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Stakeholder Perceptions of Sustainable Development in Industrial Tourism

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ABSTRACT

This study examines stakeholders' perceptions of sustainable development in the context of industrial tourism, an emerging form of cultural tourism that conforms to environmental policy and sustainability principles. Based on a sample of 405 Spanish tourists, the research applies partial least squares structural equation modeling (PLS-SEM) to assess how economic, social, and environmental dimensions influence overall perceptions of sustainability. The results reveal that social sustainability exerts the strongest direct and mediating effects, followed by environmental and economic aspects. These results highlight the importance of stakeholder engagement in sustainable tourism planning and governance, particularly in regions seeking to diversify tourism demand and enhance industrial heritage.

1 | Introduction

Tourism is one of the most relevant industries worldwide, with a significant economic impact that goes beyond the generation of direct income, stimulating related sectors such as hospitality, transport, and trade, and representing a key source of employment and foreign exchange, especially in developing countries (Tan et al. 2025; Velasco-Muñoz et al. 2025). In the social sphere, it contributes to individual and collective well-being, promotes social cohesion and cultural exchange, and strengthens social and family capital, especially through social tourism, which improves the quality of life of vulnerable groups (Ahmad et al. 2020; Pulido-Fernández and Cárdenas-García 2020). However, tourism also generates negative impacts. In the economic sphere, it can lead to structural dependency, profit leakage, and loss of competitiveness (Nguyen et al. 2019; Pulido-Fernández and Cárdenas-García 2020). On the social side, it can cause gentrification, displacement of residents, community tensions, and deculturalization processes (Ferreira et al. 2021; Valderrama et al. 2025). Finally, environmentally, it contributes to climate change, intensive resource consumption, and ecosystem degradation, especially in destinations with high tourism pressure (Yi et al. 2023; Tan et al. 2025). These conflicting effects highlight the need for sustainable tourism management that maximizes its benefits and minimizes its negative externalities.

Sustainability in tourism is understood as a holistic approach that seeks to meet the current needs of visitors, the industry, the environment, and host communities, without compromising the ability of future generations to meet theirs (Niñerola et al. 2019). The principles of sustainable tourism are based on the need to harmonize tourism development with environmental conservation, respect for local cultures, and the generation of equitable benefits for host communities (Madanaguli et al. 2022). Among the essential pillars is the responsible management of natural resources, ensuring their efficient use and long-term preservation. Social equity is also promoted, ensuring that local communities actively participate in decision-making and benefit fairly from tourism activity (Roberts et al. 2022). Another key principle is cultural integrity, which involves protecting and valuing the traditions, heritage, and cultural expressions of destinations, avoiding their trivialization or exploitation. In addition, sustainable tourism promotes the quality of the experience for both visitors and residents, seeking a balance between tourist satisfaction and the well-being of the local population (Ferreira et al. 2021). These principles must be applied transversally in all stages of tourism planning, management, and evaluation, and require collaboration between governments, businesses, communities, and tourists to build a more just, resilient, and environmentally friendly model.

Industrial tourism is emerging as an alternative capable of contributing to building a more sustainable tourism sector. Industrial tourism is defined as a form of tourism whose main attraction lies in visits to active companies, industrial facilities, production spaces, technical centers, mines, shipyards, power plants, as well as museums and interpretation centers related to industrial history and technology (Montenegro et al. 2022). It goes beyond the simple observation of production processes, seeking to offer an educational, cultural, and, in many cases, emotional experience, connecting the visitor with the industrial heritage, innovation, and know-how of a territory (Lee 2016). Key components of industrial tourism include active industrial sites, inactive industrial heritage, industrial and technical museums and interpretation centers, industrial infrastructures and landscapes, themed events and festivals, as well as associated tourism products and services (Montenegro et al. 2023).

The interest in visiting production sites is not entirely new; historically, elites and curious travelers have shown a fascination for technical advances and large production centers. However, the formalization of industrial tourism as a specific segment can be traced to the revaluation of industrial heritage from the second half of the 20th century, to the growing interest in technology and innovation, to the development of thematic routes in regions with industrial tradition, and to the support of institutions and administrations that have recognized its potential for economic diversification and the promotion of territorial identity (Knežević et al. 2019; Montenegro et al. 2022). The evolution of industrial tourism has shifted from sporadic visits to museums to more immersive experiences in active companies, with an increasing focus on interactivity, sustainability, and connection with the local community (Soares et al. 2024).

In this context, the concept of sustainable communities takes on special relevance, referring to those communities capable of balancing economic development, social cohesion, and environmental protection, guaranteeing their present and future well-being (Mtapuri et al. 2022; Mzembe et al. 2023). This approach is fully in line with the Theory of Sustainable Development and its Triple Bottom Line model, which articulates sustainability around three interdependent pillars: economic, social, and environmental. From this perspective, sustainable industrial tourism can act as a catalyst for building more resilient, inclusive, and participatory communities by fostering heritage enhancement, economic diversification, and the active involvement of local stakeholders. Therefore, the aim of this work is to assess tourists' perceptions of the sustainability of industrial tourism and its component dimensions. The research questions addressed in this paper are: Do tourists perceive industrial tourism to be sustainable? How do economic, environmental, and social aspects contribute to the sustainability of industrial tourism? In turn, do these aspects relate to each other?

In order to respond to these questions, primary information obtained from a sample of 405 national tourists residing in Spain is used. Spain has been selected as a case study because of its global leadership position in tourism, its diverse industrial heritage, and its strong institutional commitment to sustainability. The late start of the industrialization process in Spain has meant, in parallel, a delay in the development of industrial tourism compared to other neighboring countries such as Germany, the United Kingdom, and France. The country not only has an extensive network of industrial sites converted into tourist resources—such as mines, factories, and technical museums—but has also developed strategic frameworks that support this type of initiative, such as the Spanish Sustainable Tourism Strategy 2030, which promotes a model based on socio-economic, environmental, and territorial sustainability. All this makes Spain an ideal laboratory for the study of perceptions on the sustainability of industrial tourism. The methodology used is based on Partial Least Squares Structured Equation Modelling (PLS-SEM). The rest of the document is structured as follows. After this introductory section, the theoretical framework that serves as support for stating the initial hypotheses is briefly developed. Next, the methodology section describes the procedure used for the collection of information and the description of the sample, the variables used, and the analysis of the data. The results obtained are then presented. The work ends with a section setting out the main conclusions reached.

2 | Theoretical Framework and Initial Hypotheses

The work presented here is grounded in sustainable development theory. Sustainable development theory stands as a fundamental framework for understanding and addressing the challenges inherent in building an equitable and viable future. The most widespread definition of sustainable development, coined in the so-called Brundtland Report (Our Common Future) of the United Nations World Commission on Environment and Development, states that sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs (Brundtland et al. 1987). This definition underlines the importance of recognizing basic needs, especially of the most vulnerable, while acknowledging the constraints imposed by the environment and the crucial responsibility of the present generation to preserve resources and the planet for future generations (Ruggerio 2021; Manioudis and Meramveliotakis 2022). The origin of this theory goes back to the growing awareness of planetary boundaries and environmental impacts, with milestones such as the Stockholm Conference in 1972 and the "Limits to Growth" report of the same year. However, the Brundtland Report in 1987 popularized the concept. Subsequently, the Earth Summit in Rio de Janeiro in 1992 adopted Agenda 21, followed by summits in Johannesburg (2002) and Rio + 20 (2012), culminating in Agenda 2030 with its 17 Sustainable Development Goals (SDGs) (Shi et al. 2019; Ruggerio 2021; Sunny et al. 2025).

