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Sustainability and Destination Brand Awareness: The Role of Destination Attribute Perception in an Emerging Wine Tourism Destination

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ABSTRACT

Purpose: This study examines how the three dimensions of sustainability influence tourists' perceptions of the wine tourism experience and destination brand awareness in an emerging wine tourism destination. The research focuses on North Carolina to understand how sustainability practices contribute to strengthening destination branding.

Design/Methodology/Approach: A quantitative research design was adopted using survey data collected from visitors attending wine tourism events in North Carolina. The conceptual model was developed based on the Triple Bottom Line framework and tested using Partial Least Squares Structural Equation Modeling (PLS-SEM).

Findings: The results reveal that environmental sustainability has the strongest direct effect on destination brand awareness, highlighting the importance of environmental practices in shaping the reputation of wine tourism destinations. Economic and social sustainability significantly relate to tourists' perceptions of the wine tourism experience, which in turn positively affects destination brand awareness.

Practical Implications: The findings suggest that wine tourism stakeholders should prioritize sustainability initiatives, particularly environmental practices, to enhance visitor perceptions and strengthen destination branding. Integrated sustainability strategies that also support local communities and regional economies can further improve the competitiveness of emerging wine tourism destinations.

Originality/Value: This study contributes to the literature by integrating sustainability dimensions, destination attribute perception, and destination brand awareness into a unified framework, offering new insights into sustainable wine tourism development in emerging destinations.

Keywords: Wine Tourism, Destination Brand Awareness, Sustainability, Triple Bottom Line, Brand Awareness

1. INTRODUCTION

Wine tourism has become one of the most dynamic segments of the global tourism industry. Although global wine consumption has declined in recent years, visits to wine-producing regions have continued to grow, highlighting the increasing importance of experiential and rural tourism activities linked to wine culture (OIV, 2024; Vinetur, 2024). Wine tourism contributes significantly to regional economic development by supporting rural economies, promoting local products, and strengthening the cultural identity of wine regions (Nave & do Paço, 2021; Vecchio et al., 2024). In addition, wine tourism experiences often integrate landscape appreciation, gastronomy, and cultural heritage, creating opportunities for destinations to differentiate themselves in an increasingly competitive tourism market (Martínez-Falcó et al., 2024).

In recent years, sustainability has become a central issue in the wine tourism sector. Growing environmental awareness and changes in consumer behavior have led tourists to increasingly value sustainable products and destinations (Dias et al., 2023; Vecchio et al., 2024). As a result, wine tourism stakeholders are progressively adopting sustainability practices to protect natural resources, support local communities, and enhance the long-term viability of wine regions. These practices typically follow the Triple Bottom Line framework proposed by Elkington (1997),

which conceptualizes sustainability as the balanced integration of environmental, economic, and social dimensions.

Within the wine industry, environmental sustainability has received particular attention due to the vulnerability of viticulture to climate change, water scarcity, and other environmental challenges (Szolnoki, 2024; Yanes-Estévez & Pérez, 2024). At the same time, economic sustainability ensures the long-term viability of wine businesses and contributes to rural development through employment creation and tourism-related activities (Vázquez Vicente et al., 2021). Social sustainability focuses on strengthening local communities, preserving cultural heritage, and promoting inclusive development in wine regions (Martínez-Falcó et al., 2023). These dimensions play an important role in shaping the sustainability profile of wine tourism destinations.

Despite the growing importance of sustainability and destination branding in wine tourism, existing research has mainly focused on established wine regions, such as those in Europe or other traditional wine-producing areas. Comparatively little attention has been paid to emerging wine regions that are still developing their tourism identity and market positioning (Lee et al., 2020; Deale et al., 2024). In such contexts, sustainability initiatives may play a particularly important role in differentiating destinations and strengthening their brand visibility.

This distinction is theoretically relevant because emerging wine tourism destinations do not usually benefit from the accumulated symbolic capital, strong reputational associations, and established visitor expectations that characterize mature wine regions. In established wine destinations, brand awareness may be strongly supported by historical reputation, appellation recognition, regional wine identity, and consolidated tourism infrastructures. By contrast, in emerging wine regions, visitors may rely more heavily on visible and experience-based cues when forming destination associations. Sustainability practices can therefore operate not only as operational practices but also as strategic branding signals that help tourists interpret the quality, authenticity, and distinctiveness of the destination (Dias et al., 2023). In this sense, the relationship between sustainability and destination brand awareness may be particularly salient in emerging wine regions, where brand meanings are still being formed and where environmental, social, and economic practices can contribute (Bruwer & Lesschaeve, 2012) to creating recognizable and differentiated destination associations (Gómez-Carmona et al., 2023; Lee et al., 2020).

In this study, an emerging wine tourism destination is understood as a wine region whose production base, tourism infrastructure, visitor markets, and destination brand associations are still

in a process of consolidation. Unlike established wine tourism destinations, which often benefit from long-standing wine reputations, appellation recognition, mature visitor expectations, and consolidated tourism networks (Bruwer & Lesschaeve, 2012), emerging wine regions must actively construct their visibility, credibility, and identity in the tourism marketplace.

North Carolina represents an interesting case for examining these relationships. Over the past decades, the state has experienced significant growth in wine production, expanding from no wineries in 1968 to nearly 190 wineries in 2024 (Byrd et al., 2023; NC Wine and Grape Council, 2024). This growth has contributed to the rapid development of wine tourism, which now represents a multibillion-dollar industry and supports thousands of jobs in the state (Byrd et al., 2023). Although visitor numbers continue to increase, the region still faces the challenge of strengthening its reputation and brand recognition compared to more established wine tourism destinations.

Although previous studies have examined wine tourism experiences, sustainability practices, and destination branding, three gaps remain insufficiently addressed. First, most research has focused on established wine regions, while emerging destinations are still less understood despite facing different branding challenges. Second, existing studies often examine sustainability as a destination-management issue, but less attention has been paid to how sustainability becomes meaningful to tourists through their perceptions of destination attributes. Third, the role of sustainability in strengthening destination brand awareness remains underexplored in contexts where regional wine identity and market visibility are still developing. Accordingly, this study addresses the following research question: How do the environmental, economic, and social dimensions of sustainability relate to destination attribute perception and destination brand awareness in an emerging wine tourism destination?

Therefore, the main objective of this study is to examine how the Triple Bottom Line dimensions are associated with sustainability on tourists' perceptions of the North Carolina wine tourism experience and to analyze how these perceptions influence destination brand awareness. To address this objective, a quantitative research design was adopted, based on survey data collected from visitors to North Carolina wine tourism events and analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM).

