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Eco-innovation in the hotel sector in Nuevo Nayarit, Mexico. A sustainable perspective

Eco-innovación en el sector hotelero de Nuevo Nayarit, México. Una perspectiva sustentable

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Abstract: the study of eco-innovation is a field of growing relevance in the scientific field, has been the subject of exhaustive analyses from different theoretical and methodological perspectives. The diversity of these approaches demonstrates the vast and complex nature of the construct in an attempt to understand its effects and contributions to the complex environmental problems faced by tourist destinations. In this sense, this research aims to analyse the influence of eco-innovation on the sustainability of the hotel sector in Nuevo Nayarit, Mexico. To achieve this, a quantitative, cross-sectional, and explanatory methodology was used, with the participation of 226 hotel workers in a convenience sample. A partial least squares structural equation model (PLS-SEM) was used to test the research hypothesis. The results show that eco-innovation has a significant and positive influence on the sustainability of the sector, where good operating practices and environmental management are the most explanatory and predictive aspects. This work contributes to the knowledge of tourism in its relationship with environmental sciences and business management, showing the reality of an international tourist destination on an emerging issue. As future lines of research, it is proposed that the study be adjusted to a larger sample of tourists.

Keywords: eco-innovation, sustainability, hospitality, PLS-SEM, tourism, Nuevo Nayarit, tourism sector, environmental management.

Resumen: el estudio de la eco-innovación es un campo de relevancia ascendente en el ámbito científico, y ha sido objeto de análisis exhaustivos desde distintas perspectivas teóricas y metodológicas. La diversidad de estos enfoques evidencia la amplia y compleja naturaleza del constructo en un intento de comprender sus efectos y contribuciones ante las problemáticas ambientales complejas con las que se enfrentan los destinos turísticos. En ese sentido, el objetivo de esta investigación es analizar la influencia de la eco-innovación sobre la sustentabilidad del sector hotelero de Nuevo Nayarit, México. Para lograrlo se utilizó una metodología con enfoque cuantitativo, de corte transversal y de alcance explicativo, con una participación de 226 trabajadores de la hotelería en una muestra por conveniencia. Para probar la hipótesis de investigación se utilizó un modelo de ecuaciones estructurales por mínimos cuadrados parciales (PLS-SEM). Los resultados comprueban que la eco-innovación tiene una influencia significativa y positiva sobre la sustentabilidad del sector, donde las buenas prácticas de operación junto a la gestión ambiental son los aspectos de mayor poder explicativo y predictivo. Este trabajo contribuye al conocimiento del turismo en su relación con las ciencias ambientales y la gestión empresarial, evidenciando la realidad en un destino turístico internacional sobre un tema de carácter emergente. Como futuras líneas de investigación se propone ajustar el estudio a una muestra mayor y considerar aspectos específicos de la política turística y ambiental.

Palabras clave: Eco-innovación, sustentabilidad, hotelería, PLS-SEM, turismo, Nuevo Nayarit, sector turístico, gestión ambiental.

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Introduction

The hotel business sector has faced increasing environmental challenges in recent years, where eco-innovation is seen as an organizational strategy that helps reduce negative ecological effects generated by the provision of its services, especially because various hotel chains have been publicly exposed for contributing to environmental degradation when carrying out their investment projects in international destinations (CEPAL, 2017; Hernández *et al*., 2018; Vargas, 2015). Such is the case of Nuevo Nayarit, a Mexican tourist development, which has been noted for having a disproportionate growth in tourism offer, affecting the natural environment to a turning point, impacting terrestrial and marine biodiversity, with a negative effect from the growth of hotel infrastructure, transforming the landscape and degrading the beaches (Massé *et al*., 2018).

In this sense, eco-innovation has recently become a key element to strengthen the sustainability of companies (Martínez-Rubio *et al*., 2021) and destinations (Corona and Zárraga, 2014). Existing research exposes the important role of eco-innovation in significantly improving sustainability activities (Maldonado *et al*., 2020; Huang *et al*., 2016), such as social performance, green management practices, training and staff awareness (Dangelico and Pujari, 2010; Hermundsdottir and Aspelund, 2021; Hermundsdottir and Aspelund, 2022; Larbi-Siaw *et al*., 2022); generating more responsible consumption, producing greener goods and services (Maldonado*et al*.,2020). However, few studies have addressed the relationship between both variables in tourism, further evidencing the limited literature around this binomial of eco-innovation and sectoral sustainability (Aboelmaged, 2018; Días *et al*., 2021; Wang *et al*., 2020).