Sustainable development theory is generally articulated around three interdependent pillars, which are economic sustainability, social sustainability, and environmental sustainability (Mensah 2019; Sunny et al. 2025). Economic sustainability seeks responsible growth, which must be socially and environmentally conscious. It aims to improve the quality of life without depleting resources or damaging the environment while promoting social equity (Shi et al. 2019). Social sustainability focuses on social justice and seeks to ensure opportunities for all through inclusion and participation, respect for human rights, and the fulfilment of basic needs, eliminating inequalities (Ruggerio 2021; Manioudis and Meramveliotakis 2022). Environmental sustainability prioritizes environmental protection and the conservation of natural resources, given the importance of ecosystems and climate (Shi et al. 2019). It aims to minimize pollution in addition to promoting the sustainable use of resources. Some approaches consider a fourth pillar, cultural sustainability. This pillar highlights the importance of cultural diversity and heritage (Sunny et al. 2025). Sustainable development theory is guided by key principles such as the integration of economic, social, and environmental dimensions; citizen participation; the precautionary principle in the face of potential environmental damage; common but differentiated responsibility among countries; multi-level governance; and transparency and accountability (Shi et al. 2019; Manioudis and Meramveliotakis 2022).

Although the definition of sustainable development proposed by the Brundtland Report has been widely accepted as a normative framework, its general nature makes its direct empirical application difficult. Yu et al. (2000) propose an operational definition of sustainability based on the idea that sustainability can be achieved through voluntary interactions between actors, provided that resource entitlements exist and innovation is encouraged. In their model, strong sustainability is achieved when an economic activity (in our case activities based on industrial tourism) not only avoids degrading the environment but also generates simultaneous improvements in natural capital and production, thanks to processes of adaptation and innovation. The key elements for the operability of the sustainability concept would be: (i) it requires entitlements over resources for affected actors; (ii) it allows for voluntary interaction and negotiation with developers; (iii) it promotes a form of development that not only avoids damage but also improves the natural environment; (iv) it differs from the traditional externalities model by assuming that the production function can change with the environment and is not fixed. Lai and Lorne (2019) use this approach to propose a model for urban regeneration that reconciles development with heritage conservation.

In our work, we propose a double innovation that in the work of Yu et al. (2000) is called the "Schumpeterian process," which involves experimenting with new forms of production in the face of environmental changes. On the one hand, it is proposed to recover disused industrial elements which, for the most part, have altered the natural environment and whose abandonment may pose a risk, both to the environment and to the population. On the other hand, it is proposed to diversify the activity of certain industrial companies by including tourist visits to their facilities. As far as property rights are concerned, in the case of the industrial companies currently operating, there is no question of ownership, as this is vested in their owners. However, in the case of disused heritage elements, institutional will is required, both for their recovery and their exploitation, given that many of these elements are abandoned and in a state of degradation.

Thus, in the framework of this work, sustainable development based on industrial tourism is understood as that which is capable of generating income, employment, and material well-being for the population where it is developed; enhancing the conservation of culture and heritage and transmitting the industrial legacy; allowing the reuse of disused heritage elements, while maintaining a balance with urban and natural ecosystems. These dimensions have been operationalized through a set of specific indicators adapted from Moral-Moral and Fernández-Alles (2019), which allow for a quantitative assessment of tourists' perception of the sustainability of industrial tourism. This approach allows linking the theoretical concept of sustainable development with an empirical measurement that is coherent, replicable, and aligned with the principles of the theory, facilitating its analysis through structural models (Xu and Li 2025). In this sense, the proposed model not only allows us to test the direct influence of each dimension on the overall perception of sustainability, but also to explore mediating relationships between them, which provides a more complex and realistic view of how tourists integrate these concepts.

Numerous studies point out that the successful adoption of new practices requires the involvement of all stakeholders (Velasco-Muñoz et al. 2025). In the tourism sector, the adoption of innovations depends fundamentally on the collaboration and active participation of stakeholders, including businesses, communities, authorities, technology partners, and tourists (Chountalas et al. 2024). Internal capacity building, effective communication, and management of barriers such as resistance to change and lack of resources deserve special attention in this sector, with co-creation, institutional support, and integration of technologies being key to achieving sustainability and competitiveness (Pikkemaat et al. 2019; Jia et al. 2023; Cardoso et al. 2024). Stakeholder theory applied to sustainable tourism emphasizes the identification, inclusion, and active collaboration of all stakeholders (visitors, local communities, businesses, authorities and future stakeholders) in tourism planning, management, and governance, which facilitates shared decision-making, adaptation to challenges, and the achievement of sustainable economic, social, and environmental benefits (Nguyen et al. 2019; Roxas et al. 2020). This paper proposes the development of a tourism product based on industrial tourism as a measure to contribute to the sustainability of the sector. Therefore, based on stakeholder theory, gathering information on stakeholder perceptions is of particular interest to determine the feasibility of the proposal.

The most recent literature on the perspective of tourists in relation to sustainable tourism highlights a notable evolution in their attitudes, motivations, and behaviors, reflecting a growing sensitivity toward responsible practices and a greater willingness to adopt pro-environmental behaviors during their trips (Abu Elsamen et al. 2025; Nair et al. 2025; Yusof et al. 2025). This trend is manifested in the preference for authentic, immersive, and environmentally friendly experiences, as well as in the positive valuation of destinations that integrate sustainability criteria in their management (Tang et al. 2025; Van et al. 2025). Various theoretical approaches, such as the Norm Activated Theory (NAM), the Theory of Planned Behaviour (TPB), and the Value-Belief-Norm (VBN) model, have been applied to explain tourists' decisions and intentions to behave sustainably (Abu Elsamen et al. 2025; Alashiq and Aljuhmani 2025), while other studies highlight the importance of emotional, social, and contextual factors, such as the perception of environmental responsibility, the influence of social norms, or the perceived quality of sustainable services (Zheng et al. 2024; Dauti et al. 2025; MacInnes et al. 2025). However, a gap persists between positive attitudes toward sustainability and the actual adoption of responsible behaviors, which poses challenges for the design of effective interventions (Li et al. 2024; Juvan et al. 2025). In this sense, the need for integrated strategies that consider both individual motivations and the characteristics of the tourism environment is recognized, especially in rural or protected area contexts (Colasante et al. 2024; Li et al. 2025), thus consolidating the tourist as a key agent in the transition toward a more sustainable tourism model.