By examining these relationships in North Carolina, this study contributes to wine tourism research by showing how sustainability can function as a destination-branding resource in an

emerging wine region. Rather than treating sustainability only as an ethical or operational requirement, the study positions the environmental, economic, and social dimensions of sustainability as potential signals through which visitors interpret the destination and form brand-related associations. This perspective extends previous wine tourism and destination branding research by clarifying why sustainability may be especially important for regions that are still developing their tourism identity, market visibility, and competitive positioning.

The remainder of the paper is structured as follows. The next section reviews the literature on sustainability in wine tourism, destination attribute perception, and destination brand awareness, leading to the development of the hypotheses. The methodology section then presents the research design, sampling procedure, measurement scales, and analytical approach. The results section reports the measurement model, structural model, and complementary PLS-SEM analyses. Finally, the discussion explains the theoretical, practical, and societal implications of the findings, followed by limitations, future research directions, and concluding remarks.

2. LITERATURE REVIEW

2.1 Sustainability in Wine Tourism

Wine tourism has emerged as an important driver of rural development, contributing to regional economic growth while promoting cultural heritage and environmental preservation (Nave & do Paço, 2021; Vecchio et al., 2024). As wine tourism activities are closely linked to agricultural landscapes, local communities, and tourism businesses, sustainability is understood in this study as the capacity of wine tourism destinations to generate long-term value while preserving the natural, economic, and social resources on which the visitor experience depends. This understanding is framed through the Triple Bottom Line model, which conceptualizes sustainability as the balanced integration of environmental protection, economic viability, and social well-being (Elkington, 1997). In wine tourism, these three dimensions are mutually reinforcing rather than isolated: environmental sustainability protects the vineyards, landscapes,

and natural resources that support destination attractiveness; economic sustainability sustains wineries, tourism businesses, employment, and regional entrepreneurship; and social sustainability preserves community identity, cultural heritage, and local embeddedness.

Environmental sustainability is particularly relevant for wine tourism because viticulture is highly dependent on natural resources and environmental conditions. Issues such as climate change, water scarcity, and biodiversity loss have increased pressure on wineries to adopt environmentally responsible practices (Szolnoki, 2024; Yanes-Estévez & Pérez, 2024). Sustainable vineyard management, efficient resource use, and environmental certifications are therefore increasingly used by wineries as strategies to protect the natural landscape while enhancing the attractiveness of wine destinations (Bonn et al., 2020; Vecchio et al., 2024).

Economic sustainability is also a key dimension of wine tourism development. Wine tourism generates revenue not only for wineries but also for a range of related tourism businesses, including accommodation providers, restaurants, tour operators, and local attractions (Vázquez Vicente et al., 2021). By creating employment opportunities and supporting local entrepreneurship, wine tourism contributes to the economic vitality of rural regions and helps diversify regional economies.

The social dimension of sustainability focuses on strengthening local communities and preserving cultural heritage in wine-producing regions. Wine tourism experiences often involve interactions with local traditions, gastronomy, and cultural practices, which contribute to authentic and meaningful visitor experiences (Martínez-Falcó et al., 2023). Initiatives that promote local identity, encourage community participation, and support regional culture can therefore enhance both the social sustainability of wine regions and the quality of the tourism experience. These three dimensions shape the sustainability profile of wine tourism destinations and influence how visitors perceive and evaluate their experiences.

Sustainability in wine tourism can therefore be understood not only as a managerial or operational concern, but also as a form of integrated value creation. From the supply side, sustainability reflects the capacity of wineries and destinations to protect natural resources, support local economies, and reinforce community well-being (Bonn et al., 2020). From the demand side, these practices may become meaningful to visitors when they are perceived as part of the destination experience and contribute to authenticity, quality, and distinctiveness. In this way, sustainability connects organisational and community-facing purposes with visitor-facing value, helping explain why

sustainable practices may strengthen both destination attribute perception and destination brand awareness in emerging wine regions (Vecchio et al., 2024).

2.2 Sustainability and destination attribute perception in Wine Tourism

Tourists' perceptions play a central role in shaping the evaluation of tourism experiences and influencing future behavioral intentions. In tourism research, perception is typically understood as the cognitive and affective evaluation that visitors form based on their interactions with a destination's attributes and experiences (Agapito et al., 2013; Bruwer et al., 2016). These perceptions influence visitor satisfaction, loyalty, and the likelihood of recommending a destination to others.

In wine tourism contexts, the visitor experience is inherently multisensory and closely linked to the physical and cultural characteristics of the wine region. Elements such as landscape quality, wine tasting experiences, hospitality, gastronomy, and cultural authenticity contribute to shaping tourists' perceptions of the destination (Bruwer & Alant, 2009; Madeira et al., 2019). The concept of the winescape, referring to the combination of natural, cultural, and experiential attributes of wine regions, has been widely used to explain how these elements influence the visitor experience (Bruwer et al., 2016).

Destination attribute perception refers to tourists' evaluation of the physical, experiential, and symbolic attributes that shape the wine tourism experience, including the winescape, rural landscape, attractiveness of the region, and suitability of the setting for wine-related experiences. This construct is therefore not concerned with regulatory issues, but with how visitors perceive the destination attributes that give meaning and value to the wine tourism experience. This conceptualization is consistent with previous wine tourism research showing that winescape attributes and tourism features influence how visitors evaluate wine regions and form destination-related associations (Bruwer & Lesschaeve, 2012; Thomas et al., 2018).

Sustainability practices may play an important role in shaping these perceptions. As tourists become increasingly aware of environmental and social issues, they are more likely to value destinations that demonstrate responsible practices and commitment to sustainable development (Dias et al., 2023; Vecchio et al., 2024). Environmentally friendly vineyard practices, community engagement initiatives, and support for local culture can therefore enhance visitors' perceptions of authenticity, quality, and destination attractiveness.

Sustainability may also shape destination attribute perception because visitors increasingly evaluate tourism experiences through the credibility and authenticity of the practices they observe. In wine tourism, authenticity is closely linked to landscape, local identity, hospitality, and the perceived integrity of the production and consumption setting. When sustainability practices are visible and coherent with the destination's identity, they may reinforce the perception that the region is not merely communicating responsibility but embedding it in the tourism experience (Thomas et al., 2018). Conversely, if sustainability claims are not reflected in observable destination attributes, their branding value may be weakened. This is particularly relevant in wine tourism, where visitors' perceptions are strongly influenced by winescape attributes, regional identity, and the multisensory quality of the experience (Bonn et al., 2020).

