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Green Practices in Micro-Enterprises of the Iberian Hospitality Sector

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Abstract

This research critically examines the extent to which micro-enterprises in the hospitality sector operationalize sustainability, with a study conducted within the distinctive context of a UNESCO biosphere reserve. A quantitative, descriptive research design was used to collect survey data from employees and customers in a purposive sample of 30 establishments located within a UNESCO biosphere reserve. The sector is primarily composed of micro- and small-sized enterprises with limited staff, typically four to six employees, and a relatively recent presence in the market, generally four to seven years. Sustainability practices are most consistently implemented in waste management, water conservation, energy efficiency, and sustainable purchasing. In contrast, capital-intensive strategies such as solar energy systems and sustainable interior design are rarely adopted. Employees reported high levels of awareness and strong support for sustainability, while customers indicated that they encountered these practices only often or sometimes. This suggests a gap between organizational implementation and consumer recognition of sustainability initiatives. The study contributes to the scholarly discourse on sustainable hospitality by evidencing the predominance of cost-effective, behaviorally driven initiatives over technologically advanced interventions. It argues for the necessity of targeted training, financial incentives, and policy alignment to foster a systemic transition towards more robust sustainability frameworks in this specific regional context.

Keywords: Sustainable Hospitality, Green Practices, Food and Lodging Establishments, Sustainability, Iberian Peninsula

Práticas Sustentáveis em Microempresas do Setor Hoteleiro Ibérico

Resumo

Esta investigação analisa criticamente em que medida as microempresas do setor da hotelaria operacionalizam a sustentabilidade, através de um estudo realizado no contexto particular de uma reserva da biosfera da UNESCO. Recorreu-se a um desenho de investigação quantitativo e descritivo, através da aplicação de inquéritos a funcionários e clientes de uma amostra intencional de 30 estabelecimentos situados numa reserva da biosfera da UNES-

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CO. O setor é composto maioritariamente por micro e pequenas empresas, com equipas reduzidas — geralmente entre quatro a seis trabalhadores — e uma presença relativamente recente no mercado, em média de quatro a sete anos. As práticas de sustentabilidade são mais consistentemente implementadas na gestão de resíduos, conservação da água, eficiência energética e compras sustentáveis. Em contraste, estratégias intensivas em capital, como sistemas de energia solar e design interior sustentável, são raramente adotadas. Os funcionários relataram elevados níveis de consciência e forte apoio à sustentabilidade, ao passo que os clientes indicaram encontrar estas práticas apenas com frequência moderada. Isto sugere uma desarticulação entre a implementação organizacional e o reconhecimento por parte dos consumidores. O estudo contribui para o debate académico sobre hotelaria sustentável ao evidenciar a predominância de iniciativas comportamentais e de baixo custo sobre intervenções tecnologicamente avançadas. Defende-se a necessidade de formação específica, incentivos financeiros e alinhamento de políticas para promover uma transição sistémica para quadros de sustentabilidade mais robustos neste contexto regional particular.

Palavras-chave: Hotelaria Sustentável, Práticas Ambientais, Estabelecimentos de Alojamento e Restauração, Sustentabilidade, Península Ibérica.

I. BACKGROUND OF THE STUDY

The global hospitality industry is undergoing a paradigmatic transformation as both businesses and consumers increasingly recognize the necessity of embedding sustainability into core operations to mitigate escalating environmental challenges. Food and lodging establishments, in particular, are progressively implementing green practices aimed at reducing their ecological footprint while simultaneously improving efficiency and competitiveness (Soni, Sharma, & Joshi, 2022). Such initiatives resonate with the broader framework of sustainable development, which seeks to reconcile economic growth with ecological responsibility. Within this context, sustainable hospitality encompasses a wide range of practices, including resource conservation, waste reduction, and pollution control, as well as the institutionalization of eco-friendly policies that actively engage both customers and employees (Moise et al., 2021). Scholarly literature highlights that the sector's rapid expansion has significantly contributed to environmental degradation, necessitating urgent shifts towards more sustainable business models. Green practices not only reduce operational costs and environmental damage but also serve as strategic mechanisms for building reputa-

