional costs, allocating resources towards sustainable development strategies, thereby strengthening the destination's competitive position in the market. In light of the above discussion, the following hypothesis is formulated:

H7. Destination Loyalty positively influences Sustainable Destination Competitiveness

2.2.5. The role of Smart Technology in Sustainable Destination Competitiveness

ST is identified as an infrastructural enabling mechanism that enhances travelers' experiential value, operating through four core attributes: informativeness, interactivity, accessibility, and personalization. [38]

The trend of using ST to manage resources and enhance visitors' interaction significantly improves visitors' satisfaction and promotes destination choice, thereby increasing the destination's competitive advantage.[39,40] Studies by Azis et al.[41] also emphasise that ST modernizes the tourism experience and ensures long-term sustainability and competitiveness by enhancing visitors' satisfaction. Furthermore, Jeong & Shin[42] and Propescu et al.[43] suggest that integrating ST into destination development strategies creates new opportunities to attract environmentally and socially conscious tourists, laying the foundation for long-term development, as sustainability becomes a critical factor in tourist decision-making. Experience co-creation in smart tourism destinations, which leverages local traditions, crafts, and agricultural practices, plays a crucial role. It attracts tourists and ensures cultural heritage preservation, and supports local economies, thereby enhancing sustainable destination competitiveness.[44,45] Based on this, the following hypothesis is constructed:

H_8: The role of Smart Technology positively influences *Sustainable Destination Competitiveness*

2.2.6. The Role of Smart Technology in the Relationship Between Initial Perceptions of a Destination and Emotional Attachment, Cultural Identification, and Restorative Experiences.

The rapid growth of ST has transformed how tourists perceive and interact with destinations, affecting their emotions, experiences, and spiritual connections. Smartphone applications provide valuable information about location, weather, and personalized services, enhancing tourists' perception of their experience [46].

In addition, applications of AR, VR, and social media offer a comprehensive view of the destination before tourists even arrive.[47] This creates a connection between culture, body, and soul. By offering detailed insights into a destination's attractions, cultural significance, and logistics, ST sets accurate expectations and reduces uncertainty for tourists, making their experiences more familiar, meaningful, and fulfilling. Therefore, the moderating role of ST in the relationship between initial perceptions and tourists' emotional and spiritual connections becomes clear. Based on this, the following hypothesis is established:

H_{1a}: The role of Smart Technology positively mediates the relationship between Initial Perceptions of destination and tourism's Emotional Attachment.

H_{2a}: The role of Smart Technology positively mediates the relationship between Initial Perceptions of destination and tourism's Cultural Identity.

H_{3a}: The role of Smart Technology positively mediates the relationship between Initial Perceptions of destination and tourism's Restorative Experiences.

Thus, the current study employs the S-R-O theory and the push-pull model as its research framework for Agritourism Competitiveness (Figure 1).