Previous research suggests that tourists who perceive destinations as environmentally responsible and socially engaged tend to evaluate their experiences more positively and develop stronger emotional connections with the destination (Bonn et al., 2020). Consequently, sustainability initiatives may contribute to improving the perceived value of wine tourism experiences and strengthening visitors' overall evaluation of wine regions.

2.3 Destination Brand Awareness in Wine Tourism

Destination branding plays a critical role in tourism marketing, as it influences how destinations are recognized and remembered by potential visitors. Brand awareness refers to the extent to which consumers are able to recall or recognize a particular brand within a given product category (Aaker, 1991; Keller, 1993). In tourism contexts, strong brand awareness increases the likelihood that a destination will be considered during the travel decision-making process (Brochado & Oliveira, 2018).

For wine tourism destinations, brand awareness is particularly important because many wine regions compete for visitors in a highly fragmented and competitive global market. Well-established wine regions often benefit from strong reputations and recognizable brand identities, while emerging destinations face greater challenges in attracting attention and building credibility (Dias et al., 2023).

Previous studies have shown that tourists' perceptions of destination attributes significantly influence brand-related outcomes such as destination image, brand loyalty, and brand awareness (Serra-Cantallops et al., 2021). Positive perceptions of a destination's quality, authenticity, and

overall experience contribute to stronger cognitive associations with the destination, increasing the likelihood that visitors will remember and recommend it.

In wine tourism contexts, where experiences are strongly linked to place and landscape, favorable perceptions of the winescape and regional identity can strengthen the memorability and distinctiveness of wine destinations (Gómez-Carmona et al., 2023). Consequently, understanding how sustainability practices influence tourists' perceptions and destination branding outcomes is particularly relevant for emerging wine regions seeking to enhance their visibility and competitiveness.

These streams of literature suggest that sustainability, destination attributes, and brand awareness are connected, but the mechanisms linking them remain insufficiently specified in emerging wine tourism destinations. In established wine regions, brand awareness may be reinforced by historical reputation, consolidated regional identity, and accumulated visitor familiarity. In emerging wine regions, however, brand associations are less settled and may depend more strongly on visible cues experienced during the visit. Sustainability practices can therefore become part of the destination's competitive positioning when they are translated into recognizable attributes such as landscape quality, authenticity, community embeddedness, and environmental responsibility (Dias et al., 2023). This study responds to this gap by examining whether the three sustainability dimensions are associated with destination attribute perception (Bruwer & Lesschaeve, 2012) and destination brand awareness in an emerging wine region (Gómez & Molina, 2015; Lee et al., 2020). Thus, the key theoretical issue is not simply whether sustainability is positively associated with brand awareness, but whether sustainability plays a different branding role in emerging destinations, where it may help create recognition, compared with established destinations, where it may primarily reinforce existing reputation.

2.4 Hypothesis Development

Sustainability practices have increasingly been recognized as important determinants of tourism destination evaluation. In wine tourism contexts, environmental preservation, economic vitality, and community engagement contribute to shaping visitors' perceptions of the wine region and the overall tourism experience (Bruwer et al., 2016; Bonn et al., 2020). As these sustainability dimensions influence the attractiveness and authenticity of wine destinations, they are likely to affect how tourists perceive the destination.

Accordingly, it is expected that the three pillars of sustainability positively relate to tourists' perceptions of the wine tourism experience. Furthermore, sustainability practices may also contribute directly to strengthening destination brand awareness. As sustainability becomes an increasingly valued attribute in tourism markets, destinations that demonstrate responsible environmental and social practices may develop stronger brand recognition and differentiation (Dias et al., 2023; Vecchio et al., 2024).

Finally, tourists' perceptions of the destination are expected to influence destination brand awareness. Positive evaluations of the wine tourism experience can strengthen cognitive associations with the destination and increase the likelihood that visitors will recognize and recall the destination brand (Gómez-Carmona et al., 2023; Serra-Cantallops et al., 2021).

Based on these arguments, the following hypotheses are proposed:

H1: Economic sustainability positively influences destination attribute perception.

H2: Social sustainability positively influences destination attribute perception.

H3: Environmental sustainability positively influences destination attribute perception.

H4: Economic sustainability positively influences destination brand awareness.

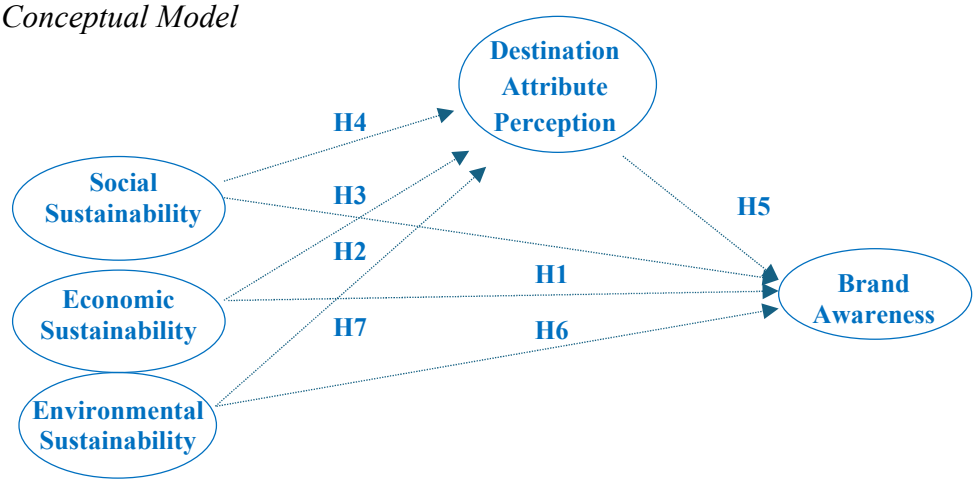
H5: Social sustainability positively influences destination brand awareness.

H6: Environmental sustainability positively influences destination brand awareness.

H7: Destination attribute perception positively influences destination brand awareness.

Figure 1 presents the hypothesized relationships between the three sustainability dimensions, destination attribute perception, and destination brand awareness.

Figure 1: Conceptual Model



3. METHODOLOGY

3.1 Research approach

This study adopted a quantitative, cross-sectional survey design grounded in a hypothetico-deductive approach. The objective was to examine whether the relationships proposed from the literature review regarding the Triple Bottom Line model of sustainability (Elkington, 1997), destination attribute perception, and destination brand awareness were empirically supported in the context of North Carolina wine tourism. Data were collected at a single point in time through a structured questionnaire administered to a convenience sample of wine tourists.