The importance of eco-innovation in the hotel industry stands out from a strategic orientation, which contributes to improving the competitiveness and sustainability of companies (Velázquez, 2019), providing broader and structural measures for the management of green businesses such as the design and implementation of environmental policies, as well as monitoring, auditing and certification activities in the field of ecology (Dang and Wang, 2022). Similarly, eco-innovation is an alternative to maintain, improve and renew the quality of goods, services and processes, defining production patterns with added value by contributing directly to sustainability (Bossink, 2012).

In order to remain or improve their market position, companies in tourism develop and promote innovation processes and activities in favor of environmental sustainability (Kuo *et al*., 2022; Reyes-Santiago *et al*., 2109). Hotels implement eco-innovations due to environmental regulations and social pressures, being these some of their main drivers (Magadán-Díaz *et al*., 2019; Velázquez *et al*., 2016). Part of the research on eco-innovation in tourism has focused on explaining the existing relationship with stakeholders, either as a market stimulus or as a possibility to meet their needs (Segarra-Oña *et al*., 2018; Weng *et al*., 2015. Its influence on the environmental performance of companies has been analyzed (Aboelmaged, 2018; Magadan and Rivas, 2018), as well as the promotion of collaboration and co-production in favor of a transition towards more sustainable practices (Buijtendijk *et al*., 2018).

Researchers have identified some gaps in recent literature, where it is observed that eco-innovation is still incipient in the hotel industry on its way to sustainability, due to several economic, commercial and regulatory factors that frame the sector (Olivera-Menezes and kindl-da Cunha, 2016). There are works around stakeholders, however, an analysis is still needed from and to the sector staff (Munawar *et al*., 2022) and, local communities (Sánchez and Vargas, 2015). In addition, other topics of growing interest are certifications (Cántaro-Márquez *et al*., 2023) and business ethics, especially in destinations of mass tourism (Niñerola *et al*., 2019).

For this reason, the aim of the research is to analyze the influence of eco-innovation on the sustainability of the hotel sector in Nuevo Nayarit, Mexico. The paper is structured in five sections. First, the literature review that supports the research hypothesis. Subsequently, the methodology developed is specified, highlighting as central techniques the survey and statistics for data processing. In a third section, the results of the study that allow for discussion are shown.

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Finally, conclusions, limitations and future lines of research are presented.

Eco-innovation

Eco-innovation in tourism represents an opportunity for both the companies that implement it, and the community (Fernández *et al*., 2017), since it contributes to the reduction of negative environmental impact, at the same time it decreases operating costs, attends to the scarcity of natural resources, prevents pollution and mitigates ecological risks (Kuo *et al*., 2022). Hence, eco-innovation is conceived as a capacity where the innovation-nature binomial integrates for developing novel ecological solutions using elements and strategies that intervene to overcome the negative externalities generated by the operation of the tourism industry (Del Rio *et al*., 2010; ISO, 2015; Rovira *et al*., 2017).

One of the strongest supports that eco-innovation has is technology, referred to the set of methods, processes and tools designed to provide solutions that reduce environmental effects (Fressoli *et al*., 2015). Nowadays, environmental technologies are increasing, for example, renewable energies and systems that allow the recovery of materials and waste that are reused or transformed into new products (Olivera-Menezes and kindl-da Cunha, 2016). Other technology includes capture and oxidation that reduce pollutant emissions, thereby improving air quality (Bell and Ruhanen, 2016; Wang *et al*., 2020).

Authors such as Velázquez *et al*. (2016) state that technology allows to fulfill the purposes of eco-innovation within the tourist business context. On the one hand, by obtaining a new or improved good, service or process and, on the other hand, by granting a certain degree of business sustainability to the organization. In addition, green technology provides benefits such as cost savings, attention to environmental policies and compliance with regulatory and certification standards (Martínez-Rubio *et al*., 2021).

Another factor of eco-innovation is environmental management, which, from the organizational field, is conceptualized as the steps or actions of a company to control the use of resources and assess their environmental impacts (Vargas, 2015). This implies analyzing the operating conditions and the risks of ecological damage, allowing an adequate decision making that improves management and strengthens their legal responsibility (Ramírez *et al*., 2015). Environmental management executes a whole system of processes and mechanisms that impact the construction of a more sustainable tourist activity (Hall, 2019). Even authors such as Longoni *et al*. (2018) and Segarra-Oña *et al*. (2018), indicate that its multidimensional character is a source of solutions that favor different areas and organizational levels, generating sustainability of hotel companies as a whole.