Industrial tourism has several advantages over conventional tourism in all three areas of sustainability. Industrial tourism offers significant economic advantages over conventional tourism, contributing decisively to the sustainability of the sector by promoting the deseasonalization of demand and the geographical diversification of tourism flows, attracting visitors all year round to often less touristic areas and relieving pressure from overcrowded destinations (Hidalgo-Giralt et al. 2021). This type of tourism attracts a more specialized and motivated market segment, willing to spend more per tourist on unique experiences, workshops, and local products, thus generating new and stable sources of income for the visited industries and local commerce, which translates into an economic boost for regional economies (Lu 2024). In addition, it fosters the creation of qualified and diversified employment, as it requires guides with specific knowledge and staff with technical skills, contributing to the retention of local talent and greater job stability (Montenegro et al. 2023). Finally, the concentration of economic benefits in large companies is a problem of conventional tourism. Industrial tourism can foster the creation of small, specialized local businesses and demand for regional products linked to industrial activity, distributing the economic impact more broadly (Jia et al. 2023). Therefore, the first starting hypothesis is the following:

Hypothesis 1. *The perception of economic sustainability will have a positive impact on the perception of the overall sustainability of industrial tourism.*

From a social perspective, industrial tourism has benefits over conventional tourism, contributing to the sustainability of the sector. On the one hand, it helps to strengthen local identity and the sense of belonging in communities, revaluing their historical and cultural heritage, and connecting generations through the preservation of traditional knowledge and crafts (Andrade and Caamaño-Franco 2018). This approach allows for social and cultural diversification of the tourism offer, providing visitors with authentic and educational experiences that foster cultural understanding and more conscious tourism, reducing the negative impact of mass tourism (Lee 2016). It also improves local quality of life and community cohesion by generating direct economic opportunities for residents, driving investment in infrastructure and services that benefit all, and facilitating greater interaction and understanding between tourists and locals (Hidalgo-Giralt et al. 2021). Finally, industrial tourism promotes community empowerment and citizen participation by involving residents in the tourism development of their own heritage, enabling grassroots decision-making and fostering greater awareness of the importance of cultural conservation (Knežević et al. 2019; Lu 2024). Consequently, the following hypotheses are proposed:

Hypothesis 2. *The perception of social sustainability will have a positive impact on the perception of the overall sustainability of industrial tourism.*

Hypothesis 3. *The perception of social sustainability will have a positive impact on the perception of the economic sustainability of industrial tourism.*

Hypothesis 4. *The perception of social sustainability will have a positive impact on the perception of the environmental sustainability of industrial tourism.*

With regard to the environmental sphere, industrial tourism also presents opportunities compared to conventional tourism. On the one hand, it contributes to the sustainability of the sector by minimizing the overall ecological footprint through the distribution of tourist flows to non-traditional areas, which reduces the saturation and degradation of fragile ecosystems (Knežević et al. 2019). It stands out for promoting the reuse and recovery of existing spaces and buildings, such as old factories or mines, which avoids new construction, the consequent occupation of virgin land and the massive generation of construction and demolition waste (Montenegro et al. 2023). Furthermore, by reducing seasonality, this model allows for a more balanced and efficient use of resources and infrastructure throughout the year, optimizing water and energy consumption (Hidalgo-Giralt et al. 2021). It also promotes low-impact tourism and environmental education, as it attracts more aware visitors and provides opportunities to raise awareness of energy efficiency and sustainable management (Lu 2024). In certain contexts, it can also contribute to biodiversity and landscape conservation through the rehabilitation of former farms or the valorisation of anthropised landscapes, transforming them into new spaces with natural and cultural value (Andrade and Caamaño-Franco 2018). Therefore, the subsequent hypotheses are stated:

Hypothesis 5. *The perception of environmental sustainability will have a positive impact on the perception of the overall sustainability of industrial tourism.*

Hypothesis 6. *The perception of environmental sustainability will have a positive impact on the perception of the economic sustainability of industrial tourism.*

Finally, given the interconnection between the different pillars that make up sustainability, as previously established, it can be assumed that there are mediating relationships between economic, social and environmental sustainability and the overall sustainability of tourism. Thus, the following hypotheses are established:

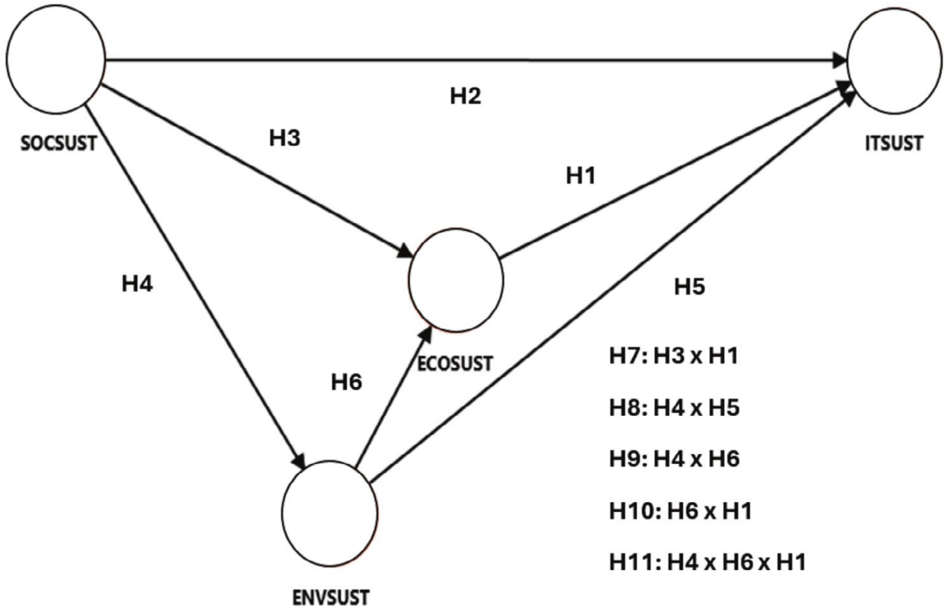

FIGURE 1 | Research model and hypotheses. *Source:* Own elaboration.

Hypothesis 7. *The perception of economic sustainability will have a positive mediating effect on the perception of social sustainability and the overall sustainability of industrial tourism.*

Hypothesis 8. *The perception of environmental sustainability will have a positive mediating effect between the perception of social sustainability and the overall sustainability of industrial tourism.*

Hypothesis 9. *The perception of environmental sustainability will have a positive mediating effect between the perception of social sustainability and the economic sustainability of industrial tourism.*

Hypothesis 10. *The perception of economic sustainability will have a positive mediating effect between the perception of environmental sustainability and the overall sustainability of industrial tourism.*

Hypothesis 11. *The perception of environmental and economic sustainability will have a positive mediating effect between the perception of social sustainability and the overall sustainability of industrial tourism.*

Figure 1 illustrates the proposed model, which stems from the hypotheses outlined.