To estimate the conceptual model and test the proposed hypotheses, this study employed PLS-SEM using SmartPLS 4 software (Ringle et al., 2018). PLS-SEM was considered appropriate because the study examines a predictive model involving multiple latent constructs and theoretically specified relationships, while also accommodating the exploratory character of research in an emerging wine tourism destination (Hair et al., 2021). The method allows the simultaneous assessment of the measurement and structural models, but the cross-sectional nature of the data means that the resulting path coefficients should be interpreted as evidence of theoretically grounded relationships rather than causal proof.

3.2. Data collection and measures

A tailored questionnaire instrument was developed based on the existing literature. The survey followed a non-probability sampling method using a convenience sample. The questionnaire was distributed on different days to attendants between April and June, at the Beaufort Wine Festival, Budbreak Wine and Craft Beer Festival, and the Yadkin Valley Wine Festival, with participants' anonymity being guaranteed.

All participants were informed about the purpose of the study, the voluntary nature of their participation, and the confidentiality of their responses. Explicit, and informed consent was obtained before completing the questionnaire. The procedures respected the rules of the General Data Protection Regulation, guaranteeing the anonymity and confidentiality of the participants.

The questionnaire items and sociodemographic questions were entered into Google Forms. Exclusion criteria for participation were at least 18 years of age and having visited at least one producer in the North Carolina wine region in the last twelve months (having attended a wine tourism offering (winery, festival, wine tasting) in North Carolina in the last twelve months). The questionnaire was available exclusively in English, considering the context of the study and previous research on the fact that the nationality of tourists visiting the region is almost exclusively North American.

Social Sustainability was evaluated using the four items formulated by Xu et al. (2016). All items were positively phrased (e.g., Wine tourism positively impacts the neighboring community). The four items measure of Economic Sustainability (e.g., Wine tourism contributes to the economic development of the region) was adapted from Xu et al. (2016). Environmental Sustainability was measured through four items (e.g., Wine tourism promotes greater protection of the natural environment) adapted from the questionnaire developed by Xu et al. (2016). Destination Attribute Perception was assessed using two items (e.g., The winescape is ideal for wine experiences) adapted from the work of Cohen and Ben-Nun (2009) and two items (e.g., The region has a beautiful rural landscape) developed by Thomas et al. (2018). Brand Awareness was assessed through 3 items (e.g., characteristics of this wine region come to my mind quickly) adapted from the study by Chow et al., 2017, and one item (The wine region has a personality that distinguishes itself from its competitors) adapted from the research carried out by Madeira et al. (2019). A 5-point Likert scale was used, ranging from 1 (strongly disagree) to 5 (strongly agree).

The measurement instrument was developed through a scale adaptation procedure based on established constructs from previous wine tourism, sustainability, and destination branding research. First, relevant scales were identified from prior studies and selected according to their conceptual fit with the constructs in the proposed model. Second, the items were adapted to the North Carolina wine tourism context while preserving their original theoretical meaning. Third, the questionnaire was structured to ensure clarity, consistency, and comparability across constructs. The psychometric properties of the scales were then assessed through indicator reliability, internal consistency reliability, convergent validity, and discriminant validity. Cronbach's alpha and composite reliability were used to evaluate internal consistency, while average variance extracted was used to assess convergent validity. Discriminant validity was examined using the Fornell–Larcker criterion and HTMT ratio (Fornell & Larcker, 1981; Hair et al., 2019).

3.3 Sample

The study involved 312 tourists, 71.2% of whom were female (n=222). This distribution may reflect a greater predisposition of this group to participate in wine-related trips. Most participants (n= 192) were 41 years old or older (61.6%), with the average age being 48 years old. This means that the region and its attributes attract people with greater maturity in their approach to wine tourism. Additionally, it was found that all visitors came from the United States, specifically, 56.1% from North Carolina (n=175), 23.1% from bordering states (n=72), namely Virginia, Tennessee, Georgia, and South Carolina, and 20.8% from non-bordering states (n=65). The data shows that North Carolina is an emerging wine tourism destination, which does not yet attract foreign visitors, considering that visitors are mostly domestic tourists from the region and surrounding states. Furthermore, the demographic data shows that 56.7% of respondents (n=177) were returning visitors and 43.3% (n=135) were new visitors, which reveals a good capacity to achieve loyalty to the destination. The characterization of the sample is expressed in Table 1.

Table 1: Sample characterization

Sociodemographic variables	**n**	**(%)**
Gender		
Female	222	(71.2%)
Male	86	(27.6%)
Other	4	(1.2%)
Age		
Between 18 to 30 years	72	(23.4%)
Between 31 to 40 years	48	(15%)
Higher or equal to 41 years	192	(61.6%)
State residency		
North Carolina	175	(56.1%)
Bordering states	72	(23.1%)
Non-bordering states	65	(20.8%)
Repeat visitors		
Yes	177	(56.7%)
No	135	(43.3%)

Source: Own elaboration

4. RESULTS

This chapter presents the results of the empirical analysis. The evaluation was conducted in two complementary stages: firstly, the measurement model was validated, ensuring the reliability and validity of the constructs used; secondly, the structural model was analyzed to test the proposed hypotheses and evaluate the explanatory capacity of the model.

Additionally, complementary techniques were applied, namely bootstrapping, Necessary Conditions Analysis (NCA), and Importance-Performance Analysis (IPMA), with the aim of reinforcing the statistical robustness and practical relevance of the results.

4.1. Assessment of the measurement model

The measurement model was first assessed to ensure the reliability and validity of the constructs before evaluating the structural relationships. In PLS-SEM, reflective measurement models are typically evaluated through indicator reliability, internal consistency reliability, convergent validity, and discriminant validity (Hair et al., 2019; Sarstedt et al., 2022).

Indicator reliability was examined through outer loadings. All items exceeded the recommended threshold of 0.70 (table 1A in the appendix), indicating that the indicators adequately represent their respective constructs and contribute meaningfully to the latent variables. Internal consistency reliability was evaluated using Cronbach's alpha and composite reliability (CR). As shown in Table 2, all constructs present values above the recommended minimum of 0.70, confirming the reliability of the measurement scales. Convergent validity was assessed through the average variance extracted (AVE). All AVE values exceeded the recommended threshold of 0.50, indicating that each construct explains more than half of the variance of its indicators (Bagozzi & Yi, 1988; Hair et al., 2019).

Table 3 shows that Economic Sustainability, Environmental Sustainability, Social Sustainability, Destination Attribute Perception, and Brand Awareness present adequate reliability and convergent validity, confirming the suitability of the measurement model. Discriminant validity was evaluated using the Fornell–Larcker criterion and the Heterotrait–Monotrait ratio (HTMT) in table 4. The Fornell–Larcker results indicate that the square root of AVE for each construct is greater than its correlations with other constructs, confirming that the constructs are empirically distinct.