In the tourism business area, instruments and actions are required to ensure the environmental quality of eco-innovative practices (Hernández *et al*., 2017). Certifications and audits fulfill this function of qualifying and quantifying ecological performance (Rosales-Lobo and Morillo-Moreno, 2018). This type of accreditation changes the behavior of workers, causing them to use natural resources more efficiently (Martínez-Rubio *et al*., 2021). In addition, they provide standards to provide security to guests and staff working in hotel establishments, since there is a guarantee that operational activities are executed correctly; their scope is so wide, that they affect the quality of life of communities as an example of environmental responsibility (Rosales-Lobo and Morillo-Moreno, 2018).

Unfortunately, the integration of environmental certifications and programs in the hotel industry is limited by the lack of interest and insufficient budget, being some of the barriers to their implementation (Vargas, 2015), since these are voluntary initiatives that are better perceived by large hotel chains, leaving small companies in the sector at a disadvantage. The truth is that international standardization in ecological matters establishes complete processes and lines of action to implement good operating practices. Therefore, environmental groups or committees are required to operate logistics aligned with business policy and law enforcement (Oliver-Solà *et al*., 2017). Thus, behind eco-innovation there are significant determinants for the hotel busi-

ness context, which go beyond achieving only an economic performance (Segarra *et al*., 2018).

Sectoral sustainability

Faced with intense global tourism competition to attract greater demand to destinations, companies in the sector seek new ways for differentiating and positioning in the market, leading them to align themselves with sustainability strategies (Sánchez and Vargas, 2015). It is important to know that the organizations have an action for environmental preservation and improvement of the quality of life of their internal and external agents, promoting social welfare (Hernández *et al*., 2021; Rosales-Lobo and Morillo-Moreno, 2018).

Sectoral sustainability refers to the ability of an economic sector to meet its needs and those of its stakeholders through actions that reflect economic, environmental and social responsibility, using activities and policies that allow its development (Camacho *et al*., 2013).

When managing the sector in a sustainable way, business models aligned with economic profitability are visualized, but with a humanistic sense that promotes organizational practices oriented to equity, transparency and equality (Sehnem *et al*., 2019; Yong *et al*., 2020). The principles of sustainability promote business actions in correspondence with community participation, employment generation, job security and compliance with obligations towards public administration (Chatterji *et al*., 2016), which maintain a significant relationship with innovation, environmental commitment, and diversity management, reflected in the daily actions of employees (Gándara *et al*., 2012; Sánchez and Vargas, 2015; Yong *et al*., 2020; Weaver, 2019).

Adopting a sustainable approach in the sector encourages the consumption of environmentally friendly goods and services (Yong *et al*., 2020). Similarly, information is given to tourists and the public to transform behavioral patterns and modify wrong habits of individuals (Carrillo, 2017; O'Ryan, 2017). Indeed, supporting sectoral sustainability includes guidelines that define the operation and management of actions from a responsible behavior on the part of the organization, and good operating practices involve acting ethically in all areas of the organization (Moreno and Álvarez, 2022). This involves fair and equitable treatment of workers, customers, suppliers and other stakeholders (ISO, 2010).

Transparency is another key aspect where the company commits to be clear in its operations, communicating in a timely and accessible way relevant information on its performance, practices and decisions (Chaudhary and Kumar, 2022). Likewise, the adoption of measures to prevent any form of discrimination in all interactions and decisions related to the sector includes compliance with business obligations, covering aspects such as environmental protection, safety of workers and tourists, payment of taxes and any other relevant legal obligations (Chaudhary and Kumar, 2022).

In the framework of labor practices, tourism companies adopt comprehensive and strategic measures, which involve the implementation of welfare programs for the human development of their employees (Munawar *et al*., 2022). This promotes their professional growth by ensuring fair working conditions, promoting safety and health in the workplace, along with standards to prevent accidents and occupational diseases, promoting a safe working environment (ISO, 2010).

Finally, eco-innovation under the current context takes on unquestionable importance, since it starts from the need to exert significant changes in favor of environmental balance, being essential to initiate a transformation based on the components of sustainability, which will generate a momentum to adopt practices that go far beyond simple business interests (Nill and Kemp, 2009; OECD, 2009; Lesakova, 2019). In summary, the research hypothesis proposed is:

> H1: Eco-innovation has a significant and positive influence on the sustainability of the hotel sector in Nuevo Nayarit, Mexico.

Materials and methods

The research was structured under the quantitative approach and the deductive hypothetical thinking method. The design is non-experimental

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and cross-sectional, since the variables used were not manipulated and the data registration was performed at a unique time, presenting the phenomenon as it occurs in that space. It also has an explanatory scope when seeking to answer how eco-innovation influences the sustainability of the hotel sector.