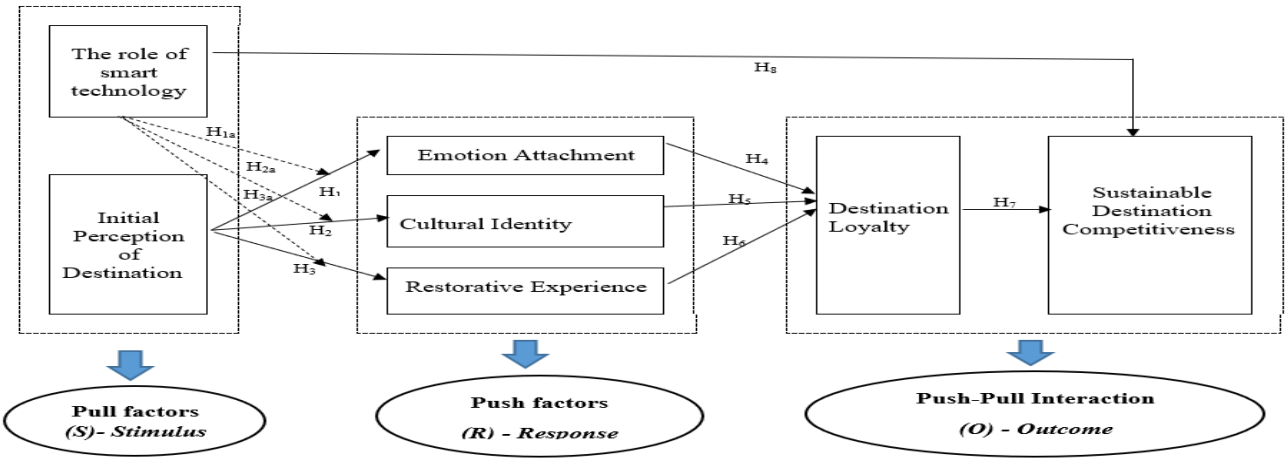

Figure 1. Research paradigm in the development of Agritourism Competitiveness

Source: Authors' suggestion

3. RESEARCH METHODOLOGY

3.1. Area content

The study was conducted in Quang Binh province, in the North Central region of Vietnam. This place is known for its beautiful natural landscape and long-standing agricultural culture, which offers many opportunities to develop agricultural tourism combined with ecotourism. However, as a poor province with a lower income than other provinces, Quang Binh has been implementing sustainable agritourism development strategies and attracting many tourists since 2021. However, with limitations in human resources, capital, and infrastructure, combined ST in this area is still limited, so Quang Binh becomes a suitable and meaningful research area where the application of ST can promote tourist experiences, enhance cultural engagement, and sense of recovery while creating sustainable competitive advantages for the destination. Therefore, Quang Binh province is an ideal choice for this study because of its emerging development potential and potential to combine technological and non-technological elements in agricultural tourism, contributing to enhancing the SDC.

3.2. Data Collection

In the first step, in-depth interviews and focus group discussions were conducted with three local government leaders and five tourism experts to identify appropriate scales for the questionnaire development. This process ensured that the constructed scales accurately reflected the critical factors in the study while maintaining comprehensiveness, objectivity, and relevance to the local context.

The second step involved collecting survey data through in-person interviews (convenience sampling) and online surveys (distributed via Facebook, Zalo, and email, using snowball sampling). A screening question, "Have you participated in agricultural tourism in Quang Binh?" was used to ensure the correct target group, excluding respondents who answered "no." The questionnaire's scales were developed based on validated instruments and established theoretical frameworks.[48] Prior to the main survey, a pilot test with 30 online questionnaires was conducted to refine the survey tool. This process evaluated the clarity and suitability of the questions, with feedback used to improve wording, ensuring clarity, non-ambiguity, and alignment with the target audience. The study strictly adhered to ethical research principles, safeguarding participants' rights and privacy. All respondents were fully informed about the study's purpose and procedures, participating only after voluntary consent. Personal information was kept strictly confidential, used solely for research purposes, and ensured no negative impact on individuals or communities. Using convenience sampling, 513 questionnaires were distributed, yielding 367 valid responses from January to March 2025.

3.3. Questionnaire Development Process

All constructs in the proposed model refer to multi-item scales validated in previous studies,

with minor adjustments to ensure reliability in the current research context. The items were rated on a 5-point Likert scale ranging from "1 = strongly disagree" to "5 = strongly agree". The questionnaire consisted of two main sections: the first part collected general and demographic information, while the second measured the main factors related to the variables in the research model. The following scales were adapted and developed from prior studies: IPD (5 items) [49,50] CI (4 items)[24,51] EA (4 items)[52,53], RE (4 items)[54,55], DL (4 items)[51,52,54], SDC (4 items)[56,57] and ST (4 items)[38,58].

The questionnaire underwent a rigorous forward-backwards translation process to ensure accuracy, following best translation practices[59]. Three bilingual translators were involved: one translated the questionnaire from Vietnamese to English, the second translated it back into Vietnamese, and the third reviewed both versions to ensure accuracy and consistency.

Smart PLS 4.1.0.0 was used for data analysis to assess the model fit and test the hypotheses, while SPSS 28.0 was employed for additional analysis. The study utilized Partial Least Squares Structural Equation Modeling (PLS-SEM) rather than Covariance-Based Structural Equation Modeling (CB-SEM), as PLS-SEM is more effective for estimating complex relationships between variables, especially with small sample sizes and non-normal distributions. Furthermore, PLS-SEM demonstrates a higher statistical power and is particularly suitable for exploratory research, making it the optimal and appropriate method for this study[60].