3 | Dataset and Methodology

3.1 | Data Collection

First, a pilot survey was conducted with 10 participants to validate the clarity and comprehensibility of the questionnaire. This first approach revealed that some indicators were confusing because they were very similar. Finally, one indicator was eliminated from the environment construct, as the remaining two indicators were considered to be well defined and delimited. The study was carried out in April 2025 using an online research platform called Prolific. The study was aimed at people of legal age, who usually reside in Spain. To ensure the robustness and validity of the results, only observations with complete data for all variables included in the study were considered (Montero et al. 2024).

The final sample includes 405 valid surveys out of a total of 434 surveys conducted. 48.9% of the sample is male, 48.6% female, while 2.5% answered other or did not answer. The average age of all respondents is 34.2 years. By age group, 49.6% are between 18 and 30 years old, 49.6% are between 31 and 65 years old, while the remaining 0.7% are over 65 years old. The sample is practically representative of the distribution of the population in Spain. Thus, 23% of those surveyed usually reside in the community of Andalusia, which is the most numerous. This is followed by Madrid with 18.0%, Catalonia with 15.1%, Galicia with 5.7%, the Basque Country with 5.2%, and Castilla-León with 4.2%. In terms of nationality, 85.7% of the sample is made up of Spaniards, while the remaining 14.3% is of foreign nationality. The remaining nationalities with one or two respondents were Argentina, Belgium, Brazil, China, Cuba, Ecuador, Estonia, France, the Netherlands, Hungary, Ireland, Morocco, Panama, Venezuela, Portugal, Singapore, and Romania. By employment status, the majority group is made up of employees, with 55.3%. This is followed by students (24.0%), the unemployed (11.1%), the self-employed (8.6%), and others (1.0%). By level of education, 60.7% of respondents had a university degree or Master's degree. 19.0% of those surveyed had secondary education. 17.0% of the respondents had vocational training. 3.2% of the sample had doctoral studies. The demographic characteristics of the respondents are shown in Table 1.

While 100 observations are typically sufficient for achieving acceptable statistical power and a quality measurement model in PLS-SEM (Reinartz et al. 2009), a more rigorous calculation

TABLE 1 | Characterization of the sample.

		Men		Woman		Other		Total	
		N	%	*N*	%	*N*	%	*N*	%
Age		198	100.0	197	100.0	10	100.0	405	100.0
	18–30	94	47.5	99	50.3	8	80.0	201	49.6
	31–65	104	52.5	95	48.2	2	20.0	201	49.6
	> 65	0	0.0	3	1.5	0	0.0	3	0.7
Nationality	Spaniards	181	91.4	156	79.2	10	100.0	347	85.7
	Foreign	17	8.6	41	20.8	0	0.0	58	14.3
Occupation	Student	54	27.3	40	20.3	3	30.0	97	24.0
	Employee	108	54.5	112	56.9	4	40.0	224	55.3
	Unemployee	15	7.6	27	13.7	3	30.0	45	11.1
	Self-employed	20	10.1	15	7.6	0	0.0	35	8.6
	Retiree/pensioner	1	0.5	3	1.5	0	0.0	4	1.0
Education	Secondary education	49	24.7	26	13.2	2	20.0	77	19.0
	Vocational training	32	16.2	33	16.8	4	40.0	69	17.0
	University education	111	56.1	131	66.5	4	40.0	246	60.7
	Doctoral studies	6	3.0	7	3.6	0	0.0	13	3.2

Source: Own elaboration.

was performed using G*Power (v. 3.1.9.6., Kiel, Germany) (Faul et al. 2009). This analysis, based on a mean effect size of 0.15, a 0.05 significance level, and 0.95 statistical power, indicated a required sample size of 146. Since the study collected 405 responses, significantly exceeding this requirement, the sample size was considered adequate.

3.2 | Variables

To collect information on respondents' perceptions of the different areas of industrial tourism sustainability, four constructs were used and measured using an adaptation of the scale proposed by Moral-Moral and Fernández-Alles (2019). The final scale is composed of eleven indicators, four to assess the economic dimension, four for the social dimension, two for the environmental dimension, and one for the perception of overall sustainability, which acts as the dependent variable, as presented in Table 2. The first construct was set in reflective mode, while the second and third were set in formative mode. The measurement model specification (whether reflective or formative) adhered to the qualitative decision rules established by Jarvis et al. (2003) and the guidance provided by Bollen and Diamantopoulos (2017). Specifically, formative constructs are characterized by indicators that define features of the construct and do not necessarily share the same content. In contrast, for reflective constructs, indicators are manifestations of the construct itself and exhibit similar content. The first two constructs were set in formative mode, while the third was set in reflective mode. The measurement scale used was a Likert-type scale, where a value of 1 means "strongly disagree" and a value of 7 means "strongly agree."

3.3 | Data Analysis

In order to empirically test the hypotheses proposed in this study and capture the complexity of social perceptions, a robust quantitative methodology has been adopted, focusing on structural equation modelling (SEM) analysis. Specifically, the Partial Least Squares (PLS-SEM) approach has been chosen, a technique that is optimally aligned with the exploratory objectives of this research. The proposed conceptual model is primarily aimed at unraveling the usefulness and perception of the fundamental dimensions of Sustainable Development Theory (economic, social, and environmental) in the context of industrial tourism. The interest lies in determining whether the potential general public perceives industrial tourism as sustainable and, more granularly, whether they consider each of these dimensions as inherent elements of sustainability in their territory. This approach allows for a holistic understanding of how stakeholders integrate and value the pillars of sustainability in an emerging tourism niche such as industrial tourism.

In the context of perception studies, where theories may still be developing or relationships are complex, PLS-SEM offers a significant advantage by prioritizing the maximization of the explained variance of dependent variables, which is crucial for generating knowledge in emerging fields (Hair et al. 2019). Additionally, PLS-SEM presents a number of practical and statistical advantages that make it particularly attractive for this research. First, it includes lower requirements for normality of the data, which is common in perception surveys (Becker et al. 2023). On the other hand, it shows robustness to small to moderate sample sizes, as evidenced in the literature, which ensures the validity of the results even if the sample is limited

TABLE 2 | Instrument for measuring the perception of sustainability in industrial tourism.

Construct	Indicator	Description
ENVSUST (Reflective)	ENVSUST1	It can enhance and repurpose the industrial heritage of municipalities, giving it a second life (e.g., abandoned factories, transport infrastructure).
	ENVSUST2	It is closely linked to the conservation and protection of natural and cultural heritage.
SOCSUST (Formative)	SOCSUST1	It increases knowledge about the activities of businesses.
	SOCSUST2	It helps preserve the traditions and culture of municipalities.
	SOCSUST3	It allows visitors to discover the culture and traditions of municipalities.
	SOCSUST4	It enables local residents to enjoy the industrial resources within their own area.
ECOSUST (Formative)	ECOSUST1	It brings economic benefits for businesses.
	ECOSUST2	It boosts job creation opportunities.
	ECOSUST3	It helps improve the quality of life in municipalities.
	ECOSUST4	It is a type of tourism that would contribute to attracting tourists year-round, preventing concentration solely in summer.
ITSUST	ITSUST1	It contributes to the development of more sustainable tourism.

