GEOADRIA

Green Organizational Culture and Ecological Performance of Hotels in Dalmatia: The Mediating Role of Eco-Innovations

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Increasing environmental challenges and the growing demand for sustainable tourism encourage hotels to enhance green practices. In this context, green organizational culture may function as a key internal resource, while eco-innovation represents the mechanism through which this resource is translated into measurable ecological outcomes. The aim of this paper is to examine the impact of green organizational culture on the implementation of eco-innovations and the ecological performance of hotels, while testing the mediating role of eco-innovations. The research was conducted on a sample of 73 hotels in Dalmatia, and the data were analysed using the PLS-SEM approach. The results confirm a positive effect of green organizational culture on eco-innovations ($\beta = 0.608$; $p < 0.001$) and a positive effect of eco-innovations on ecological performance ($\beta = 0.440$; $p < 0.001$). The direct effect of culture on ecological performance is not significant ($\beta = 0.149$; $p = 0.155$), whereas the indirect effect through eco-innovations is significant ($\beta = 0.267$; $p < 0.001$), indicating a pattern of full mediation. Findings suggest that green organizational values influence environmental outcomes primarily through

concrete eco-innovation activities, thereby providing empirical support for the RBV/NRBV explanation of the mechanism through which organizational resources operate in the hotel sector.

Keywords: green organizational culture, eco-innovations, ecological performance, hospitality industry, NRBV

INTRODUCTION

Tourism represents an important driver of economic development; however, at the same time, it generates significant environmental pressures through increased resource consumption, greenhouse gas emissions, and waste generation (Siti Nabiha et al., 2014), thereby contributing to climate change (Koçak et al., 2020). In this context, sustainability becomes one of the key challenges of contemporary tourism development.

The hotel sector plays a particularly important role in achieving tourism sustainability, as it is among the largest consumers of energy and natural resources within the tourism industry. Hotel operations are characterised by intensive consumption of water, energy, and food, as well as by waste generation and pollutant emissions (Aboelmaged, 2018; Bohdanowicz, 2006). The hotel sector is estimated to account for approximately 1% of global car-bon emissions, underscoring the need for the implementation of sustainable practices within the hospitality industry (Sustainable Hospitality Alliance, 2022). Accordingly, hotels are increasingly adopting measures aimed at reducing carbon emissions, increasing the use of renewable energy sources, and enhancing water management practices in response to growing sustainability-related pressures (Khatter, 2023).

The importance of sustainable business practices is particularly evident in tourist regions whose competitiveness largely depends on the preservation of natural resources and environmental quality. Dalmatia, as one of the most important tourist regions in Croatia, represents a particularly relevant context for investigating the sustainability of hotel operations due to its pronounced tourism intensity, seasonality, and strong dependence of tourism supply on environmental resources. Intensive tourism activity during the peak season further increases pressure on energy and water consumption, as well as on waste management systems, making sustainable resource management and the implementation of eco-innovations key prerequisites for the long-term competitiveness of the destination.

From a theoretical perspective, this research is grounded in the Resource-Based View (RBV), according to which competitive advantage arises from valuable, rare, and difficult-to-imitate internal resources (Barney, 1991), and the Natural Resource-Based View (NRBV), which emphasises the role of environmentally oriented organizational resources and capabilities in achieving sustainable competitive advantage (Hart, 1995). One of the key resources in the hotel sector is green organizational culture, which implies the integration of environmental values into business operations, the encouragement of sustainable employee behaviour, and the development of organizational commitment to environmental protection. In line with the NRBV approach, organizational resources do not necessarily exert a direct influence on performance but achieve their effect through the development of specific organizational capabilities. In this context, eco-innovations represent a key mechanism through which organizational values oriented towards sustainability are translated into concrete activities and measurable ecological outcomes.