Sample

It was a non-probabilistic sample, whose selection technique was by convenience. It was composed of 226 workers of 18 hotels, mostly women (65.9%) in an age range between 26 and 40 years (71.35%) single and in cohabitation (82.5%), with a bachelor's degree (81.85%). Most representative place of birth is Mexico City (47.34%), however, the place of residence of respondents has more representativeness in Banderas Bay (66.81%). In terms of seniority in the workplace, it is between 1 and 5 years (58.40%), with the most active management workers (42.03%) belonging to hotels that are mostly five stars (41.59%) (Table 1).

Table 1
Sociodemographic data of the sample

Variable	Value	Frequency (f)	Percentage (%)	Variable	Value	Frequency (f)	Percentage (%)
Gender	Man	77	34.08	Place of residence	Puerto Vallarta	24	10.61
	Female	149	65.92		Campeche	38	16.81
Age	20 to 25 years	14	6.19		Bahía de banderas	151	66,83
	26 to 30 years	66	29.23		Other	13	5.75
	31 to 35 years	28	12.38	Level of education	High school	28	12.38
	36 to 40 years	67	29.64		Bachelor	185	81,85
	41 to 45 years	39	17.25		Graduate	13	5.77
	46 to 50 years	12	5.31	Seniority	Less than 1 year	14	6.19
Marital status	Single	81	35.84	Seniority	1-5 years	132	58.40
	Married	65	28.76		6 to 10 years	27	11.94
	Divorced	12	5.32		11 to 15 years	53	23.47
	Cohabiting	68	30.08	Position Level	Operating control	95	42,04
Place of birth	Tampico	25	11.09		Middle Control	66	29.20
	Mexico City	107	47.34		Steering control	65	28.76
	Guadalajara	27	11.94	Hotel Class (stars)	Three	37	16.37
	Veracruz	26	11.50		Four	52	23.22
	Colima	27	11.94		Five	94	41.59
	Tepic	14	6.19		Great tourism	14	6.19
					Other	29	12.63

Instrument design and data collection

The technique for data collection was the self-administered survey. The instrument was a questionnaire designed from the review of the scientific literature and the analysis of expert judgment. Once the pilot test was applied with 35 observations, the final items that measure the variables of eco-innovation and sectoral sustainability were determined. Thus, the instrument was composed of two sections, the first where the 25 items were evaluated (table 2) through a Likert-type scale of six points, whose values range from (1) to (6) totally in agreement, res-

pectively. The second section was a technical file that allowed to obtain the sociodemographic data of the workers and identify the hotel to which they belong.

The questionnaire was captured in digital format (online) on the Google Forms platform, where it was sufficient to have the link to the questionnaire and an electronic device with internet connection. It was carried out during the first half of 2021, for this, the authorization of the managers was requested, guaranteeing the confidentiality, anonymity and good use of the information obtained.

Table 2
Operationalization of study variables

Variable	Dimension	Authors	Unit	Code	Item
Eco-	Tecnologías ambientales (TA)	Bell y Ruhanen, (2016); Fressoli *et al.* (2015); Martínez-Rubio *et al.* (2021); Velázquez *et al.* (2016); Wang *et al.* (2020)	Energy Saving	ET_01	Adopts eco-technologies for energy saving.
			Solid waste recycling	ET_02	Uses technologies for solid waste recycling (e.g. plastic, cardboard, glass, metal or other).
			Reduction of gas emissions	ET_03	Employs technology to reduce the emission of toxic gases into the atmosphere.
Eco-Innovation (Eco-I)	Environmental management (EM)	Vargas, (2015); Ramírez *et al.* (2015); Hall, (2019); Longoni *et al.* (2018); Segarra-Oña *et al.* (2018)	Ecological processes of operation	EM_01	Maintains processes that use environmentally friendly inputs avoiding pollution.
			Environmental Impact control	EM_02	Introduces mechanisms to monitor or control its environmental impact.
			Environmental impact assessment	EM_03	Has methods for assessing its environmental impact.
			Environmental risk analysis	EM_04	Develops mechanisms for environmental risk analysis.
Sectoral sustainability (Su-S)	Participation in Community Development (PCD)	Sánchez and Vargas (2015); (Chatterji *et al.*, 2016); Hernández *et al.* (2021); ISO (2010); Rosales-Lobo and Morillo-Moreno (2018); Camacho *et al.* (2013); Sehnem *et al.* (2019); Yong *et al.* (2020)	Improving quality of life	PCD_1	Improves the quality of life of the local community.
			Community integration	PCD_02	Promotes the integration of the local community in tourism activities.
			Job Opportunities	PCD_03	Provides job opportunities for the local community.
			Links with the community	PCD_04	Links with community actors for its development.