Source: Adapted from Moral-Moral and Fernández-Alles (2019).

(Valle and Assaker 2016). Finally, there is flexibility in measurement scales, allowing the use of formative and reflective measurement scales, essential for capturing multidimensional constructs. Its iterative approach also facilitates the handling of complex models with multiple constructs and relationships (Sarstedt et al. 2020).

The analysis of the proposed PLS-SEM model will follow the two-step procedure commonly accepted in the methodological literature (Hair et al. 2019), ensuring the robustness and validity of the findings. The initial phase, the Outer Model evaluation, will focus on determining the reliability and validity of the scales used, confirming that each item uniquely and consistently measures the latent construct it is intended to estimate. Metrics such as composite reliability, convergent validity (AVE) and discriminant validity will be examined. Once the measurement model has been validated, the structural model (Inner Model) will be evaluated, analyzing the causal relationships and interdependencies between the different latent constructs. Here, path coefficients, R^2 values (variance explained) and Q^2 values (predictive relevance) will be examined, providing empirical evidence on the strength and direction of the hypothesized relationships between the perceptions of the sustainability dimensions and the overall perception of sustainability of industrial tourism. For the implementation and analysis of PLS-SEM, use will be made of the SmartPLS v.4.1.1.2 software (Ringle et al. 2024), recognized for its intuitive interface and its ability to manage complex models efficiently.

4 | Results

4.1 | Measurement Model

4.1.1 | Reflective Measurement Model

In a first phase of analysis, the psychometric properties of the proposed scales were assessed, including their reliability and validity. Reliability indicates the internal consistency of the items of a scale, ensuring that they measure the same latent construct in a consistent way (Valle and Assaker 2016). In parallel, validity is examined through convergent and discriminant validity. Convergent validity confirms that the indicators of a scale are strongly correlated with the construct they are intended to measure, while discriminant validity ensures that each construct is empirically distinct from others, verifying that there is no undue relationship between an indicator and constructs outside its theoretical definition (Becker et al. 2023).

The individual reliability of the items within the measurement model is assessed by means of their factor loadings (λ). Following the methodological criteria established in the literature, an indicator is considered acceptable if its factor loadings with the construct to which it belongs are equal to or greater than 0.707 (Hair et al. 2019). In the present study, it has been verified that all indicators present factor loadings that meet or significantly approach this threshold. Additionally, cross loadings are examined to confirm that each indicator measures exclusively the construct to which it is theoretically assigned, and that it does not contribute substantially to the variance of other constructs in the model. Moreover, the Average Variance Extracted (AVE) is required to be greater than 0.5.

Construct reliability, or internal consistency, was assessed using the composite reliability coefficient (ρc). This coefficient allows us to verify the rigor with which the indicators or manifest variables measure the same latent variable. The literature states that satisfactory values for composite reliability should be between 0.60 and 0.70 in exploratory studies (Nunnally and Bernstein 1994). In the present study, the reliability of the latent constructs was confirmed by observing that their internal consistency measures (ρc) exceed the value of 0.8, indicating high internal consistency. On the other hand, Cronbach's alpha gives an estimate of reliability based on the intercorrelations of the indicators. This indicator is biased by the sample size, so it is considered less reliable than the composite reliability. Values between 0.7 and 0.9 are considered more reliable. The construct analyzed yields a value of 0.88.

Finally, in terms of discriminant validity, the AVE of each latent construct must be greater than the variance that this construct shares with the other constructs in the model (Hair et al. 2019; Richter et al. 2016). After verification, it was found that the correlations between the constructs are lower than the square root of their respective AVE values, which corroborates the existence of adequate discriminant validity. Finally, the Heterotrait Monotrait Ratio (HTMT) of correlations is the ratio of the correlations between traits and the correlations within traits. A correlation close to 1 indicates a lack of discriminant validity. Furthermore, if it can be found that the 95% confidence interval does not contain the value 0.90, then we can say that the constructs are empirically distinct. The tests performed indicate that the reflective construct shows positive results in all of them. Table 3 shows a summary of the results of the reflective model.

TABLE 3 | Valuation of the measurement model: reflective construct.

Outer loadings				
Indicator	**Loading (λ)**	**CI 2.5%**	**CI 97.5%**	***p***
EVNSUST1	0.885	0.859	0.908	0.000
ENVSUST2	0.891	0.853	0.914	0.000
Construct reliability and average variance extracted				
Criterion	**Value**	**CI 2.5%**	**CI 97.5%**	***p***
Cronbach's Alpha	0.731	0.658	0.787	0.000
Dijkstra–Henseler's Rho	0.731	0.653	0.786	0.000
Composite reliability	0.881	0.854	0.904	0.000
AVE	0.788	0.745	0.825	0.000
Discriminant validity				
Fornell–Larcker criterion				**ENVSUST**
ENVSUST				0.888
ITSUST				0.607
HTMT ratio	**Value**	**CI 2.5%**		**CI 97.5%**
	0.709	0.624		0.788

Source: Own elaboration.

4.1.2 | Formative Measurement Model

In the case of the training models, it is not necessary to assess the composite feasibility. The scale used has been tested in previous work, which supports its validity. To assess the possibility of multicollinearity, the Variance Inflation Factor (VIF) was used. This indicator quantifies multicollinearity between predictor variables. High VIF values (>5 or >10) indicate that the variance of the coefficients is inflated by this correlation, affecting the reliability of the individual estimates. In the model analyzed, the highest VIF value of an indicator is 2.381.

After confirming the absence of severe collinearity using the VIF, the statistical significance of each external weight is assessed using the bootstrapping procedure to obtain *t* values and *p* values. A *p* value of less than 0.05 indicates a significant contribution. Beyond significance, it is crucial to determine the practical relevance of these weights by analyzing their magnitude. Weights with higher absolute values suggest a greater contribution to the construct. Table 4 shows a summary of the results of the formative construct indicators. All of them show significant contributions, except ECOSUST2. However, as the external loadings are greater than 0.5, the indicator is maintained.

4.2 | Structural Model

Once the measurement model has been validated, the next step is the evaluation of the structural model. First of all, it has been checked that there is no collinearity between the constructs. Figure 2 shows the model results.

Next, we examine the path coefficients (β), which represent the hypothesized relationships between the constructs. These coefficients indicate the strength and direction of the effects. To determine whether these relationships are statistically significant, the bootstrapping procedure of 10,000 samples was used. This method generates *t* values and *p* values associated with each path coefficient. In an exploratory study, we are interested in identifying which relationships are robust and deserve further attention in future research. A *p* value of less than 0.05 will indicate that the relationship is statistically significant. This analysis allows us to corroborate the significance of the proposed hypotheses (Hair et al. 2019). The results obtained indicate that all the hypotheses put forward in the study are empirically supported. To reinforce these findings, a non-parametric technique based on confidence intervals was employed. According to Henseler et al. (2009), if a confidence interval for a path coefficient does not include the value zero, the hypothesis that the path coefficient is zero can be rejected. The application of this procedure consistently confirmed the previously obtained results.