tion and long-term viability (Kulretne, Jones, & Hill, 2019; Cunha, 2023). Nevertheless, evidence suggests that the adoption of environmentally friendly technologies and systemic sustainability initiatives remains uneven across regions and market segments. This disparity is particularly pronounced in rural hospitality contexts, where structural limitations, such as financial constraints, limited human capital, and infrastructural challenges, may hinder the adoption of advanced sustainability practices (Abdou et al., 2020; Barakagira & Paapa, 2023; Kusa et al., 2023). The literature presents a complex perspective. Although the benefits of green practices are frequently highlighted, several studies report that implementation within Small and Medium-sized Enterprises (SMEs), which constitute the majority of the hospitality sector, is often superficial or impeded by significant barriers. Research findings on the effectiveness of these practices are inconsistent. Some studies indicate that, in the absence of structural support, SMEs may not progress beyond symbolic actions, and anticipated financial benefits may fail to materialize. This study aims to address these issues by analyzing the extent and depth of green practice adoption in the specific structural context of Iberian micro-enterprises. The Iberian Peninsula offers a particularly compelling context for examining these dynamics. Characterized by diverse ecosystems, rich cultural landscapes, and vibrant tourism industries, the region also faces environmental pressures linked to climate change, over-tourism, and resource scarcity. While both Spain and Portugal have committed to ambitious sustainability agendas aligned with the European Green Deal, the practical implementation of sustainability within the hospitality sector remains uneven (Bhatnagar, 2023). Rural areas, in particular, often lack the financial and technological capacity to adopt advanced green practices, despite their reliance on natural and cultural assets that are highly sensitive to ecological degradation (Huyen, Hong & Hoang, 2025). A critical evaluation is required to determine how food and lodging establishments throughout the Iberian Peninsula incorporate sustainability into their operations. This study systematically examines the degree of green practice adoption, evaluates alignment with environmental objectives, and identifies structural or behavioral barriers to implementation. This research examines the practices and challenges of the hospitality sector within a UNESCO biosphere reserve in the Iberian Peninsula, generating insights relevant at both regional and international levels. It provides empirical evidence for stakeholders, including business owners, policymakers, and local communities, on operation-

alizing sustainability in rural and semi-rural contexts. The findings suggest that this context may serve as a model for achieving economic growth while maintaining environmental stewardship, contributing to global discussions on sustainable tourism in ecologically sensitive regions.

II. METHODOLOGY

This study employed a quantitative, descriptive research design, with a primary emphasis on survey-based inquiry, to systematically examine the adoption of green practices among food and lodging establishments in a UNESCO Biosphere Reserve on the Iberian Peninsula. Two key respondent groups were purposively targeted: (a) employees, including managers, supervisors, and frontline staff, and (b) customers who regularly patronize these establishments. Data collection was conducted through structured questionnaires designed to assess levels of awareness, perceptions, and engagement with sustainability initiatives. Sampling Procedure

A non-probability, purposive sampling technique was employed to select 30 food and lodging establishments within a designated UNESCO biosphere reserve in the Iberian Peninsula. The sample included 14 hotels and 16 restaurants to represent both key subsectors. Establishments were chosen based on accessibility and willingness to participate. The sample consisted exclusively of micro-enterprises, reflecting the prevalent business structure in the rural and semi-rural areas studied. No establishment had more than 10 employees. Of the 30 establishments, 18 were located in Portugal and 12 in Spain. Although this sample offers a cross-section of the Iberian context, its non-random nature restricts the generalizability of the findings. Results should be interpreted as indicative of trends within similar biosphere reserve contexts.