Eco-innovations encompass the development of products/services, processes, organizational practices, and marketing activities that contribute to reducing resource consumption, emissions, and environmental risks (Kemp & Pearson, 2008). Despite their importance, re-search on eco-innovations in the hotel sector remains limited (García Pozo et al., 2015). Studies encompassing different types of eco-innovations are particularly scarce (García Granero et al., 2018; Marcon et al., 2017), as are studies addressing the organizational factors that stimulate their development in the hotel sector (Aboelmaged, 2018). Furthermore, there is a lack of empirical research examining the mechanism through which green organization-al culture contributes to the ecological performance of hotels through eco-innovations. Accordingly, the question arises as to how green organizational culture contributes to the eco-logical performance of hotels and whether this effect is achieved directly or indirectly through eco-innovations. It is particularly important to understand the role of implementing different types of eco-innovations within this relationship.

Building on the identified research gap, this paper contributes to literature in three ways. First, it empirically examines the mediating role of eco-innovations in the relationship between green organizational culture and the ecological performance of hotels, thereby contributing to the understanding of the mechanism through which organizational resources contribute to the achievement of ecological outcomes. Second, the research extends existing knowledge to the context of the hotel sector in Dalmatia, a region characterised by high tourism intensity, pronounced seasonality, and strong competitiveness dependence on the preservation of

environmental resources. Third, eco-innovations are operationalised as an aggregated indicator of the implementation of different types of eco-innovation activities, namely product/service, process, organizational, and marketing eco-innovations, thereby enabling a broader understanding of their application in the hotel sector.

The aim of this paper is to examine the impact of green organizational culture on eco-innovations and the ecological performance of hotels, with particular emphasis on the mediating role of eco-innovations.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Natural resource-based view theory and resource-based view theory

The theoretical foundation of this research can be linked to the RBV of a firm and the NRBV. RBV represents a framework used by management to identify and exploit strategic resources to achieve and sustain competitive advantage (Barney, 1991). Building upon this theory, the NRBV emphasises that a firm's competitive advantage is based on its relationship with the natural environment (Hart, 1995).

The NRBV encompasses three key strategic capabilities: pollution prevention, product stewardship, and sustainable development. Pollution prevention arises from pressures to reduce emissions and waste (Hart, 1995), whereby firms develop strategies based on process improvement, recycling, and innovation to reduce costs and achieve competitive advantages (Frosch & Gallopoulos, 1989; Willig, 1994). Product stewardship is focused on the development of "green" products through innovation, stakeholder involvement, and the application of life cycle analysis (Keoleian & Menerey, 1993). Sustainable development integrates ecological and economic goals, requires long-term investments, and is aimed at reducing the negative environmental impacts of growth.

Green organizational culture

The hotel sector is facing increasingly pronounced environmental and economic pressures, including high resource consumption and growing guest demands for sustainable services, which encourage the implementation of green business models (Rodríguez-Antón et

al., 2012). In this context, sustainability becomes a key strategic priority, and environmental objectives are increasingly integrated into firms' business strategies (Hoffman, 2001).

In accordance with the Natural Resource-Based View theory (Hart, 1995), internal resources and organizational capabilities constitute the foundation for the development of effective environmental strategies. Among these, green organizational culture stands out as an important intangible resource that may contribute to competitive advantage and ecological performance. Although regulatory requirements and managerial decisions may initiate change, their successful implementation largely depends on organizational culture (Crane, 1995). Organizational culture shapes employee behaviour and supports strategy implementation, while the sharing of green values encourages environmentally responsible behaviour and orientation towards sustainability (Newton & Harte, 1997; Parr, 2012).

Green organizational culture is oriented towards addressing environmental problems, reducing negative environmental impacts, and increasing the positive effects of business operations on the environment (Roscoe et al., 2019). Such a culture encourages the development of new ideas, collaboration among employees, and the adoption of sustainable solutions, thereby creating the preconditions for the development of product, process, and organizational eco-innovations.