The HTMT analysis generally supports discriminant validity, with all values below the recommended threshold of 0.90, except for the relationship between Economic Sustainability and Social Sustainability, which reached 0.951. This value indicates substantial empirical proximity between the two constructs and requires careful interpretation. Conceptually, however, the two dimensions remain distinct within the Triple Bottom Line framework: economic sustainability refers to the contribution of wine tourism to regional economic vitality, employment,

entrepreneurship, and business viability, whereas social sustainability refers to community well-being, cultural preservation, local identity, and social embeddedness (Xu et al., 2016; Martínez-Falcó et al., 2023). In emerging wine tourism destinations such as North Carolina, these two dimensions may be especially interconnected because economic development often occurs through community-based tourism activities, local entrepreneurship, and the valorization of regional culture. Therefore, the high HTMT value suggests conceptual proximity in visitors' perceptions rather than complete construct redundancy. To further assess this issue, HTMT inference was examined using bootstrapped confidence intervals. The results indicated that the confidence interval for the Economic Sustainability–Social Sustainability relationship did not include the value of 1, supporting the empirical distinction between the two constructs despite their high association (Henseler et al., 2014; Franke & Sarstedt, 2019).

As such, the measurement model demonstrates satisfactory psychometric properties. Indicator loadings above 0.70, reliability coefficients above 0.70, AVE values above 0.50, and acceptable discriminant validity confirm that the constructs are reliable and valid for the subsequent structural analysis.

Table 2: Composite reliability and convergent validity of the constructs

Construct	**Cronbach's alpha**	**CR**	**AVE**
Economic Sustainability	0.90	0.93	0.78
Environmental Sustainability	0.96	0.97	0.93
Social Sustainability	0.91	0.94	0.79
Destination Attribute Perception	0.80	0.88	0.72
Brand Awareness	0.93	0.95	0.82

Source: Own elaboration

Table 3: Discriminant validity of the constructs (Fornell-Larcker criterion)

Construct	**EC**	**ENS**	**SS**	**DAP**	**BA**
Economic Sustainability	**0.886**				
Environmental Sustainability	0.707	**0.964**			
Social Sustainability	0.866	0.752	**0.893**		
Destination Attribute Perception	0.537	0.452	0.540	**0.848**	
Brand Awareness	0.428	0.592	0.487	0.438	**0.910**

Note: ES=Economic sustainability; ENS=Environmental sustainability; SS=Social Sustainability; DAP = Destination Attribute Perception; BA = Brand awareness; Values in the diagonal (in bold) correspond to AVE; Off-diagonal values are the correlations between the constructs (Fornell-Larcker criterion)

Source: Own elaboration

Table 4: Discriminant validity of the constructs (HTMT)

Construct	**EC**	**ENS**	**SS**	**DAP**	**BA**
Economic Sustainability	-				
Environmental Sustainability	0.755	-			
Social Sustainability	0.951	0.802	-		
Destination Attribute Perception	0.619	0.500	0.615	-	
Brand Awareness	0.464	0.625	0.527	0.477	-

Note: ES=Economic sustainability; ENS=Environmental sustainability; SS=Social Sustainability; DAP = Destination Attribute Perception; BA = Brand awareness; Values in the diagonal (in bold) correspond to AVE; Off-diagonal values are the correlations between the constructs (Fornell-Larcker criterion)

Source: Own elaboration

4.2 Assessment of the structural model

After confirming the adequacy of the measurement model, the structural model was evaluated to test the hypothesized relationships among the constructs. The assessment followed the recommended PLS-SEM procedures, including the examination of path coefficients, their statistical significance, and the explanatory power of the model (Hair et al., 2021; Sarstedt et al., 2022). The significance of the relationships was tested using bootstrapping procedures, which generate standard errors and confidence intervals through repeated resampling of the data. This method is widely used in PLS-SEM because it does not require multivariate normality and provides robust significance testing for path coefficients.

Table 5 and Figure 2. present the structural model results. Economic Sustainability has a positive and significant relationship with Destination Attribute Perception, supporting H1. Social Sustainability also has a positive and significant relationship with Destination Attribute Perception, supporting H2. However, Environmental Sustainability is not significantly associated with Destination Attribute Perception; therefore, H3 is not supported. Regarding the direct relationships with Brand Awareness, Economic Sustainability and Social Sustainability are not significant predictors, meaning that H4 and H5 are not supported. Environmental Sustainability shows the

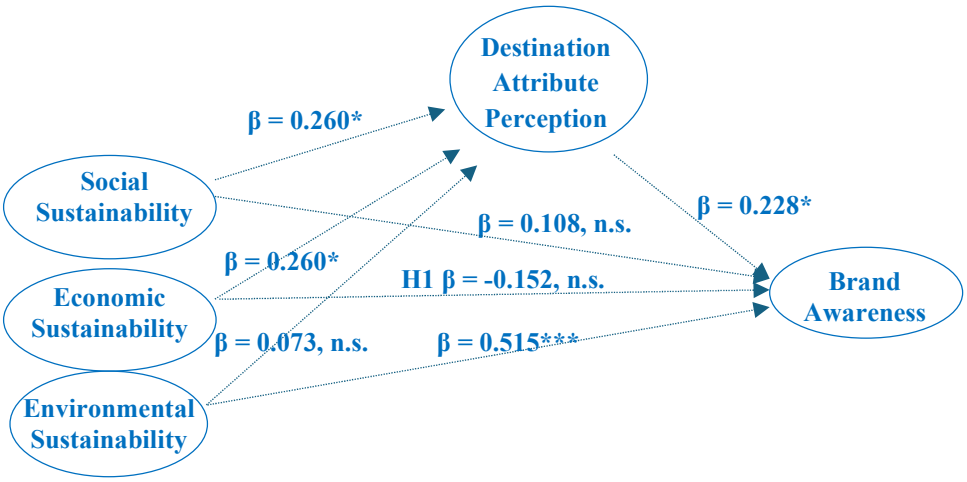
strongest direct relationship with Brand Awareness, supporting H6. Finally, Destination Attribute Perception has a positive and significant relationship with Brand Awareness, supporting H7. These results indicate that environmental sustainability is directly associated with destination brand awareness, whereas the roles of economic and social sustainability are primarily linked to tourists' perceptions of destination attributes.