Research Instrument and Validation

Data were collected using two structured questionnaires, one for employees and one for customers. The instruments were developed based on a comprehensive review of the sustainable hospitality literature (e.g., Han & Kim, 2019; Gil-Soto et al., 2019). The scales for green practices used a 5-point Likert scale (1 = Never, 5 = Always), while the awareness and perception sections used 5-point scales tailored

to the questions (e.g., 1 = Not at all Familiar, 5 = Extremely familiar). To ensure content validity, the questionnaires were reviewed by a panel of three experts in sustainability and hospitality management. A pilot test was conducted with 5 employees and 10 customers, not included in the final sample. The internal consistency reliability of the scales was assessed using Cronbach's Alpha. The results indicated good reliability for the main constructs: Energy Efficiency ($\alpha = 0.78$), Water Conservation ($\alpha = 0.82$), Waste Management ($\alpha = 0.89$), Sustainable Purchasing ($\alpha = 0.85$), Employee Awareness ($\alpha = 0.76$), and Customer Perception ($\alpha = 0.81$). The surveys were administered over a two-month period, from April to June 2024, using both face-to-face distribution in selected establishments and digital dissemination via online platforms. This dual approach was intended to maximize participation, ensure accessibility, and reduce potential non-response bias (Cunha & Krupskyi, 2023). Descriptive statistics, including mean, standard deviation, and frequency distributions, were used to profile respondents and establish baseline awareness and perception levels. Independent-sample t-tests assessed differences between hotels and restaurants. The Shapiro-Wilk test and Levene's test confirmed that assumptions of normality and homogeneity of variances were met. One-way Analysis of Variance (ANOVA) compared mean differences across variables with more than two categories, such as years of operation and business size. Effect sizes were calculated using Cohen's d for t-tests and eta-squared (η^2) for ANOVA to interpret practical significance. This analytical approach enabled comprehensive identification of sustainability practice patterns and provided insights into the integration of environmental initiatives in the regional hospitality sector.

III. ANALYSIS AND INTERPRETATION OF RESULTS

Characteristics of the Sample Population

A clear understanding of the sample population's characteristics is necessary to contextualize the study's findings. This section examines the demographic and organizational attributes of participants, offering insights into the structure of the hospitality sector in the Iberian Peninsula and identifying factors that may influence the adoption of sustainable practices. Presenting the sample composition enhances research transparency and reliability by enabling readers to assess data representativeness within the broader industry context. This section outlines the distribution of respondents by establishment type, years of

operation, and workforce size. These variables are relevant because existing literature indicates that enterprise type, longevity, and organizational scale significantly influence managerial priorities, operational capacities, and willingness to adopt sustainability initiatives. Situating the findings within the demographic and operational profile of the sample enables a more nuanced interpretation of subsequent results.

Type of Business

The sample included 14 hotels (46.7%) and 16 restaurants (53.3%), representing the two primary segments of the hospitality sector. This balance is significant because hotels and restaurants encounter distinct sustainability challenges. Hotels generally have higher energy and water demands, whereas restaurants produce more food-related waste. Including both subsectors ensures that the findings reflect a broad range of hospitality practices in the region.

Years of Operation

Most establishments (66.7%) have operated for 4 to 7 years, indicating a relatively young yet stable industry. Only 13.3% are new entrants (1 to 3 years), and 20% have operated for over 8 years. This distribution indicates ongoing growth and consolidation in the sector, with many businesses adapting to evolving market trends such as sustainability requirements. Younger establishments may be more receptive to innovative green practices, whereas older businesses may encounter challenges retrofitting infrastructure to meet sustainability standards.

Number of Employees

The majority of establishments (93.3%) employ 4 to 6 workers, with only one establishment each in the 1 to 3 employees (3.3%) and 7 to 10 employees (3.3%) categories. This distribution underscores the micro-enterprise character of the regional hospitality industry. The prevalence of small teams affects sustainability efforts. Limited manpower and resources may restrict the adoption of capital-intensive initiatives such as solar panels or advanced water treatment. However, smaller establishments may more readily implement low-cost, behaviorally driven measures including waste segregation, energy conservation, and customer engagement.