Table 5 shows the effects, confidence intervals, and *p* values of the relationships between the different constructs, both direct and mediated. Panel A displays the direct effects, which align with hypotheses 1 to 6. Meanwhile, Panel B shows the indirect effects, reflecting hypotheses 7 to 11. Indeed, all hypotheses were confirmed, as they yield *p* values less than 0.05. To ascertain the effect size of exogenous constructs on endogenous constructs, the f^2 value was employed. A small effect is indicated by $0.02 \le f^2 < 0.15$, a moderate effect by $0.15 \le f^2 < 0.35$, and a large effect by $f^2 > 0.35$ (it is deemed that there is no effect when f^2 values fall below 0.02) (Cohen 1988). Our analysis revealed that the latent variable SOCSUST exerted a moderate effect on ECOSUST and a large effect on ENVSUST, whilst all remaining effects were found to be small.

TABLE 4 | Valuation of the measurement model: formative constructs.

Construct	Indicator	VIF	Weight	CI 2.5%	CI 97.5%	*p*	Loading
ECOSUST1	ECOSUST1	1.343	0.138	0.003	0.271	0.044	0.536
	ECOSUST2	1.592	0.009	−0.149	0.163	0.909	0.587
	ECOSUST3	1.612	0.630	0.474	0.771	0.000	0.901
	ECOSUST4	1.343	0.448	0.321	0.577	0.000	0.788
SOCSUST	SOCSUST1	1.598	0.143	0.021	0.282	0.031	0.690
	SOCSUST2	2.381	0.365	0.217	0.502	0.000	0.882
	SOCSUST3	2.079	0.262	0.112	0.406	0.000	0.820
	SOCSUST4	1.676	0.427	0.311	0.546	0.000	0.854

Source: Own elaboration.

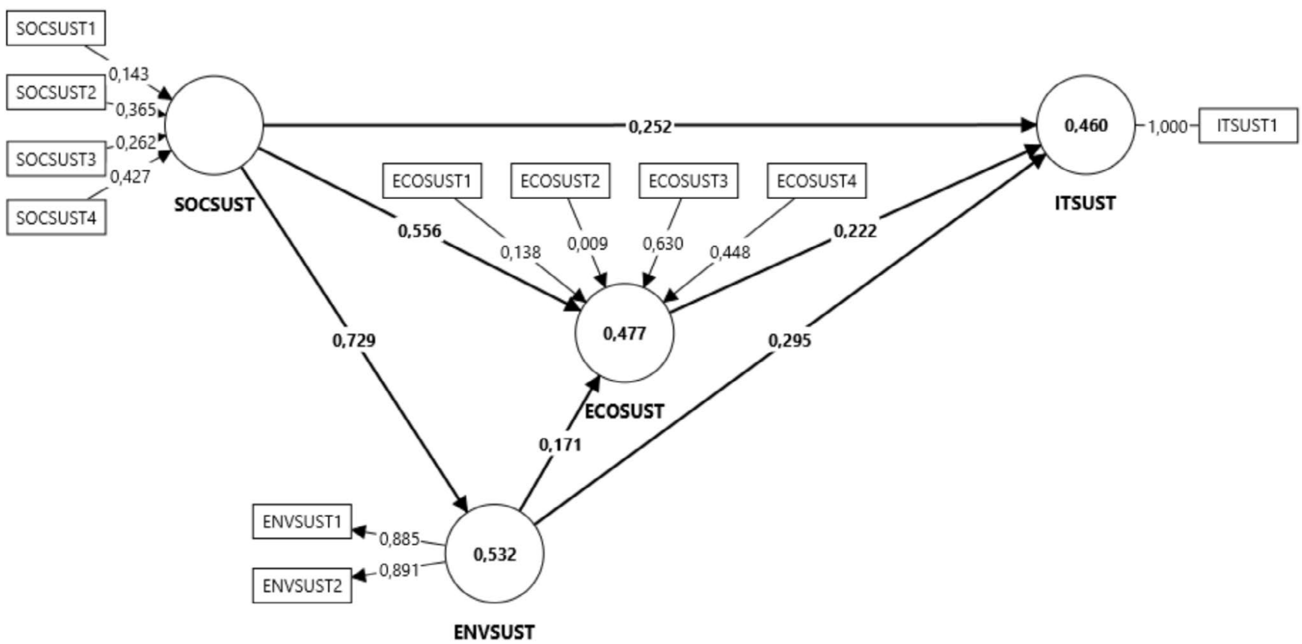

FIGURE 2 | Model results. *Source:* Own elaboration.

The total effects of the antecedent constructs on the final ITSUST construct are visually interpreted using the importance-performance map (IPMA), which is displayed in Figure 3. Importance is determined by the total effect of a construct on ITSUST, while performance represents the latent variable's average score on a 0 to 100 scale (Ringle and Sarstedt 2016). In our analysis, SOCSUST shows the greatest importance for ITSUST. Specifically, a one-unit increase in SOCSUST's performance (from 76.170 to 77.170) boosts ITSUST's performance by 0.618 points, moving it from 68.889 to 69.507. Following SOCSUST, ENVSUST is the next most influential variable, and finally, ECOSUST.

The next step is to analyze the coefficient of determination (R^2) for each endogenous (dependent) construct in the model. The R^2 represents the amount of variance of a dependent construct that is explained by its predicted constructs in the model. In exploratory studies, a higher R^2 is generally preferable, as the emphasis is on prediction. Hair et al. (2019) suggest values of 0.25, 0.50, and 0.75 as indicators of weak, moderate, and substantial explanatory power, respectively. However, in an exploratory context, even lower values may be interesting if the model is opening up new lines of research. In Table 6, the coefficient of determination (R^2) outlines the explained variance of the latent dependent variables, showing how much of this variance is accounted for by each preceding construct. It can be seen that the SOCSUST variable largely accounts for the variance in ECOSUST. Conversely, the variance in ITSUST is explained in a broadly similar extent by the three analyzed components—social, economic, and environmental—though the environmental component is the most influential, with the economic component having the least impact.

Finally, it was considered that there might be divergent perceptions among respondents contingent on their age and educational background. To investigate this, a dummy variable for age was constructed, coding younger individuals as 0 and older individuals as 1. This yielded 201 and 204 observations, respectively.

TABLE 5 | Valuation of the structural model.