Table 5. Structural model results

Hypothesis	Relationship	β	t-value	p-value	Result
H1	ES → DAP	0.260	2.059	0.040	Supported
H2	SS → DAP	0.260	2.008	0.045	Supported
H3	ENS → DAP	0.073	0.704	0.482	Not supported
H4	ES → BA	-0.152	1.315	0.189	Not supported
H5	SS → BA	0.108	0.922	0.356	Not supported
H6	ENS → BA	0.515	6.795	0.000	Supported
H7	DAP → BA	0.228	2.978	0.003	Supported

Note: ES = Economic Sustainability; SS = Social Sustainability; ENS = Environmental Sustainability; DAP = Destination Attribute Perception; BA = Brand Awareness.

Figure 2. Structural model results



4.3 Necessary Conditions Analysis

NCA was conducted as a complementary method to PLS-SEM to determine whether any of the sustainability dimensions constitute necessary conditions for achieving higher levels of Destination Attribute Perception and brand awareness. Unlike traditional causal models that estimate average effects, NCA identifies whether a certain level of a predictor must be present for the outcome to occur (Dul, 2015; Schneider & Wagemann, 2021).

The results on table 6 indicate that none of the sustainability dimensions represent a strong strictly necessary condition, as effect sizes remained below the threshold typically associated with strong necessity. However, environmental sustainability presented the highest effect size among the predictors. This suggests that although it is not strictly required for brand awareness to occur, its absence significantly constrains the achievement of higher levels of destination awareness. As such, the NCA results complement the PLS-SEM findings by highlighting the relative importance of environmental sustainability, confirming that this dimension plays a central role in strengthening brand awareness within the North Carolina wine tourism context. The bottleneck analysis (table 7) shows that to reach 90% of brand awareness, only an average level of Destination Attribute Perception is needed (2.8). These results indicate that the NCA does not support the interpretation of environmental, economic, or social sustainability as strict necessary conditions for achieving high brand awareness. Instead, the bottleneck analysis suggests that destination attribute perception is the only condition imposing a minimum requirement at higher levels of brand awareness. Managerially, this means that sustainability initiatives should not be treated as automatic guarantees of stronger brand awareness; they need to be converted into recognizable destination attributes that visitors can perceive and remember.

Table 6: NCA Ceiling and effect size results

	CR-FDH	Effect size
Economic Sustainability	0.000	0.000
Environmental Sustainability	0.000	0.000
Destination Attribute Perception	0.194	0.188
Social Sustainability	0.000	0.000

Table 7: Bottleneck analysis for Destination Brand Awareness

	Economic	Environmental	Destination	Social

	Sustainability	Sustainability	Attribute Perception	Sustainability
0.000%	0.000	0.000	NN	0.000
10.000%	0.000	0.000	NN	0.000
20.000%	0.000	0.000	NN	0.000
30.000%	0.000	0.000	NN	0.000
40.000%	0.000	0.000	NN	0.000
50.000%	0.000	0.000	NN	0.000
60.000%	0.000	0.000	NN	0.000
70.000%	0.000	0.000	NN	0.000
80.000%	0.000	0.000	1,600	0.000
90.000%	0.000	0.000	2,800	0.000

4.4 Importance-Performance Analysis

To provide managerial insights, an IPMA was conducted (Table 8). This technique extends the PLS-SEM results by considering both the total effect of each construct on the target variable (importance) and its average performance score (Hair et al., 2021). The results indicate that environmental sustainability has the highest importance for brand awareness, although its performance is only moderate. This suggests that improvements in environmental practices could substantially strengthen the destination's brand positioning.

Economic sustainability showed relatively high performance but lower importance, indicating that while these practices are well established, they do not significantly differentiate brand awareness. Social sustainability demonstrated moderate contributions in both importance and performance, suggesting a supportive but less decisive role. Destination Attribute Perception also exhibited notable importance for brand awareness, reinforcing its role as a mechanism through which sustainability practices contribute to destination reputation. Accordingly, the IPMA results suggest that strengthening environmental sustainability initiatives represents the most promising strategy for enhancing brand awareness in the North Carolina wine tourism sector.

The IPMA results provide a complementary managerial message. Environmental Sustainability combines the highest total effect on Brand Awareness with a lower performance score than Economic Sustainability, Social Sustainability, and Destination Attribute Perception. This indicates that environmental sustainability is not only statistically important but also offers the clearest room for improvement. Therefore, recommendations concerning landscape preservation, responsible vineyard management, biodiversity protection, resource efficiency, and

environmental communication are directly grounded in the empirical evidence rather than inferred only from general sustainability arguments.

Table 8: IPMA results for Destination Brand Awareness

	Total effects	Performance
Economic Sustainability	-0.093	88.862
Environmental Sustainability	0.532	76.073
Destination Attribute Perception	0.228	89.337
Social Sustainability	0.167	88.240

4.5 Coefficients of determination and predictive relevance

The explanatory and predictive capacity of the structural model was assessed using the coefficient of determination (R^2) and predictive relevance (Q^2). R^2 measures the proportion of variance explained in the endogenous constructs, while Q^2 evaluates predictive relevance through the blindfolding procedure. The results show that Destination Attribute Perception achieved an R^2 of 0.359, indicating that approximately 36% of its variance is explained by the sustainability dimensions. Brand awareness presented an R^2 of 0.562, demonstrating that more than half of its variance is explained by the model predictors.

Regarding predictive relevance, the Q^2 values were positive for both constructs (0.204 for Destination Attribute Perception and 0.314 for brand awareness), confirming that the model possesses adequate predictive capability. These results indicate that the model demonstrates moderate to strong explanatory power and satisfactory predictive relevance.

5. DISCUSSION

The strongest finding of this study is the direct relationship between environmental sustainability and destination brand awareness. This result is theoretically meaningful because environmental sustainability is likely to be the most visible and immediately interpretable sustainability dimension in wine tourism. Wine destinations are strongly associated with vineyards, rural scenery, landscape quality, and the natural conditions that support the wine experience. As a result, visitors may more

easily connect environmental practices with the identity and memorability of the destination than they connect economic or social practices with brand awareness. This interpretation is consistent with previous evidence showing that environmental conditions influence wine consumers' perceptions of quality, value, and regional reputation (Bonn et al., 2020).

The different pattern observed for economic and social sustainability also deserves attention. These dimensions did not show significant direct relationships with destination brand awareness, suggesting that they may be less immediately visible as brand cues. Economic sustainability may be perceived through regional development, employment creation, and business viability, while social sustainability may be perceived through community engagement, cultural preservation, and local identity. However, these benefits may not automatically translate into destination recall or recognition unless they are made visible within the visitor experience. This finding refines prior research on wine tourism experiences by suggesting that winescape-related and directly observable attributes are more likely to shape brand-related associations than less visible structural or community-level benefits (Bruwer et al., 2016).