3.4. Common Method Bias (CMB)

This study used both procedural and statistical measures to minimize common method bias stemming from Consistency Motif and social desirability bias[61]. For procedural measures, the questionnaire was piloted with five tourism experts and five tourists to identify any wording errors that could lead to biased answers and to ensure clarity for all participants. Furthermore, an introductory letter was included to explain the respondents' role and the value of their contribution, ensuring respect for their confidentiality. The order of the questions was randomized, and an attention-check question was incorporated: "To ensure that you are paying attention and understanding the questions, please select 'Strongly agree' for this question. Finally, a pilot test was conducted, and an unrotated factor solution showed that a single factor explained only 31.16% of the variable variation. We also tested that all direct relationships had variance inflation factor values less than 3.33 (Table 5), confirming that CMB is not a significant concern[62].

4. RESULTS AND DATA ANALYSIS

4.1. Descriptive statistics

The sample had a relatively balanced gender distribution, with 48.77% male and 51.23% female participants. The majority of participants were young, with a large proportion under the age of 30. Income levels were diverse, with most participants falling into middle-income groups (from 5-10 million VND). Additionally, the frequency of ST use was high, with over 74% of participants using it for 2 hours or more per day (Table 1).

4.2. Reliability and validity of the measurement model

The results from Tables 2 and 3 indicate that the psychological attributes of the measurement scale, including reliability and validity, meet the required criteria. Specifically, the factor loadings, composite reliability (CR), average variance extracted (AVE), and Cronbach's α of all constructs exceed the recommended thresholds, with CR > 0.70, AVE > 0.50, and α > 0.70. This confirms that the measurement scale not only has internal consistency but also adequate convergent validity. Furthermore, the evaluation of discriminant validity based on the criteria of Fornell & Larcker [63] and Hair et al. [64] shows that the square root of AVE for each construct is always greater than the correlation between that construct and the other constructs, demonstrating clear differentiation between the constructs in the model. Additionally, the variance inflation factor (VIF) values in Table 2 are all less than 5, indicating that multicollinearity is not present, thus confirming that the model does not suffer from issues of parameter estimation accuracy.[62] Finally, the Heterotrait-Monotrait Ratio (HTMT) measurement also supports discriminant validity, as all construct pairs have an HTMT value less than 0.85, ensuring that the constructs in the model are distinctly separated.[63] The measurement scales in this study meet all the necessary criteria for reliability, convergent validity, and discriminant validity, providing a solid foundation for subsequent analyses.

Table 1. Characteristics of respondents

Characteristic	N	%	Characteristic	N	%
1. Gender			**3. Income (Million VND/month)**		
Male	179	48.77	<5	36	9.80
Female	188	51.23	5-10	219	59.67
2. Age (Year)			>10	112	30.53
< 30	145	39.51	**4. Frequency of use of smart technology (Hours/day)**		
30 - 40	123	33.51	< 2	90	24.52
> 41	99	26.98	2 – 4	149	40.60
			> 4	128	34.88
***Notes*:** VND- Vietnamese Dong					

Source: Authors' calculation

Table 2. Measurement model analysis

NO.	Constructs	Items	Outer loadings	VIF	A	CR	AVE
1	Initial perceptions of destination (IPD)	IPD1	0.891	2.482	0.852	0.853	0.593
		IPD2	0.845				
		IPD3	0.803				
		IPD4	0.836				
2	Cultural Identity (CI)	CI1	0.819	2.396	0.877	0.879	0.645
		CI2	0.720				
		CI3	0.830				
		CI4	0.837				
3	Emotional Attachment (EA)	EA1	0.826	2.203	0.864	0.865	0.617
		EA2	0.725				
		EA3	0.756				
		EA4	0.829				
4	Restorative Experiences (RE)	RE1	0.792	2.031	0.891	0.891	0.672
		RE2	0.833				
		RE3	0.859				
		RE4	0.793				
5	Destination Loyalty (DL)	DL1	0.828	2.621	0.919	0.920	0.741
		DL2	0.879				
		DL3	0.869				
		DL4	0.867				
6	The role of Smart Technology (ST)	ST1	0.893	2.119	0.932	0.932	0.775
		ST2	0.840				
		ST3	0.902				
		ST4	0.884				
7	Sustainable Destination Competitiveness (SDC)	SDC1	0.805	3.012	0.889	0.891	0.670
		SDC2	0.879				
		SDC3	0.795				
		SDC4	0.793				
***Notes*:** AVE: Average variance extracted, CR: Composite reliability; α: Cronbach's alpha; VIF: Variance inflation factors							