Panel A. Direct effects	Path	CI 2.5%	CI 97.5%	*p*	f^2	VIF
ECOSUST➔ITSUST	0.222	0.099	0.332	0.000	0.048	1.912
SOCSUST➔ITSUST	0.252	0.111	0.391	0.000	0.043	2.727
SOCSUST➔ECOSUST	0.556	0.427	0.667	0.000	0.276	2.137
SOCSUST➔ENVSUST	0.729	0.659	0.782	0.000	1.137	1.000
ENVSUST➔ITSUST	0.295	0.167	0.443	0.000	0.073	2.193
ENVSUST➔ECOSUST	0.171	0.044	0.298	0.008	0.026	2.137

Panel B. Indirect effects	Effect	CI 2.5%	CI 97.5%	*p*
SOCSUST➔ECOSUST➔ITSUST	0.123	0.058	0.191	0.000
SOCSUST➔ENVSUST➔ITSUST	0.215	0.121	0.326	0.000
SOCSUST➔ENVSUST➔ECOSUST	0.125	0.032	0.219	0.008
ENVSUST➔ECOSUST➔ITSUST	0.038	0.009	0.084	0.043
SOCSUST➔ENVSUST➔ECOSUST➔ITSUST	0.028	0.007	0.062	0.044

Panel C. Total effects	Effect	CI 2.5%	CI 97.5%	*p*
ECOSUST➔ITSUST	0.222	0.099	0.332	0.000
SOCSUST➔ITSUST	0.618	0.533	0.683	0.000
SOCSUST➔ECOSUST	0.681	0.601	0.738	0.000
SOCSUST➔ENVSUST	0.729	0.659	0.782	0.000
ENVSUST➔ITSUST	0.333	0.202	0.475	0.000
ENVSUST➔ECOSUST	0.171	0.044	0.298	0.008

Source: Own elaboration.

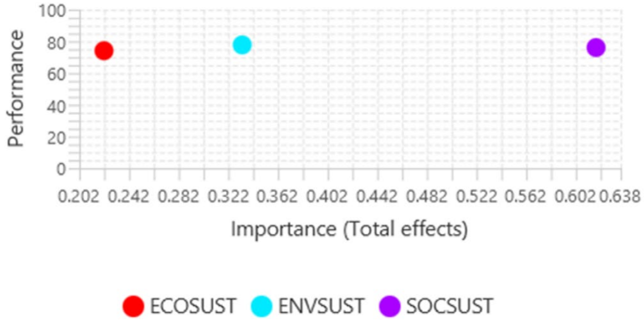

FIGURE 3 | Importance-performance map for the ITSUST construct. *Source:* Own elaboration.

Similarly, a dichotomous variable was created for educational attainment, assigning a value of 0 to participants without a university education and 1 to those with one, resulting in 146 and 259 observations, respectively.

To ascertain whether significant differences existed between the established groups, Multi-Group Analyses (MGA) were applied in the cases of both age and education. This necessitated prior Measurement Invariance of Composite Models (MICOM) analyses to confirm that any observed variations in model estimations across groups, should they arise, were not attributable to differing interpretations of the latent variables between those groups.

The MICOM analysis comprises three sequential steps. The initial step establishes configural invariance, signifying that the constructs are specified identically across both groups. This configural invariance is considered guaranteed when employing the same indicators, processing the data uniformly, and utilizing an identically configured algorithm. Consequently, the subsequent two steps were executed using a two-tailed permutation test with 5000 permutations and a significance level of 0.05. The second step tests composite invariance, a condition met when the original correlation is greater than or equal to the 5th percentile of the empirical distribution, and all *p* values exceed 0.05. This ensures that the composite is formed equivalently across the two analyzed groups and that at least partial measurement invariance is present, thereby validating the application of multi-group analyses. Table 7 presents the results obtained from Step 2 for both age (Panel A) and education (Panel B).

TABLE 6 | Variance decomposition.

Dependent variable	R^2	Preceding variable	Path	Correlation	Explained variance
ENVSUST	0.532	SOCSUST	0.729	0.729	0.532
ECOSUST	0.477	SOCSUST	0.556	0.681	0.378
		ENVSUST	0.171	0.577	0.099
ITSUST	0.460	SOCSUST	0.252	0.618	0.156
		ECOSUST	0.222	0.563	0.125
		ENVSUST	0.295	0.607	0.179

Source: Own elaboration.

TABLE 7 | MICOM analysis: Step 2.

Panel A. Age			
Construct	**Original correlation**	**5%**	***p***
ECOSUST	0.998	0.940	0.963
ENVSUST	0.999	0.997	0.350
SOCSUST	0.998	0.961	0.958
ITSUST	1.000	1.000	0.233
Panel B. Education			
Construct	**Original correlation**	**5%**	***p***
ECOSUST	0.998	0.934	0.708
ENVSUST	1.000	0.997	0.738
SOCSUST	0.987	0.956	0.521
ITSUST	1.000	1.000	0.388

Source: Own elaboration.

The final step, Step 3, verifies the equality of composite means and variances. This would indicate complete measurement invariance, a condition that requires sample differences to fall within the confidence interval and all *p* values to be greater than 0.05. Table 8 presents these results for age (Panel A) and education (Panel B).

It is observed that although Step 3 is not fully met for the mean of the SOCSUST variable in education, the successful verification of Step 2 satisfies the conditions for applying MGA analysis (Henseler et al. 2009). This analysis evaluates whether the differences between the path coefficients of the obtained samples are significantly different, for both age and education. Table 9 presents the results from both permutation and Henseler's MGA, reporting findings from bootstrapping, the parametric test, and the Welch-Satterthwaite test. Path coefficients are considered different at a 5% significance level when *p* values are either less than 0.05 or greater than 0.95.

Our findings indicate no discernible differences in the perception of industrial tourism sustainability between younger and older individuals. However, we did identify differences based on educational attainment regarding how ECOSUST contributes to the overall concept of ITSUST, with a slightly greater perceived influence among the university-educated population. Furthermore, depending on the statistical method applied, a greater perceived influence of ENVSUST on ITSUST by the university-educated population was also observed (permutation and parametric test).

5 | Discussion

This study set out to assess tourists' perceptions of the sustainability of industrial tourism and its dimensions, using Sustainable Development Theory as a theoretical underpinning. This study has allowed for deepening the understanding of tourist perceptions on the sustainability of industrial tourism, addressing a dimension little explored in the academic literature: the demand perspective. The literature review has highlighted the scarcity of scientific contributions exploring the point of view of different stakeholders, such as the local resident or supply agents, and it has been explicitly suggested that future research should pay due attention to the study of tourists' perspectives (Moral-Moral and Fernández-Alles 2019; Soares et al. 2024). Understanding the perceptions of different tourism stakeholders, including visitors, is fundamental for sustainable tourism planning, management, and governance. Citizens, who enjoy spaces as visitors, have the potential to provide direct feedback on sustainability.

The findings of this study align significantly with the concept of sustainable communities by demonstrating how tourism perceptions of the sustainability of industrial tourism can foster synergies between different stakeholders. The relevance of social sustainability, both in its direct effect and its mediating role, underlines the need to actively integrate local communities in the design and management of tourism experiences, thus promoting more inclusive, resilient, and culturally enriching environments, in line with previous studies (Mtapuri et al. 2022; Yi et al. 2023). This integration not only strengthens the link between visitors and residents but also facilitates consensus building among stakeholders—such as public managers, tourism businesses, and citizens—around development models that balance economic benefits, environmental conservation, and social cohesion (Mzembe et al. 2023; Zada et al. 2025). In this sense, sustainable industrial tourism is presented as a strategic tool to promote more equitable and participatory territories, aligned with the principles of global sustainability and collaborative governance.