This pattern contributes to the destination branding literature by showing that sustainability dimensions do not have equivalent branding effects in emerging wine regions. Environmental sustainability appears to operate as a direct signal of place quality and authenticity, whereas economic and social sustainability may require experiential translation through storytelling, hospitality, local products, cultural encounters, and community-based activities. Therefore, the findings extend previous research by showing not only that sustainability matters for wine tourism, but also that different sustainability dimensions become brand-relevant through different mechanisms.

The weaker direct role of economic and social sustainability may be explained by their lower visibility as branding cues. Visitors may value local economic development, employment creation, community engagement, and cultural preservation, but these dimensions are less likely to be immediately recognized as distinctive brand attributes unless they are explicitly embedded in the visitor experience. Thus, while environmental sustainability may directly strengthen destination awareness through visible landscape and winescape associations, economic and social sustainability may require translation into experiential elements such as local storytelling, community-based activities, regional products, hospitality, and cultural encounters. This pattern

refines previous work on winescape and destination image by showing that not all sustainability dimensions become equally salient in tourists' brand-related evaluations (Bruwer et al., 2016).

This finding also helps differentiate the branding logic of emerging wine tourism destinations from that of established regions. In mature wine destinations, brand awareness may be reinforced by long-standing reputations, accumulated visitor familiarity, and recognized regional identities. In emerging destinations, however, visitors may have fewer pre-existing associations and may therefore rely more strongly on the attributes encountered during the visit. Sustainability practices become theoretically important in this context because they can provide tangible cues through which visitors interpret the destination's quality, responsibility, and distinctiveness. This suggests that sustainability may play a more formative role in emerging wine regions than in mature destinations, where brand awareness may already be supported by established symbolic and market structures (Lee et al., 2020).

The strongest finding of this study is the direct relationship between environmental sustainability and destination brand awareness. This result is particularly relevant in the context of emerging wine tourism destinations because environmental practices may function as visible and differentiating signals through which visitors recognize and remember the destination. Wine tourism is strongly anchored in landscape, vineyards, rural scenery, and the perceived authenticity of place. Consequently, environmental sustainability is likely to be more immediately observable to visitors than economic or social sustainability, which may operate in less visible ways. Practices associated with landscape preservation, environmental quality, responsible vineyard management, and protection of natural resources can therefore strengthen the symbolic and experiential associations (Dias et al., 2023) that support destination brand awareness (Bruwer & Lesschaeve, 2012; Bonn et al., 2020).

By contrast, economic and social sustainability did not show significant direct relationships with destination brand awareness. This does not mean that these dimensions are irrelevant. Rather, their contribution appears to be more indirect and experience-based. Economic sustainability, such as support for local businesses, employment, and regional development, and social sustainability, such as community engagement, cultural preservation, and local identity, may not be immediately recognized as brand attributes by visitors (Thomas et al., 2018). Instead, they may shape how tourists evaluate the destination experience and its authenticity (Martínez-Falcó et al., 2023). This interpretation is consistent with wine tourism research emphasizing that destination meanings are

formed through interactions between winescape attributes, regional identity, hospitality, and visitor experience (Bruwer et al., 2016; Vecchio et al., 2024).

The study also indicates that economic and social sustainability are more closely associated with visitors' perceptions of destination attributes than with brand awareness directly. These findings reinforce the idea that sustainable practices may contribute to the perceived authenticity and value of the wine tourism experience (Bruwer et al., 2016). Initiatives that support local communities, promote regional culture, and generate economic benefits for rural areas may therefore strengthen visitors' positive evaluations of the destination experience, even if their direct association with brand awareness is weaker. These findings reinforce the idea that sustainable practices contribute to the perceived authenticity and value of the wine tourism experience (Bruwer et al., 2016; Bonn et al., 2020). Initiatives that support local communities, promote regional culture, and generate economic benefits for rural areas can therefore strengthen visitors' positive perceptions, which in turn enhance the recognition and memorability of the destination brand.

Another important contribution of this research lies in confirming the role of tourists' perceptions as a key mechanism linking sustainability practices and destination brand awareness. The results suggest that visitors' evaluations of the winescape, the regional landscape, and the overall tourism experience significantly influence the cognitive associations formed with the destination. This finding supports branding literature indicating that favorable destination perceptions strengthen brand equity and increase the likelihood that tourists will remember and recommend the destination (Serra-Cantallops et al., 2021).

The study provides empirical evidence that sustainability practices can serve as strategic drivers of destination branding in emerging wine tourism regions. By integrating sustainability, destination attribute perception, and destination brand awareness into a single analytical framework, the research contributes to advancing the understanding of how sustainable development strategies influence the competitiveness and positioning of wine tourism destinations.

These findings extend wine tourism and destination branding research by suggesting that the three dimensions of sustainability do not contribute to brand awareness in the same way. In emerging wine regions, environmental sustainability may operate as a direct branding cue because it is visible, place-based, and closely connected to the winescape. Economic and social sustainability, in turn, may strengthen brand awareness more indirectly by improving tourists' perceptions of the destination experience.

The substantial empirical overlap between Economic Sustainability and Social Sustainability should also be considered when interpreting these findings. Although the two constructs are theoretically distinct within the Triple Bottom Line framework, the high HTMT value indicates that visitors may not clearly separate the economic and social benefits of wine tourism in an emerging rural destination. This may reflect the nature of wine tourism development in regions such as North Carolina, where employment creation, local entrepreneurship, community vitality, cultural preservation, and regional identity are closely intertwined. Therefore, the nonsignificant direct effects of Economic Sustainability and Social Sustainability on Brand Awareness should be interpreted with caution, as their high empirical proximity may reduce the ability to isolate their distinct branding roles. This finding suggests that, in emerging wine regions, the economic and social dimensions of sustainability may be experienced by visitors as part of a broader community-development logic rather than as clearly separable destination attributes.

In the specific case of North Carolina, the findings indicate that strengthening environmental sustainability initiatives and effectively communicating them to visitors may represent a key pathway for enhancing the region's brand awareness in an increasingly competitive wine tourism market. More broadly, the results suggest that sustainability should be considered not only as a regulatory or ethical obligation but also as a strategic component of destination development and branding in wine tourism.

5.1 Theoretical contributions

This study makes three theoretical contributions to wine tourism and destination branding research. First, it extends sustainability research by showing that the Triple Bottom Line dimensions do not relate to destination brand awareness in the same way. Rather than confirming a general positive role of sustainability, the findings indicate a differentiated pattern: environmental sustainability emerges as a direct branding cue, whereas economic and social sustainability are more closely associated with tourists' evaluations of destination attributes. This refines existing wine tourism research by showing that sustainability dimensions may have distinct branding functions in emerging wine regions.