Table 1

Frequency and Percentage Distribution of the Profile of the Respondents

Type of Business	***F***	***%***
Hotel	14	46.70
Restaurant	16	53.30
Total	**30**	**100**
Years of Operation		
1 – 3 years	4	13.30
4 - 7 years	20	66.70
Above 8 years	6	20.00
Total	**30**	**100**
Number of Employees		
1-3 employees	1	3.30
4-6 employees	28	93.30
7-10 employees	1	3.30
Total	**30**	**100**

Own source.

Data indicate that the majority of businesses in the hospitality sector are small or micro-sized enterprises with constrained staffing and financial resources. The sector comprises an approximately equal distribution of hotels and restaurants. Consequently, sustainability initiatives in the Iberian Peninsula are expected to prioritize practical and cost-effective measures rather than large-scale or technologically advanced solutions. The prevalence of recently established businesses suggests ongoing industry transformation and a potential openness to sustainability practices, particularly when supported by training, policy development, and community engagement programs.

Table 2
Analysis of Energy Efficiency Practices

Energy Efficiency Practices	Mean	SD	DI
The establishment uses energy-efficient lighting (e.g., LED bulbs) in both guest rooms and dining areas.	4.45	0.60	Always
The establishment utilizes natural ventilation (e.g., opening windows, using ceiling fans) to reduce reliance on air conditioning in both guest rooms and dining areas.	4.25	0.72	Always
Solar energy is used for lighting or water heating in the establishment's common areas, kitchens, or guest rooms where feasible.	3.17	1.23	Sometimes
The establishment reduces energy consumption by using energy-efficient cooking appliances (e.g., induction cookers, energy-efficient stoves) in the kitchen and dining area.	4.64	0.56	Always
Local, sustainable building materials such as bamboo or wood are used in the construction and renovation of the establishment to reduce energy consumption.	4.80	0.41	Always
The establishment promotes energy-saving practices by encouraging guests to turn off lights, air conditioning, and electronics when not in use in both guest rooms and dining areas.	4.80	0.41	Always
Energy-efficient appliances (e.g., refrigerators, water pumps, air conditioning units) are regularly maintained to ensure efficient operation in both lodging and food service areas.	4.25	0.72	Always
The establishment limits the use of air conditioning or electric heaters by optimizing natural temperature control in guest rooms and dining areas.	4.85	0.36	Always
Energy-saving measures, such as installing timers or sensors on lights, are implemented in the guest rooms and dining areas to reduce unnecessary energy use.	3.12	1.27	Sometimes
The establishment educates both employees and guests about energy conservation practices and encourages their participation in minimizing energy use.	4.71	0.53	Always
Category Mean	**4.67**	**0.51**	**Always**

Own source

The results indicate that food and lodging businesses demonstrate a strong commitment to energy conservation. On average, these businesses consistently implement energy-efficient practices, particularly those that are low-cost or straightforward to implement.

High-Scoring Practices (Means: 4.71--4.85)

The highest-rated practices are limiting air conditioning and heating through natural temperature control (M = 4.85), encouraging energy-saving behavior among guests (M = 4.80), and utilizing sustainable building materials (M = 4.80). These findings indicate a preference for practical measures that do not require significant capital investment.

Low-Scoring Practices (Means: 3.12--3.17)

In contrast, the adoption of capital-intensive or technologically advanced practices is limited. The use of solar energy (M = 3.17) and automated systems such as timers or motion-sensor lighting (M = 3.12) was reported only occasionally. High standard deviations suggest substantial variation in adoption among establishments.