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Variable	Dimension	Authors	Unit	Code	Item
Sectoral sustainability (Su-S)	Promotion of Responsible Consumption (PRC)	Carrillo (2017); Moreno and Álvarez (2022); O'Ryan (2017); Yong *et al.* (2020)	Environmental Campaigns	PRC_01	Carries out environmental campaigns (for example: reforestation, recycling, care of natural resources).
			Use of environmental products	PRC_02	Promotes the use of environmentally friendly products and/or services (e.g. biodegradable or organic products).
			Advertising	PRC_03	Informs about the consumption of products and services responsible for the environment.
	Good Operating Practices (GOP)	Moreno and Álvarez, 2022; (Chaudhary and Kumar, 2022),	Ethics	GOP_01	It is guided by ethical behaviors.
			Transparency	GOP_02	Develops transparently (they do not cover up facts).
			Non-discrimination	GOP_03	Maintains "non-discrimination" policies.
			Compliance with legal obligations	GOP_04	Fulfills its obligations under the laws and other legal instruments.
	Working Practices (WP)	Lesakova (2019). Munawar *et al.* (2022); Nill and Kemp (2009)	Social security	WP_01	Provides social security for its workers.
			Safety and hygiene	WP_02	Maintains conditions of safety and occupational health.
			Human Development	WP_03	Promotes activities for the development of talent, skills and competences of workers.

Processing of data

To analyze the influence of eco-innovation on sectoral sustainability as proposed in the hypothesis, structural equation modeling by partial least squares (PLS-SEM) was used with the support of the software Smart PLS. The starting point is the approach of a hierarchical component model (HCM) or second-order reflective-reflective model, where the measurement model is integrated by factors that manifests a dimension, which in turn reflects a variable (Hair *et al*., 2017). In this sense, the procedure followed was carried out in three phases. First, the measurement model was evaluated where the internal consistency and validity of the constructs were verified, the convergence was confirmed through the factorial load and the average variance extracted (AVE), while for discriminant validity the square root of the AVE and correlations were compared (Henseler *et al*., 2015). In accordance with the recommendations of Hair *et al*. (2017), collinearity was assessed using the Variance Inflation Factor (VIF).

As a next step, observing that the reflective model fulfilled the validity and reliability, the evaluation of the structural model was carried out where the determination coefficients (R^2) were analyzed as well as the size and significance of the path coefficients for each dimension, the size of the effects (f^2) and the predictive relevance (Q^2), based on the methodology proposed by Henseler *et al*. (2015)

The third phase consisted in the interpretation of the model. Additionally, a descriptive analysis was performed considering the means and standard deviations, and a correlations analysis using the Pearson coefficient for normal data, according to the values of asymmetry and kurtosis ±2 (Field, 2018).

Results

Measurement Model

The reliability of the instrument was demonstrated by Cronbach's alpha (α), rho_A and composite reliability (pj) tests; the values satisfactorily meet the established criteria being higher than 0.700 (Table 3) (Nunnally, 1980; George and Mallery, 2003; Hair *et al*., 2009; Salas and Escurra, 2014). Also, convergent and discriminant validity is fulfilled, having values above 0.500 for average extracted variance (AVE), the same happens with the square root, since in all cases the correlations between the dimensions of each construct were exceeded (Pérez-Cruz, 2023) (table 3).

Table 3
Reliability, convergent and discriminating validity

Variable	Dimension	Cronbach alpha (α)	rho_A	Composite	AVE	TA	GA	PyNA	PDC	PCR	BPO	PL
Eco-I	ET	ET	EM	PyNA	PCD	PRC	GOP	WP				
	EM	0.718	0.730	0.825	0.543	0.714	0.737*					
	PyNA	0.835	0.835	0.890	0.668	0.680	0.753	0.817*				
Su-S	PCD	0.809	0.810	0.875	0.636	0.736	0.637	0.598	0.798*			
	PRC	0.793	0.799	0.878	0.707	0.714	0.672	0.661	0.766	0.841*		
	GOP	0.831	0.833	0.888	0.664	0.704	0.618	0.622	0.770	0.738	0.815*	
	WP	0.762	0.764	0.863	0.679	0.738	0.673	0.604	0.763	0.745	0.792	0.824*

Note. * square root of the AVE.

Table 4 shows the cross factor loads per item, which have a value of at least 0.700; however, for item EM_04 that is below this value it was preserved because it is very close to the recommended estimate and because of its theoretical relevance for the study (table 4) (Hair *et al*., 2017). In addition, the variance inflation factor (VIF) was revised, verifying that there are no multicollinearity problems between the items.