Source: Authors' calculation

Table 3. Discriminant validity

	IPD	CI	EA	RE	DL	ST	SDC
Fornell–Lacker criterion							

IPD	**0.770**						
CI	0.467	**0.803**					
EA	0.344	0.328	**0.785**				
RE	0.382	0.465	0.328	**0.820**			
DL	0.349	0.302	0.311	0.264	**0.861**		
ST	0.527	0.374	0.550	0.586	0.498	**0.880**	
SDC	0.348	0.322	0.376	0.468	0.271	0.367	**0.818**
HTMT ratio							
IPD							
CI	0.205						
EA	0.466	0.556					
RE	0.480	0.493	0.440				
DL	0.434	0.376	0.571	0.323			
ST	0.268	0.328	0.461	0.205	0.509		
SDC	0.479	0.272	0.266	0.509	0.462	0.466	

Source: Authors' calculation

4.3. The structural model

R^2 and Adjusted R^2: In social studies, an R^2 value of 0.10 is sufficient to indicate that the model can significantly explain a portion of the variation in the dependent variable. [60,64] The results in Table 4 show that R^2 values ranged from 0.139 to 0.261 (> 0.10), validating the model's explanatory power. In addition, the adjusted R^2 values, which ranged from 0.127 to 0.250, were slightly lower than the corresponding R^2 values, indicating that the independent variables significantly accounted for a portion of the variation in the dependent variables. The Q^2 values were greater than 0.00, ranging from 0.157 to 0.272, indicating moderate predictive ability for the dependent variables. In addition, Q^2 values ranging from 0.153 to 0.413 confirm that the indicators effectively represent their latent constructs, validating the indicators and their representation of the constructs.[60]

Additionally, the strength of the relationships within the constructs was calculated using the effect size (f^2), which measures the explanatory power of each exogenous variable in the model. This is done by assessing the change in R^2 value when a specific exogenous variable is removed from the model, independent of sample size. As shown in Table 5, the f^2 values are greater than 0.02 but less than 0.35, except for the f^2 value for H_5 and H_{3a}, which were insignificant with a value less than 0.02; this indicates a small to medium effect.[65]

Direct effect

The results of the structural model analysis showed that the direct effect hypotheses were confirmed, except for one hypothesis, H_5, which was not statistically significant. Specifically, IPD has a strong impact on EA ($\beta = 0.318$, p-value < 0.001), CI ($\beta = 0.206$, p-value = 0.015), and RE ($\beta = 0.267$, p-value < 0.001), suggesting that a positive first impression of a destination promotes tourists' emotional, cultural connection, and restorative experience.

In addition, EA has a strong influence on DL ($\beta = 0.317$, p-value < 0.001), while RE also has a significant impact on DL ($\beta = 0.411$, p-value < 0.001), confirming that emotional and recovery factors are the main drivers of tourist loyalty. However, the relationship between CI and DL was not statistically significant ($\beta = 0.208$, p-value = 0.440). Finally, ST has a positive impact on SDC ($\beta = 0.201$, p-value = 0.042), emphasizing the role of technology in enhancing SDC.

Moderating Effect

The results reveal ST has a positive moderating effect on the relationship between IPD and EA ($\beta = 0.217$, p-value < 0.001) as well as between IPD and CI ($\beta = 0.125$, p-value = 0.003), confirming H_{1a} and H_{2a}. However, the moderating effect of ST did not have a significant impact on the relationship between IPD and RE ($\beta = 0.207$, p-value = 0.349), leading to the rejection of H_{3a}. This suggests that RE is not strongly influenced by the role of technological intervention and is dominated by primitive elements in agritourism.