Table 3

Water Efficiency Practices

Water Efficiency Practices	Mean	SD	DI
The establishment installs low-flow faucets, shower heads, and toilets in guest rooms and public areas.	4.80	0.41	Always
The establishment regularly checks for leaks in pipes, faucets, and toilets and repairs them promptly.	4.83	0.38	Always
The establishment encourages guests to reuse towels and linens during their stay to minimize water usage.	4.33	0.71	Always
The establishment collects and reuses rainwater for non-potable uses, such as landscaping or cleaning.	4.87	0.35	Always
The establishment uses water-efficient cleaning practices and tools, such as mops that require less water.	4.87	0.35	Always
Category Mean	**4.74**	**0.44**	**Always**

Own Source

The results demonstrate a consistently high level of commitment to water conservation across establishments, with an overall category mean of 4.74 ("Always") and low variability (SD=0.44).

Table 4
Waste Management Practices

Waste Management Practices	Mean	SD	DI
The establishment implements a comprehensive recycling program for paper, plastics, glass, and metals.	5.00	0.00	Always
The establishment separates organic waste (e.g., food scraps) from non-organic waste for composting or disposal.	5.00	0.00	Always
The establishment uses biodegradable or compostable materials for take-out containers and packaging.	4.97	0.18	Always
The establishment minimizes food waste by using portion control and repurposing leftovers creatively in the kitchen.	4.97	0.18	Always
The establishment donates unused, safe food to local charities instead of throwing it away.	3.43	1.33	Often
The establishment provides staff with training on waste reduction techniques, such as efficient use of resources and reducing packaging waste.	4.93	0.25	Always
The establishment regularly monitors and tracks waste generation and uses findings for reduction and improvement.	4.97	0.18	Always
The establishment uses bulk purchasing for food and other supplies to reduce packaging waste.	4.80	0.48	Always
The establishment eliminates or reduces single-use plastic items, such as straws, utensils, and bottles, by using alternatives like reusable or paper products.	2.78	1.38	Sometimes
The establishment encourages guests to participate in waste reduction efforts, such as sorting recyclables or reducing food waste during their stay.	4.97	0.18	Always
Category Mean	**4.90**	**0.41**	**Always**

Own Source

The data show that waste management is the most consistently and robustly implemented sustainability dimension, with an overall category mean of 4.90 ("Always"). The very low SD for most items indicates near-universal adoption of core practices like recycling and composting.

Table 5

Sustainable Purchasing Practices and Materials

Sustainable Purchasing Practices and Materials	Mean	SD	DI
The establishment prioritizes sourcing ingredients and products from local suppliers to reduce carbon footprint.	4.77	0.50	Always
The establishment purchases organic and sustainably grown food products whenever possible.	4.63	0.61	Always
The establishment uses eco-friendly, biodegradable, or compostable packaging materials instead of plastic.	4.80	0.48	Always
The establishment sources seafood and meat products from sustainable and ethically responsible suppliers.	4.93	0.25	Always
The establishment prioritizes purchasing cleaning products that are non-toxic, biodegradable, and environmentally safe.	4.93	0.25	Always
The establishment reduces single-use plastics by using reusable or refillable containers for condiments, toiletries, and beverages.	4.93	0.25	Always
The establishment buys furniture, fixtures, and décor made from recycled, upcycled, or sustainable materials.	2.80	1.32	Sometimes
The establishment prefers bulk purchasing to minimize packaging waste and reduce transportation emissions.	4.20	0.92	Often
The establishment ensures that paper products (napkins, tissue, menus) are made from recycled or sustainable sources.	4.40	0.81	Always
Category Mean	**4.69**	**0.58**	**Always**

Own source

The results reveal a strong commitment to sustainable procurement, with an overall category mean of 4.69 ("Always"). The high SD for the purchase of sustainable

furniture (SD=1.32) highlights the large disparity in adoption of this capital-intensive practice.