Second, the study contributes to destination branding research by clarifying why sustainability may be particularly important in emerging wine tourism destinations. In established wine regions, destination brand awareness is often supported by accumulated reputation, regional familiarity, and

consolidated associations. In emerging regions, however, brand meanings are still developing, which makes visible and experience-based cues especially relevant for visitors' recognition and recall of the destination. The findings therefore extend destination branding literature by suggesting that sustainability can operate as a strategic resource for brand formation when destination identity is not yet fully institutionalized (Gómez & Molina, 2015).

Third, the study clarifies the role of destination attribute perception as a mechanism connecting sustainability management with visitor-facing destination value. By showing that economic and social sustainability are associated with how visitors perceive the destination experience, the study demonstrates that sustainability contributes to branding not only through direct recognition effects but also through the experiential interpretation of place. This contributes to wine tourism theory by linking sustainability practices, winescape evaluation, and brand awareness within a single model of emerging destination development (Bruwer & Lesschaeve, 2012).

5.2 Practical and societal implications

The findings offer practical implications for wineries, destination managers, and policymakers. First, environmental sustainability should be treated as a central component of destination branding rather than only as an operational practice. Wineries and regional tourism organizations should communicate visible environmental practices, such as landscape preservation, responsible vineyard management, biodiversity protection, and resource efficiency, as part of the destination's identity. Second, economic and social sustainability should be embedded in the visitor experience through local partnerships, community-based wine tourism routes, regional gastronomy, cultural storytelling, and support for local producers. These initiatives may strengthen destination attribute perception and reinforce the authenticity of the wine tourism experience. Third, policymakers can use sustainability-oriented wine tourism to support rural development, local identity, and long-term regional competitiveness. In this sense, sustainability has broader societal relevance because it can contribute to environmental awareness, community well-being, and the viability of emerging rural destinations.

These implications are especially relevant for emerging wine tourism destinations. In well-established wine regions, sustainability initiatives may reinforce an already recognizable destination identity. In emerging regions, however, sustainability can help create that identity in the first place. For this reason, wineries and destination managers in emerging regions should not

communicate sustainability as a secondary attribute, but as part of the core destination narrative. Environmental practices should be made visible in the winescape, economic contributions should be connected to local value creation, and social sustainability should be communicated through community, culture, and hospitality. This approach can help emerging wine destinations transform sustainability from an internal management practice into a visitor-facing source of recognition and differentiation.

5.3 Limitations and future research

Because the study relies on cross-sectional survey data, the directionality of the proposed relationships is theoretically grounded but cannot be interpreted as definitive causal evidence. Future studies could use longitudinal, experimental, or quasi-experimental designs to examine how sustainability perceptions evolve over time and how they influence destination brand awareness across different stages of destination development. Another limitation concerns the high HTMT value observed between Economic Sustainability and Social Sustainability. Although HTMT inference supported the empirical distinction between the two constructs, the magnitude of the HTMT value indicates substantial overlap and should not be overlooked. This raises an important issue of construct distinctiveness, suggesting that visitors may perceive the economic and social benefits of wine tourism as closely connected in emerging rural destinations. As a result, the separate effects of these two dimensions should be interpreted cautiously. Future research should refine the measurement of economic and social sustainability in wine tourism, include items that more clearly distinguish business viability, employment, and regional income from community well-being, cultural preservation, and social embeddedness, and test alternative specifications such as a higher-order sustainability construct or comparative models across emerging and mature wine tourism destinations.

The study also relies mainly on sociodemographic and visitation-related information to characterize the sample. Although this is consistent with the purpose of the study, additional behavioral segmentation variables could provide a more nuanced understanding of wine tourists. Future studies should consider including variables such as wine knowledge, wine involvement, frequency of wine consumption, preferred purchasing channels, wine preferences, and previous experience with wine regions. These variables may help explain whether sustainability-related

perceptions and destination brand awareness differ across visitor segments with different levels of expertise, involvement, and consumption behavior.

5.4 Conclusion

This study examined how environmental, economic, and social sustainability relate to destination attribute perception and destination brand awareness in North Carolina, an emerging wine tourism destination. The findings show that environmental sustainability has the strongest direct relationship with brand awareness, suggesting that visible environmental practices can function as powerful branding cues in emerging wine regions. Economic and social sustainability, while not directly associated with brand awareness, contribute to how visitors perceive the destination experience. Overall, the study demonstrates that sustainability is not only a requirement for responsible wine tourism development but also a strategic resource for building destination identity, recognition, and competitiveness. For emerging wine regions, the challenge is therefore not only to adopt sustainable practices, but to make them visible, credible, and meaningful within the visitor experience.

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Appendix

Table 1A: Factor loadings of construct indicators

Construct	Indicator	Item	Factor loading
Economic Sustainability	Item 1_ES	Wine tourism contributes to the economic development of the region	0.862
	Item 2_ES	Wine tourism contributes to the development of local infrastructure	0.888
	Item 3_ES	Wine tourism attracts additional investment for local businesses	0.900
	Item 4_ES	Wine tourism provides entrepreneurship to the region	0.893
Environmental Sustainability	Item 1_ENS	Wine tourism promotes greater protection of the natural environment	0.961
	Item 2_ENS	Wine tourism development promotes protection of wildlife and their natural habitat	0.971
	Item 3_ENS	The development of wine tourism strengthens environmental conservation efforts	0.960
		The development of wine tourism promotes positive environmental ethics among visitors	
Social Sustainability	Item 1_SS	Wine tourism positively impacts neighboring communities	0.921
	Item 2_SS	The community benefits from the development of wine tourism	0.927
	Item 3_SS	wine tourism activity helps to preserve local traditions and culture	0.883
	Item 4_SS	wine tourism increases income and improves the community's standard of living	0.839
Destination Attribute Perception	Item 1_DAP	The quality of the environment is an appeal to visit the region	0.868
	Item 2_DAP	The winescape is ideal for wine experiences	0.790
	Item 3_DAP	The region has a beautiful rural landscape	0.884
		The region presents pristine environments	
Brand awareness	Item 1_BA	This wine region has a good reputation	0.914
	Item 2_BA	North Carolina is a well-known wine region	0.900
	Item 3_BA	The characteristics of this wine region come to my mind quickly	0.928
	Item 4_BA	The wine region has a personality that distinguishes Itself from its competitors	0.899

Source: Own elaboration