Table 4. R-square, adjusted R-square, and Q-square

Constructs	R^2	Adjusted R^2	Q^2 (Cross-Validated Redundancy)	Q^2 (Cross-Validated Communality)
IPD				0.183
CI	0.261	0.250	0.157	0.211
DL	0.232	0.227	0.272	0.313
EA	0.172	0.168	0.186	0.351
RE	0.139	0.127	0.252	0.413
ST				0.318
SDC	0.180	0.172	0.178	0.153

Source: Authors' calculation

Table 5. VIF and results for direct effects

Paths/ Hypothesis	Estimate (β)	P- value	Decision	VIF	f^2
Direct effects					
IPD → EA (H_1)	0.318	0.000***	Support	1.046	0.203
IPD → CI (H_2)	0.206	0.015*	Support	1.000	0.212
IPD → RE (H_3)	0.267	0.000***	Support	1.920	0.207
EA → DL (H_4)	0.317	0.000***	Support	1.328	0.142
CI→DL (H_5)	0.208	0.440	Reject	1.148	0.013
RE →DL (H_6)	0.411	0.000	Support	1.610	0.203
DL →SCD (H_7)	0.310	0.000***	Support	1.830	0.140
ST →SCD (H_8)	0.201	0.042*	Support	1.319	0.164
Moderating effects					
IPD*ST → EA (H_{1a})	0.217	0.000***	Support	1.072	0.295
IPD*ST → CI (H_{2a})	0.125	0.003**	Support	1.091	0.183
IPD*ST → RE (H_{3a})	0.207	0.349	Reject	1.720	0.011
Notes: ***p-value < 0.001, **p-value < 0.01, *p-value < 0.05					

Sources: Authors' calculation

5. DISCUSSION

This study found that a multidimensional picture of the factors shaping the sustainable competitiveness of agritourism destinations. The results not only confirm some of the inherent relationships demonstrated in previous studies but also shed light on the complex intersections and paradoxes that exist. The emotional experiences, culture, and technology have opened up many discussions on the balance between technology and tradition in sustainable destination development in new tourist destinations with resource constraints.

The results of this study showed that IPD has a substantial impact on EA and RE, but has a less significant impact on CI. A significant breakthrough is that this study used ST as a constituent of the stimulus and as a moderator in the relationship between IPD and cultural and emotional attachment factors (EA, CI, RE). A notable difference is that emphasizing the selective moderating of ST – specifically enhancing the IPD relationship to EA, CI, but not affecting RE- the trend has shifted from smart technology to tradition. This aligns with previous findings, smart technology is playing an important role in cultural engagement and enhancing destination attachment in agritourism. Smart tourism destinations use information and communication technology to improve services and create cultural experiences that visitors can participate in and feel directly.[7,66] However, ST did not significantly support the relationship between IPD and RE – a personal and sensory element of the mind that requires traditional rather than digital interventions. This paradox suggests that the RE of tourists tends to be "disconnecting" from the digital world to fully immerse themselves in nature, which is what agritourism experiences aim to achieve.[7,67-69] The presence of technology can now become a factor that detracts from the authenticity of the experience.[70] Previous studies have used the S-O-R and Push-Pull Theory to explain the connection between perceptions and behaviors, including satisfaction, loyalty, and the intention to adopt sustainable practices at tourist destinations.[10,11,12,24,28] However, our research supports these theories by showing that IPD

influences RE and DL. Conversely, it reveals that ST does not significantly impact the relationship between IPD and RE, which contradicts hypotheses suggesting that technology enhances tourism experiences. This finding opens new research directions, emphasizing that in agritourism destinations, nature-based experiences may be more important than technological interventions for encouraging restoration and loyalty among tourists. They prioritize sensory experiences, which are emotional connections that technology struggles to replicate and may even diminish authenticity. Therefore, their core need is a "digital detox" from the digital world, in order to restore their spirits through the primitive and direct experiences that agritourism destinations offer. It is recommended that a strategy be set to use technology intelligently—as an 'invisible' support tool rather than a factor that directly interferes with the core experience, to enhance the authenticity of the experience. The broader implications of these findings suggest considering a balance between technological and traditional factors, with each connecting element.