Table 6
Awareness Level of Employees on Green Practices

Awareness of employees on green practices	Mean	SD	DI
How familiar are you with green practices implemented by your establishment?	4.20	0.71	Extremely Familiar
How often are you informed about green initiatives or sustainability practices of establishment?	3.87	0.82	Very Familiar
Have you received formal training or information about the green practices of the establishment?	3.53	0.94	Very Familiar
Category Mean	**3.87**	**0.82**	**Very Familiar**

Own source

The results indicate that employees possess a generally strong awareness of sustainability initiatives within their establishments, with an overall category mean of 3.87 ("Very Familiar"). The lower score and higher SD for formal training (M=3.53, SD=0.94) suggest inconsistent access to structured learning.

Table 7
Customer Awareness on Green Practices

Customer Awareness on Green Practices	Mean	SD	DI
How aware are you of the green practices of the establishment?	4.23	0.73	Extremely Aware
Do you receive information about the green practices or sustainability efforts of this establishment during your visit?	3.77	0.90	Often
How often do you notice the establishment engaging in green practices during your stay?	3.80	0.92	Often
Category Mean	**3.93**	**0.85**	**Often**

Own source

The results indicate that customers demonstrate a generally strong awareness of sustainability measures, with an overall consensus of 3.93 ("Often"). The lower scores for receiving information and noticing practices indicate a communication gap.

Table 8

Perception of Employees on Green Practices

Perception of Green Practices	Mean	SD	DI
1. How effective do you think the green practices of the establishment are in reducing its environmental impact?	4.53	0.63	Extremely Effective
2. How important do you think green practices are in improving the reputation and sustainability of the establishment?	4.27	0.69	Extremely Important
3. How motivated are you to follow the green practices at work?	4.53	0.63	Extremely Motivated
4. How satisfied are you with the green practices implemented by your establishment?	4.50	0.63	Extremely Satisfied
Category Mean	**4.46**	**0.64**	

Own Source

The results reveal an overall category consensus of 4.46, indicating that employees hold highly positive perceptions of green practices within their establishments. The low SDs suggest a consensus among employees.

Table 9

Customers' Perception of Green Practices

Customers Perception of Green Practices	Mean	SD	DI
How satisfied are you with the environmental practices implemented by the establishment?	4.37	0.71	Extremely Satisfied
How likely are you to recommend the establishment to others based on its environmental efforts?	3.90	0.80	Very likely
How important are green practices to your decision to stay at the establishment?	4.10	0.80	Very Important
Do you believe that the establishment's green practices improve your overall experience during your visit?	4.10	0.80	Very Much
How likely are you to pay more for services at this establishment because of its green practices	3.90	0.88	Very Likely
Category Mean	**4.07**	**0.80**	

Own Source

The results yield an overall category mean of 4.07, reflecting a generally positive perception of sustainability initiatives. The lower scores for willingness to pay and recommend indicate a cautious stance.

Table 10

Test of Difference on the Employees' Green Practices when Grouped According to Profile Variables

Types of Business	Mean	t-value	p-value	Decision
Hotel	2.33	2.15	28	Reject H_0
Restaurant	3.05			
Profile	df	F	P-value	Decision
Year of Operation				
Between Groups	2	2.05	0.5	Accept H_0
Within Group	27			
Number of Employees				
Between Groups	2	2.58	0.09	Accept H_0

Own source

Type of Business (Hotel vs. Restaurant)

The independent-samples *t*-test revealed a statistically significant difference between hotels (M = 2.33) and restaurants (M = 3.05) regarding the adoption of green practices, $t(28) = 2.15$, $p = .040$. Consequently, the null hypothesis (H_0) was rejected. The effect size was large (Cohen's $d = 0.80$), suggesting a meaningful practical difference in the level of green practice adoption between the two business types.

Years of Operation

A one-way ANOVA was conducted to examine differences in green practices across establishments grouped by years of operation (1-3 years, 4-7 years, and above 8 years). Results showed $F(2,27) = 2.05$, $p = 0.15$, indicating no statistically significant differences. The effect size was small ($\eta^2 = 0.04$). Thus, the null hypothesis was accepted.
Number of Employees

Similarly, the ANOVA results for the number of employees revealed $F(2,27) = 2.58$, $p = 0.09$, which is also not statistically significant at the 0.05 level. The effect size was small to moderate ($\eta^2 = 0.07$). The null hypothesis was accepted.