Following the above, green organizational culture represents a key organizational prerequisite for the development of eco-innovations and the enhancement of hotels' ecological performance. Therefore, it is expected that green organizational culture positively affects the development of eco-innovations and it may directly contribute to the improvement of ecological performance.

Eco-Innovations

Increasing awareness of climate change, regulatory pressures, and changing consumer preferences encourage firms to introduce eco-innovations to reduce negative environmental impacts and strengthen competitiveness (OECD, 2013). In this paper, the terms *eco-innovations* and *green innovations* will be used interchangeably, depending on the terminology employed

in the original literature, whereby both concepts refer to innovations aimed at reducing negative environmental impacts. Eco-innovations encompass new or significantly improved products, processes, organizational methods, and marketing approaches that reduce resource consumption, emissions, and environmental risks throughout their life cycle (Kemp & Pearson, 2008). In this context, green innovations refer to the development of products, processes, and organizational solutions that reduce ecological footprint and contribute to the achievement of environmental goals (Gürlek & Tuna, 2018; Küçükoğlu & Pınar, 2015; Wang, 2019).

In the literature, eco-innovations are most conceptualised through four dimensions. Product/service eco-innovations refer to the development of offers with a lower environmental impact (Dong et al., 2014), whereas eco-process innovations include technological and operational solutions aimed at resource savings and emission reduction (Sehnem et al., 2016).

Eco-organizational innovations encompass changes in management and internal practices that support environmental objectives (Yurdakul & Kazan, 2020), while eco-marketing innovations involve the application of new marketing approaches aimed at promoting sustainable products and services (Chege & Wang, 2020).

In the hotel sector, eco-innovations are of particular importance because they contribute to environmental improvement and business performance (Dangelico & Pujari, 2010; Martínez-Perez et al., 2015).

In accordance with the Resource-Based View approach, eco-innovations are increasingly viewed as a strategic resource of firms that enables the achievement of competitive advantage (Aboelmaged, 2018; Kuo et al., 2021). However, despite growing interest, their role remains insufficiently clarified, particularly in the context of the hotel sector, which further justifies the need for this research. Following the above, eco-innovations may contribute to the enhancement of firms' ecological performance.

Ecological performance

Balancing social values and environmental protection with economic growth is considered a key objective of sustainable organizational development (Gürlek & Tuna, 2018). Firms worldwide adopt green innovation practices with the aim of reducing negative environmental impacts and improving economic performance (Miroshnychenko et al., 2017). Ecological performance may include obtaining environmental certifications (Asadi et al., 2020; Wang, 2019), improving environmental performance, compliance with environmental standards, and reducing energy consumption (Asadi et al., 2020). Ecological performance helps organizations reduce costs through lower energy consumption and compliance with environmental regulations, enables compliance with environmental regulations, facilitates fulfilments of key stakeholder requirements, and contributes to maintaining environmental quality (García-Machado & Martínez-Ávila, 2019).

Hypothesis development

Green organizational culture and eco-innovations

Previous empirical studies consistently confirm a positive relationship between green organizational culture and environmentally oriented innovation activities. Roespinoedji et al. (2019) identified a significant positive effect of green organizational culture on green innovations. Similar findings are confirmed by Wang (2019) and Küçükoğlu and Pınar (2016), while more recent studies further confirm this relationship in the hotel sector (Asadi et al., 2020; Fatoki, 2021; Gu, 2023; Roespinoedji et al., 2019).

These findings suggest that firms with a more developed green organizational culture demonstrate a greater propensity to implement product, process, organizational, and marketing eco-innovations. Accordingly, the following hypothesis is proposed:

H1: Green organizational culture has a positive and statistically significant effect on eco-innovations in the hotel sector.