Table 4
External Factorial Loads and VIF

Item	VIF	ET	EM	PyNA	PCD	PRC	GOP	WP
ET_01	1.711	0.849						
ET_02	1.596	0.801						
ET_03	1.282	0.768						
EM_01	1.979		0.761					
EM_02	1.306		0.712					
EM_03	1.544		0.808					
EM_04	1.416		0.658					
PyNA_01	1.739			0.804				
PyNA_02	1.855			0.824				
PyNA_03	1.889			0.827				
PyNA_04	1.734			0.815				

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Item	VIF	ET	EM	PyNA	PCD	PRC	GOP	WP
PCD_1	1.952				0.799			
PCD_02	1.613				0.784			
PCD_03	2.236				0.820			
PCD_04	2.059				0.787			
PRC_01	1.659					0.831		
PRC_02	1.653					0.855		
PRC_03	1.725					0.835		
GOP_01	1.644						0.786	
GOP_02	2.061						0.854	
GOP_03	2.356						0.805	
GOP_04	2.148						0.812	
WP_01	2.026							0.794
WP_02	1.787							0.865
WP_03	1.572							0.811

Structural Model

Regarding the degree of fit between the model and the data, the bootstrapping re-sampling technique was used with a simulation of 5000 cases. As seen on Table 5, the values of t and p for each of the relationships between items and constructs satisfactorily meet the criteria $t \geq 1.96$ and $p<0.001$. R^2 values are greater than 0.100 as recommended to guarantee an important predictive explanation model. The effect sizes (f^2) are large when they are greater than 0.350 and it shows a great predictive relevance having a value Q^2 to 0.100.

The goodness of fit of the model was acceptable to obtain 0.080 in the standardized residual mean square root (SRMR.), according to the complexity of the model and sample size for this study, where the variables are still at an exploratory level (Simms *et al*., 2002).

Figure 1 shows that the eco-innovation variable has a significant and strong influence on the sectoral sustainability variable ($\beta=0.809$; $f^2=1.891$; $p<0.001$), where the predictive capacity is high ($R^2=0.654$; $Q^2=0.355$) which supports the research hypothesis (H_1).

Table 5
Coefficient Model

Dimensions	Path Coefficient	Standard deviation	t-value	p-value	R^2	R^2aj	f^2	Q^2
ECO-I→SUS-S	0.809	0.034	23.499	0.000	0.654	0.653	1.891	0.355
ECO-I→ET	0.870	0.015	56.439	0.000	0.757	0.756	3.121	0.484
ECO-I→EM	0.911	0.014	65.262	0.000	0.829	0.829	4.862	0.444
ECO-I→PyNA	0.917	0.009	96.728	0.000	0.841	0.840	5.284	0.556
SUS-S→PCD	0.915	0.012	78.449	0.000	0.837	0.837	5.151	0.527
SUS-S→PRC	0.889	0.015	61.154	0.000	0.790	0.789	3.751	0.549
SUS-S→GOP	0.918	0.014	66.407	0.000	0.843	0.842	5.358	0.554
SUS-S→WP	0.903	0.014	66.246	0.000	0.815	0.814	4.405	0.548