IV. RESULTS, INTERPRETATION, AND IMPLICATIONS

The limitations of this study must be acknowledged. The purposive sample of 30 establishments provides valuable insights but restricts the generalizability of the findings to the broader hospitality sector in the Iberian Peninsula. The results primarily represent micro-enterprises operating in comparable biosphere reserve contexts. Additionally, the cross-sectional design precludes causal inference. Future research should employ larger, randomized samples and longitudinal or mixed-methods designs to investigate underlying motivations and causal relationships more comprehensively. The study's findings offer a detailed account of sustainability implementation among food and lodging establishments in the Iberian Peninsula. The sector is predominantly composed of micro- and small-sized enterprises, with most businesses employing four to six workers and operating for four to seven years. The sample included both hotels and restaurants in nearly equal proportions, ensuring balanced representation of the two primary sub-sectors. These structural characteristics influence the results: limited human and financial resources restrict the adoption of capital-intensive innovations, while the relatively recent establishment of

most businesses indicates a sector in the process of consolidating its practices and demonstrating adaptability in adopting low-cost, behaviorally focused measures. Analysis of the four domains of sustainability practices reveals a strong commitment to environmental responsibility, though the extent of implementation varies. Energy efficiency measures, such as LED lighting, natural ventilation, and guest engagement strategies, are widely adopted, reflecting a pragmatic focus on cost-effective solutions that integrate easily into daily operations. In contrast, capital-intensive measures like solar energy systems and automated sensors are infrequently implemented, highlighting the structural constraints experienced by small enterprises. Water efficiency practices are also robust, with widespread adoption of rainwater collection, leak monitoring, and low-flow fixtures. Towel and linen reuse programs are present but less consistently applied, indicating that customer-facing initiatives are less developed than infrastructural and operational measures. Waste management emerged as the strongest domain, with comprehensive recycling and composting programs, staff training, and guest involvement all scoring near universal adoption. The practices not only reflect a strong institutionalization of waste reduction but also indicate alignment with both environmental and cost-saving imperatives. Yet, food donation programs and the reduction of single-use plastics were notably weaker, revealing persistent challenges linked to legal restrictions, logistical barriers, and adaptation to regulatory changes such as the European ban on single-use plastics. Sustainable purchasing also scored highly, especially in the sourcing of ethical and eco-friendly products, biodegradable packaging, and non-toxic cleaning supplies. However, long-term investments in sustainable furniture and fixtures were rarely made, reflecting the capital intensity of such initiatives and the difficulty of prioritizing them in resource-constrained enterprises. Beyond operational practices, the study also examined levels of awareness and perception among employees and customers. Employees demonstrated a moderate to high level of awareness of sustainability practices, although much of this knowledge appeared to have been acquired informally rather than through structured training. While they were generally very familiar with practices, the relatively low score for formal training highlights a gap in capacity building. Despite this, employee perceptions were overwhelmingly positive: they viewed green practices as highly effective in reducing environmental impact, as important for reputation, and reported strong motivation and satisfaction with their adoption. Customers, in turn, expressed strong general awareness of sustainability but reported only moderate recognition