In the case of Quang Binh, an up-and-coming destination, the study results show that the relationship between CI and DL is not supported, which is in contrast to studies in developed destinations where CI plays a key role in agritourism experiences.[10,24] Consistent with earlier research, this study also highlights the mediating role of nostalgia in the relationship between destination image and cultural identity, emphasizing that cultural identity is only formed when there is a deep emotional connection through real-life experiences.[69,71] The results show that there are no fully developed cultural connection programs, making it difficult for tourists to build deep relationships with the cultural resources of the destination, which is in contrast to developed agritourism areas. However, the difference in this study arises from the context of emerging destinations, where mediating factors such as nostalgia, cultural learning, and a sense of belonging are lacking. As a result, cultural experiences are not fully exploited, in contrast to models in developed countries with more established agritourism, where CI is reinforced through structured tourism programs.[71,72,73] This new finding identifies a characteristic of destinations in the early stages of development. While cultural assets are rich and pristine, they are often not professionally invested in or "packaged" into in-depth tourism products. Activities connected to destination stories have not yet created a strong sense of or full absorption of core values. Therefore, for newly developed tourist destinations, cultural experiences are not yet powerful enough to foster deep EA that can be transformed into DL. This novel finding emphasizes the need to prioritize investment in systematically and professionally developing cultural experiences, turning core values into attractive tourism products. This will build sustainable competitive advantages and help overcome initial challenges.

One of the important findings of this study is the strong impact of RE on DL. Consistent with earlier research, factors such as service quality, satisfaction, and positive image are often considered to be determinants of tourists' return visits and recommendation of a destination to others.[10,74] Our study changes this understanding in the context of agritourism by providing evidence of the central role of RE in DL development. These results provide a new interpretive lens, suggesting that the value that tourists pursue is not limited to tangible agricultural activities, but also lies in the psychological and spiritual aspects of restoration. These results provide a new perspective on this, showing that the value that tourists seek lies not only in agricultural activities, but also in a spiritual "healing", a sense of peace and pristineness of the rural countryside of Quang Binh. This result supports previous studies, with the beauty of the countryside with natural landscapes and cultural values becoming intangible values, directly contributing to building long-term relationships with tourists.[75,76] From there, the study proposes a repositioning of the concept: agricultural tourism, at least in this context, should be seen as a branch of wellness tourism, beyond the traditional role of experiential tourism or simple sightseeing.[77] The implications of these findings are critical for destinations with similar natural and cultural resources as Quang Binh, where preserving pristine and tranquil spaces is not only an environmental obligation but also a strategic imperative to differentiate and increase competitiveness.

On the other hand, tourism is proven to be a factor affecting SCD. This finding supports previous studies, affirming that tourist loyalty will support investment connection, become voluntary brand ambassadors, and spread positive and

trustworthy images for the destination.[11,32] This could lead to building loyalty not only as a marketing goal, but also as a core strategy to create sustainable development from the tourist community itself, affirming the role of tourism in sustainable destination development.

6. CONCLUSION AND IMPLICATIONS

The study found a significant relationship between IPD, EA, CI, and RE, along with the moderating role of ST for SCD. Furthermore, although ST has a regulatory impact, its full potential for enhancing recovery experiences in emerging destinations has not yet been fully explored. This may be due to limitations in technological infrastructure and tourists' preference for natural and cultural elements in these destinations. However, technology must still focus on creating evocative cultural and engaging experiences, essential for agritourism, thereby enhancing tourists' loyalty to destinations. In the context of tourism in Quang Binh, the pristine traditional beauty of agriculture has created a sense of comfort and familiarity for tourists, so technological elements are rarely exploited due to limited resources. Therefore, developing a balanced development strategy where technology and tradition are harmoniously integrated is imperative. This approach will help agritourism develop sustainably, meet both traditional and modern needs, preserve cultural values, and be suited for emerging tourist destinations, ultimately increasing competitiveness and sustainable development.

Theoretical Contribution

Firstly, the study has built a new theoretical framework for sustainable competitiveness based on technological and non-technological factors. The theoretical framework is more comprehensive when combining factors of cognition and emotional experiences of culture and soul to create long-term attachment and enhance SDC.

Secondly, this study extends the push-pull and S-R-O theories in agritourism, helping to understand how initial perceptions and interactive technology influence tourists' behavior, emotions, and DL and SDC.

Thirdly, the study extends previous theories of ST, not only supporting experiences but also connecting emotions and culture, which is one of this study's novel and unique points when emphasizing the combination of technology and culture that can create sustainable competitive advantages for tourist destinations through loyalty.