Figure 1
Influence of eco-innovation on sectoral sustainability

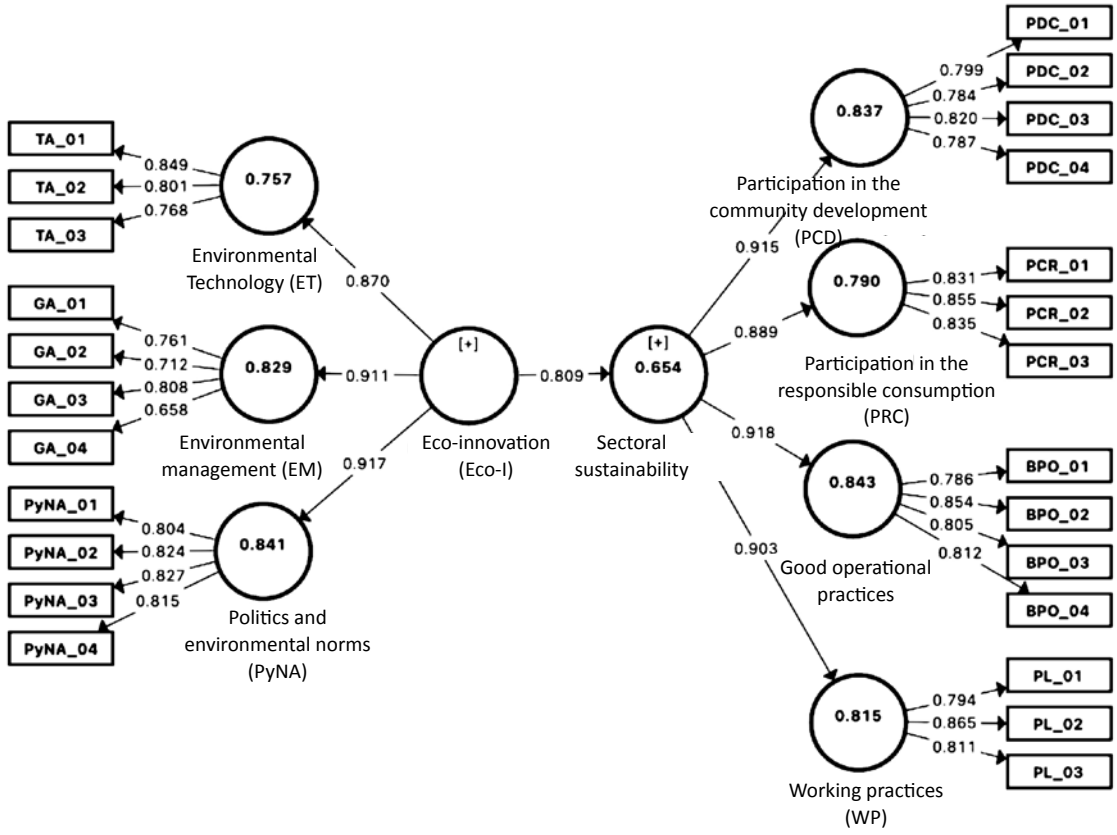

Table 7 shows that hotel companies are adopting eco-innovation and sectoral sustainability, although not enough, since the dimensions have been assessed as low positive ($\bar{x}$=4,187; σ=1.496 a $\bar{x}$=4,626; σ=1.462). When visualizing the estimation of items (table 6), environmental technology for solid waste recycling were the best evaluated ($\bar{x}$=4,491, σ=1.772), the same is true for the inclusion of ecological operating processes of the environmental management dimension ($\bar{x}$=4,496, σ=1.824); and in the case of environmental policy and standardization, some hotels are working with environmental committees ($\bar{x}$=4,350, σ=1.832).

Considering the answers for the sectoral sustainability variable, it is observed that the hotel companies promote job opportunities for the local community ($\bar{x}$=4.708, σ=1.581); also, the use of products and services friendly with the environment ($\bar{x}$=4,451, σ=1.723). Good operating practices, as well as labor practices were considered positive, but with a moderate evaluation degree, hence it is considered that companies maintain ethical behavior ($\bar{x}$=4,708, σ=1.724) and safety and hygiene conditions for their workers ($\bar{x}$=4,752, σ=1.676).

Regarding correlations, the association between good operating practices and labor practices stands out (r=0.792; p=<0.001), reflecting that actions of ethics, transparency, non-discrimination and compliance with the laws in hotels are intertwined with practices of social security, hygiene and human development for staff. The relationship between environmental technology and environmental management is also remarkable (r=0.785; p=<0.001), since it reflects the function that both factors must prevent and correct the effects that hotel activity produces on the environment.

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Participation in community development has a strong association with good operating practices (r=0.769; p=<0.001); as well as environmental technology with labor practices (r=0.742; p=<0.001).

Tabla 6
Estadísticos descriptivos por ítem

Eco-innovation			Sectoral sustainability					
Item	**Average**	**Std. Dev**	**Item**	**Average**	**Std. Dev**	**Item**	**Average**	**Std. Dev**
ET_01	4.438	1.820	PCD_1	4.549	1.687	PL_01	4.394	1.833
ET_02	4.491	1.772	PCD_02	4.319	1.730	PL_02	4.752	1.676
ET_03	4.221	1.765	PCD_03	4.708	1.581	PL_03	4.704	1.714
EM_01	4.496	1.824	PCD_04	4.469	1.762			
EM_02	4.190	1.716	PRC_01	4.385	1.776			
EM_03	4.009	1.769	PRC_02	4.451	1.723			
EM_04	3.832	1.861	PRC_03	4.159	1.614			
PyNA_01	4.350	1.832	GOP_01	4.708	1.724			
PyNA_02	4.128	1.844	GOP_02	4.588	1.790			
PyNA_03	4.133	1.781	GOP_03	4.637	1.838			
PyNA_04	4.137	1.863	GOP_04	4.571	1.827			