The methodology employed, based on SEM and specifically mentioning the advantages of PLS-SEM in perception studies

TABLE 8 | MICOM analysis: Step 3.

Panel A. Age					
	Construct	**Difference**	**CI 2.5%**	**CI 97.5%**	***p***
Mean	ECOSUST	−0.139	−0.198	0.194	0.163
	ENVSUST	−0.089	−0.193	0.189	0.365
	SOCSUST	0.052	−0.195	0.193	0.585
	ITSUST	−0.019	−0.193	0.193	0.867
Variance	ECOSUST	0.011	−0.296	0.305	0.941
	ENVSUST	0.026	−0.326	0.338	0.883
	SOCSUST	−0.035	−0.343	0.348	0.835
	ITSUST	−0.064	−0.300	0.302	0.688
Panel B. Education					
	Construct	**Difference**	**CI 2.5%**	**CI 97.5%**	***p***
Mean	ECOSUST	0.122	−0.202	0.200	0.234
	ENVSUST	0.068	−0.203	0.201	0.513
	SOCSUST	0.224	−0.211	0.194	0.033
	ITSUST	0.069	−0.200	0.200	0.493
Variance	ECOSUST	−0.077	−0.325	0.300	0.621
	ENVSUST	0.236	−0.357	0.333	0.191
	SOCSUST	−0.039	−0.380	0.353	0.841
	ITSUST	−0.093	−0.331	0.301	0.552

Source: Own elaboration.

with developing theories or complex relationships, is consistent with approaches used in other exploratory work in the field of tourism and perceptions (Valle and Assaker 2016; Ali et al. 2017; Soares et al. 2024). Through a PLS-SEM-based model, it has been empirically demonstrated that the three classical dimensions of sustainable development—economic, social, and environmental—significantly influence the overall perception of sustainability of industrial tourism. An outstanding contribution of this work is the validation of mediating relationships between the dimensions of sustainability, which provides a more complex and realistic view of how tourists integrate these concepts in their assessment of industrial tourism. In addition, the multi-group analysis reveals that, although there are no significant differences by age, there are nuances according to educational level, which could guide more effective communication and segmentation strategies.

One of the main difficulties in dealing with empirical work based on the sustainability paradigm is the application of the concept itself. In this paper, we have followed the proposal of Yu et al. (2000), who argue that sustainability—especially in its strong version—can only be assessed and promoted if it is translated into observable and negotiable indicators among actors. Their model, based on property rights over resources and adaptive innovation processes (what they call the "Schumpeterian process"), makes it possible to identify situations in which development not only avoids environmental degradation, but also generates simultaneous improvements in natural capital and productivity. This vision is especially useful in contexts such as industrial tourism, where the recovery of degraded spaces and their reconversion into tourism resources can represent an opportunity to transform negative externalities into shared benefits. The operationalization of the concept of sustainability, through specific dimensions and indicators, not only facilitates its empirical measurement but also allows guiding decision-making toward more inclusive, negotiated, and resilient development models.

The results confirm, in line with previous studies such as Moral-Moral and Fernández-Alles (2019), that environmental sustainability is the factor with the greatest explanatory weight in the general perception of sustainability, which reinforces the growing sensitivity of tourists to the ecological impacts of tourism. However, in contrast to other studies, social sustainability also emerges as a key component, not only because of its direct effect but also because of its mediating role in the relationships between the other dimensions, which is a novel contribution of this study. This finding underlines the importance of integrating local communities in the design and management of industrial tourism, promoting authentic and culturally enriching experiences. From an economic perspective, although its direct impact is more moderate, its relevance

TABLE 9 | MGA analysis.

Panel A. Age

Path	Group 0	Group 1	Difference	Permutation *p* value	Bootstrap *p* value	Parametric test, *p* value	Welch–Satterthwaite test *p* value
ECOSUST➔ITSUST	0.156	0.312	−0.157	0.189	0.182	0.180	0.180
ENVSUST➔ECOSUST	0.091	0.250	−0.159	0.217	0.221	0.218	0.219
ENVSUST➔ITSUST	0.336	0.233	0.103	0.491	0.457	0.455	0.456
SOCSUST➔ECOSUST	0.576	0.536	0.040	0.751	0.728	0.737	0.737
SOCSUST➔ENVSUST	0.692	0.772	−0.081	0.183	0.165	0.167	0.169
SOCSUST➔ITSUST	0.297	0.205	0.092	0.544	0.523	0.527	0.528

Panel B. Education

Path	Group 0	Group 1	Difference	Permutation *p* value	Bootstrap *p* value	Parametric test *p* value	Welch–Satterthwaite test *p* value
ECOSUST➔ITSUST	0.215	0.218	−0.003	0.981	0.983	0.981	0.979
ENVSUST➔ECOSUST	0.232	0.113	0.119	0.385	0.381	0.372	0.383
ENVSUST➔ITSUST	0.282	0.301	−0.019	0.912	0.897	0.900	0.894
SOCSUST➔ECOSUST	0.483	0.626	−0.142	0.270	0.278	0.267	0.279
SOCSUST➔ENVSUST	0.720	0.741	−0.021	0.736	0.771	0.733	0.744
SOCSUST➔ITSUST	0.310	0.227	0.083	0.593	0.578	0.592	0.576

Source: Own elaboration.

is manifested in mediated relationships, especially in combination with the social and environmental dimensions. This suggests that the economic benefits perceived by tourists are conditioned by the perception of a fair, inclusive, and environmentally friendly tourism model, as also highlighted in other works such as (Pulido-Fernández et al. 2015; Baena and Cerviño 2024).

6 | Conclusions

The aim of this work was to assess tourists' perceptions of the sustainability of industrial tourism and its component dimensions. The results have made it possible to answer the research questions posed and to verify all the initial hypotheses. The main contributions of this work are, firstly, that they provide empirical evidence on the theoretical approaches of the triple bottom line theory. Second, to the best of the authors' knowledge, it is the first time that both direct and moderating effects between its three domains and sustainability have been empirically tested.

In practical terms, the results offer relevant implications for tourism managers, public decision-makers, and companies in the sector. Industrial tourism, by combining education, culture, sustainability, and local economic development, is positioned as a viable alternative to diversify the tourist offer, reduce seasonality, and revitalize territories with industrial heritage. To maximize its potential, it is essential to design tourism products that integrate sustainability values in a cross-cutting manner, encouraging citizen participation, heritage conservation, and responsible innovation.

It is recommended that future research broaden the focus to other stakeholders, such as residents, entrepreneurs, or local authorities, and that comparative studies should be carried out across different geographical and cultural contexts. It would also be valuable to explore longitudinally how perceptions of sustainability in industrial tourism evolve as this segment consolidates.

Finally, the development of this work has not been without limitations. First, the size of the survey sample was constrained by the limited budget available. Second, the use of a web platform to collect the information meant that the sample included a very high percentage of younger people with a higher level of education. Finally, the incipient nature of industrial tourism in Spain means that a large percentage of the population is unaware of this type of tourism, even if they do practice it or have practiced it at some point.

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Conflicts of Interest

The authors declare no conflicts of interest.

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