of practices during their visits, revealing a communication gap. Although they valued sustainability as part of their experience and decision-making, their willingness to pay more for environmentally responsible services remained limited, consistent with the well-documented attitude--behavior gap in sustainable consumption. Inferential analysis further clarified the patterns. Significant differences were found between hotels and restaurants, suggesting that sustainability adoption varies by subsector, likely reflecting different operational demands and cost structures. However, no significant differences were observed by years of operation or number of employees, indicating that sustainability practices are not dependent on organizational maturity or scale but are instead shaped by external drivers such as regulatory frameworks, consumer expectations, and cost-saving imperatives. Overall, the findings indicate that sustainability in the Iberian hospitality sector is primarily based on pragmatic, cost-effective practices rather than advanced technological investments. Waste management is the most developed domain, followed by water conservation, sustainable purchasing, and energy efficiency, with the latter constrained by dependence on low-cost measures. Employees exhibit strong motivation and positive perceptions, whereas customers report satisfaction but demonstrate limited awareness and financial commitment. These patterns suggest that sustainability is established as a core organizational value, yet its implementation and communication remain inconsistent. The implications are twofold. From a theoretical perspective, the study supports existing scholarship that emphasizes the predominance of behaviorally driven, low-cost initiatives in small-scale enterprises and contributes to debates on the value-action gap by illustrating the disjunction between customer appreciation of sustainability and their limited willingness to pay. From a practical perspective, the findings underscore the need for capacity building through formal training for employees, stronger communication strategies to increase customer awareness, and policy interventions to support capital-intensive investments such as renewable energy and sustainable infrastructure. Sector-specific strategies are also necessary: hotels require targeted support for energy and water management, while restaurants may benefit from greater focus on food waste reduction and sustainable sourcing. In summary, the hospitality sector in this context exhibits readiness and commitment to sustainability, yet progress is limited by structural constraints and inconsistent communication. Achieving transformative change requires a systemic approach that integrates business practices with policy incentives, technological innovation, and

customer engagement. Coordinated efforts are essential for the sector to contribute effectively to regional and global sustainability objectives.

V. CONCLUSION

This study examined the adoption of green practices among food and lodging establishments in a UNESCO biosphere reserve in the Iberian Peninsula, providing a comprehensive account of sustainability initiatives across energy efficiency, water conservation, waste management, and sustainable purchasing. The results reveal that while the hospitality sector is strongly engaged with environmentally responsible practices, implementation is uneven and shaped by structural, financial, and communicative constraints. Waste management and water conservation emerged as the most consistently applied domains, reflecting practices that are both cost-effective and operationally feasible. In contrast, energy efficiency and sustainable procurement showed gaps, particularly in capital-intensive areas such as renewable energy systems and sustainable infrastructure. The analysis further demonstrated that employees possess high levels of motivation and positive perceptions toward green practices, though their awareness is often developed informally and not reinforced through systematic training. Customers, meanwhile, expressed satisfaction with and recognition of sustainability efforts, but their awareness during visits was limited by weak communication strategies, and their willingness to pay a premium for environmentally responsible services remained modest. Together, these findings underscore the persistence of the "value--action gap" in sustainable hospitality, in which stakeholders express support for sustainability but are hesitant or unable to translate this support into consistent behavioral or financial commitment. Statistical analysis confirmed that differences in sustainability adoption are more strongly associated with type of establishment (hotels versus restaurants) than with organizational size or years of operation. This suggests that sustainability strategies must be sector-specific, addressing the unique operational and environmental challenges of different hospitality formats. Theoretically, this study contributes to the scholarship on sustainable hospitality by reinforcing the argument that micro- and small enterprises adopt pragmatic, low-cost sustainability measures rather than advanced technological solutions. It also provides empirical evidence on how employee perceptions and

customer awareness interact with organizational practices, enriching debates on stakeholder engagement and sustainable consumer behavior. Practically, the findings underscore the need for targeted capacity-building through formal training, enhanced communication strategies to increase customer awareness of sustainability initiatives, and policy frameworks that offer financial incentives for high-cost innovations, such as renewable energy and sustainable furnishings. Ultimately, while this study offers a detailed snapshot of sustainability practices in a specific context, its findings highlight a sector caught between environmental ambition and structural constraints. To advance beyond incremental, cost-saving practices, a systemic approach is required that integrates business operations, customer engagement, and supportive public policy. Strengthening these interconnections will enable the sector not only to contribute more effectively to local and regional sustainability goals but also to position itself as a model of environmentally responsible hospitality in ecologically sensitive contexts.

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