Table 7
Descriptive statistics and Pearson correlations

Dimension	Average	Standard deviation	Asymmetry	Kurtosis	ET	EM	PyNA	PCD	PRC	GOP	WP
ET	4.383	1.441	-0.615	-0.735	1						
EM	4.298	1.329	-0.512	-0.232	0.785**	1					
PyNA	4.187	1.496	-0.384	-0.880	0.673**	0.730**	1				
PCD	4.511	1.347	-0.544	-0.793	0.739**	0.739**	0.598**	1			
PRC	4.332	1.433	-0.642	-0.417	0.716**	0.731**	0.658**	0.760**	1		
GOP	4.626	1.462	-0.629	-0.764	0.707**	0.748**	0.623**	0.769**	0.731**	1	
WP	4.617	1.432	-0.535	-1.068	0.742**	0.737**	0.607**	0.764**	0.742**	0.792**	1

Note. ** =P< 0.001.

Discussion and conclusions

This research provides empirical evidence that eco-innovation (through the use of environmental technology, the implementation of environmental management actions and the integration of standardization instruments) positively influences the sustainability of the hotel sector where the development of the community, the promotion of responsible consumption, good operating practices and labor practices are included, as suggested by other research (Kuo *et al*., 2022; Martínez-Rubio *et al*., 2021; Longoni *et al*., 2018; Rosales-Lobo and Morillo-Moreno, 2018; Segarra-Oña *et al*., 2018; Velázquez *et al*., 2016).

Eco-innovation responds to the need to prevent pollution and mitigate environmental impacts (Kuo *et al*., 2022; Rovira *et al*., 2017). Hotel companies in Nuevo Nayarit are beginning to introduce technology primarily for energy saving and waste recycling, as found by Bell and Ruhanen (2016) and Wang *et al*. (2020). The analysis of environmental risks was the least valued aspect; it is necessary that hotels integrate preventive instruments of environmental management and that benefit the company, leading it towards sus-

tainability (Hall, 2019; Longoni *et al*., 2018 and Segarra-Oña *et al*., 2018).

The findings reveal that environmental policy and normalization are positive to generate sustainability in hotels, however, there is a greater relationship with the promotion of responsible consumption than with participation in community development, thus confirming how certifications and standards are reference for tourists and the general public to maintain a greener administration and responsible behavior (Carrillo, 2017; Dang and Wang, 2022; O'Ryan, 2017); while the possibility of improving the quality of life and job opportunities are limited (Sánchez and Vargas, 2015; Hernández *et al*. , 2021).

In terms of eco-innovation, the postulates of Rosales-Lobo and Morillo-Moreno (2018) are reaffirmed, where companies align their activities with the principles of sustainability and achieve a positive and moderate influence on actions that increase aspects such as job creation, job security and compliance with obligations, guaranteeing fair working conditions (Munawar *et al*., 2022; Moreno and Álvarez, 2022; ISO, 2010).

The research met its objective to determine the influence of eco-innovation on sectoral sustainability in the hotel industry of Nuevo Nayarit, Mexico. It was shown that eco-innovation when managed through preventive and control instruments defines the operation of activities for more responsible business conduct, ethics and compliance with their legal obligations.

It is evident that sectoral sustainability is explained by eco-innovation from environmental technology, which play an important role by being significantly associated with community development and labor practices, attending to employee safety and improving the quality of life of communities.

However, areas for improvement have also been highlighted, which reinforces the need to strengthen environmental policy and standardization in order to provide more structured and extensive measures for the management of a greener sector. This highlights the urgency of a stronger regulatory framework that can guide hotel companies in their transition to sustainability.

Sustainability requires a commitment that goes beyond mere participation, contributing to the generation of employment, job security and the fulfillment of obligations towards public administration. These aspects are vital for the sustainability of any sector, so they deserve priority attention in the agenda of hotel companies.

The relevance of sectoral sustainability for the hotel industry has been confirmed. However, while these practices are valuable, their implementation degree is still considered early, indicating that there is still room for improvement and expansion of these initiatives. In addition to the above, the ability of the economic sector to meet its own needs and those of its stakeholders through responsible actions is evidenced.

As limitations in this research, it was considered that the data collection was performed during the recovery of tourism activity (post-pandemic), where the appreciation of respondents could change during a stability phase. Therefore, caution is recommended when trying to generalize the conclusions obtained. The exhibition is also made up of employees of the hotel industry, which offers the perception of a single group.

In short, these variables must be investigated in other national and international tourist destinations. This approach would provide a more holistic view that would enrich the understanding of the relationship between eco-innovation and sector sustainability to build a more robust and accurate framework of reality analysis.

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