Fourthly, this study contributes to theory by further exploring the relationship between RE and DL. Compared to previous studies, this study extends the dimension of tourists' mental and emotional recovery beyond the factors of satisfaction, experiential emotion, and familiarity in the limited research in the context of agritourism, where nature and wellness play an essential role.

Managerial and social implications

Tourism managers must optimize destination images through social media to better connect initial perceptions with visitor experiences. The interaction of ST will increase cognitive and behavioral value, emphasizing the role of technology in emotional and cultural connections, factors not fully explored in previous studies. This highlights the need for managers to integrate technology more flexibly, combining with non-technological elements such as healthcare services and the natural environment to enhance RE.

Destination managers must prioritize strategies to protect natural resources, preserve local culture, and promote community participation to ensure long-term sustainability while balancing the role of technology. The research results have demonstrated the influence of tourist loyalty, positioning as a strategic pillar for sustainable destination development. Therefore, businesses need to consider tourism as a sustainable development strategy. Therefore, building a long-term business method requires a shift in thinking: from focusing on short-term, material benefits to nurturing a deep and meaningful relationship. Linking community activities, cultural engagement, and emotional engagement allows tourists to become active partners in efforts to preserve indigenous cultural values and environmental sustainability. This approach not only increases tourist attachment but also contributes to enhancing brand value in an organic and long-term way.

Limitations and Recommendations for Future Work

The scope of the current study is limited to a specific geographic area and one type of agritourism, which may affect how broadly the findings can be applied. Future research should test

this model on other tourism types such as eco-tourism, cultural tourism, or wellness tourism to strengthen the reliability and relevance of the theory. Also, the study did not account for tourists' cultural differences, even though various backgrounds can influence expectations, perceptions, and loyalty. Therefore, future studies should include cross-cultural analyses to explore these variations. Furthermore, this research relied on convenience and snowball sampling, which can introduce self-selection bias and diminish the sample's representativeness. Though efforts were made to diversify recruitment channels, these measures could not fully eliminate bias. Consequently, future studies should use probability sampling and broaden the sampling frame to more regions. This study's evaluation of SDC is based on tourists' opinions, which may not fully reflect operational and structural aspects of competitiveness. While suitable for initial insights, this limits the ability to generalize the results. Future research should incorporate objective indicators—such as operational efficiency, environmental performance, and market data—alongside subjective measures to improve reliability. To keep the study simple and ensure parameter identification with the available sample, it did not include detailed mechanisms of the Attention Restoration Theory (ART) and the Cognitive–Affective Model at the observed variable level. Future research should directly measure key ART components such as being away, fascination, extent, and compatibility—and the cognitive–affective sequence, using multi-method approaches and probability-based sampling to enhance robustness and generalizability.

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Appendix 1. Questionnaire

Constructs	Items
Initial perceptions of destination (IPD)	*This destination features:* 1. Beautiful natural scenery and diverse agriculture. 2. Encouragement of agricultural participation. 3. A rich agricultural culture. 4. A friendly, connected community
Cultural Identity (CI)	*This experience made me feel:* 1. Immersed in the local culture. 2. A sense of belonging in the culture. 3. Interested in cultural differences. 4. That I learned something new about my own culture
Emotional Attachment (EA)	*This experience made me feel:* 1. That this destination is special. 2. That it's familiar when I think of it. 3. That I will always miss it. 4. That it holds many memories.
Restorative Experiences (RE)	*This experience made me feel:* *1.* Relieved of stress. 2. Gently drawn into the environment's ambiance. 3. Fully immersed in the space. 4. Comfortable and happy throughout the experience.
Destination Loyalty (DL)	*I will:* 1. Recommend Quang Binh to others. 2. Revisit in the future. 3. Speak positively about it. 4. Encourage friends and family to visit
Sustainable Destination Competitiveness (SDC)	*This destination is committed to sustainable practices:* 1. Efficient resource management. 2. Strong environmental protection. 3. Preservation of local culture. 4. Active involvement of the local community in agritourism.

The role of Smart Technology (ST)	*Using smart technology helps me to:* 1. Plan my trip with personalized recommendations 2. Enhance service experiences through real-time interactions with local providers 3. Access the latest information when needed 4. Easily find and navigate places at my destination