Green organizational culture and eco-innovations

Green organizational culture is oriented towards addressing environmental problems, reducing negative environmental impacts, and increasing the positive effects of business operations on the environment (Roscoe et al., 2019). In the hotel sector, firms that develop and foster green values demonstrate a greater capacity to implement solutions aimed at reducing negative environmental impacts (Fraj et al., 2015; Gürlek & Tuna, 2018). Empirical studies confirm a significant positive relationship between green organizational culture and ecological performance in the hotel sector (Fatoki, 2021). Similar findings have also been confirmed in other industries. Wang (2019) identifies a significant positive relationship between green organizational culture and ecological performance in manufacturing firms. Furthermore, García-Machado and Martínez-Ávila (2019) confirm that green organizational culture positively affects firms' ecological performance. Accordingly, the following hypothesis is proposed:

H2: Green organizational culture has a positive and statistically significant effect on ecological performance.

Eco-Innovations and the ecological performance of hotels

In contemporary hotel operations, eco-innovations play an increasingly important role, as they enable the reduction of negative environmental impacts, more efficient resource utilisation, and the strengthening of sustainable competitiveness. The introduction of environ-mentally friendly products, processes, and organizational solutions represents a key instrument for achieving improved ecological outcomes and the long-term resilience of hotels.

Previous studies consistently confirm the positive contribution of eco-innovations to sustainability and business performance. Elzek et al. (2021) demonstrated that green product, process, technological, and organizational innovations positively affect firm sustainability. Similar findings are reported by Alsughayir (2017) and Ma et al. (2018), while Eryiğit and Özcüre (2015) emphasise that green product innovations reduce negative environmental impacts. Furthermore, Saudi et al. (2019) and Tseng et al. (2013) confirm the positive effect of green product innovations on ecological and sustainable performance, while Fatoki (2021) and

Marfo et al. (2024) identifies a significant positive relationship between eco-innovations and ecological performance.

A positive effect has also been confirmed for process innovations. Küçükoğlu and Pınar (2016) emphasise that green process innovations reduce negative environmental im-pacts while simultaneously improving business performance, whereas additional studies confirm their contribution to overall sustainable performance (Eryiğit & Özcüre, 2015; Tseng et al., 2013).

These findings suggest that hotels implementing multiple types of eco-innovations achieve better ecological outcomes through the reduction of negative environmental impacts and more efficient resource utilisation. Accordingly, the following hypothesis is proposed:

H3: Eco-innovations have a positive and statistically significant effect on the ecological performance of hotels.

Mediating role of eco-innovations in the relationship between green organization-al culture and ecological performance

Wang (2019) highlights that firms can improve their ecological performance through green innovations developed within an organizational culture that supports environmental values. Firms with a well-developed green organizational culture possess a greater capacity to generate and implement innovations aimed at reducing waste, pollution, and energy consumption, which consequently contributes to improved ecological performance. Similarly, Gürlek and Tuna (2018) emphasise that green organizational culture creates favourable conditions for the development of green innovations through the sharing of environmental values within the organization. In this sense, green organizational culture does not affect ecological performance only directly but also indirectly through the promotion of eco-innovations.

Empirical findings further confirm this relationship. Fatoki (2021) finds that eco-innovations play a mediating role in the relationship between green organizational culture and ecological performance. In accordance with the Natural Resource-Based View theory, internal resources and organizational capabilities do not affect performance solely through direct effects but also through the development of specific capabilities and innovations that generate

competitive advantage (Hart, 1995). Based on the theoretical and empirical findings, the following hypothesis is proposed:

H4: Eco-innovations mediate the relationship between green organizational culture and ecological performance.

Conceptual model

The proposed conceptual model assumes that green organizational culture represents a key internal organizational resource capable of stimulating the development of eco-innovations and consequently contributing to the ecological performance of hotels. In accordance with the RBV and the NRBV, organizational resources do not necessarily exert an effect on performance directly but rather through the development of specific organizational capabilities. In this model, eco-innovations represent the mechanism through which organizational values oriented towards sustainability are translated into concrete activities and measurable ecological outcomes.

The model assumes a positive direct effect of green organizational culture on product/service, process, organizational, and marketing eco-innovations, as well as a positive effect of eco-innovations on the ecological performance of hotels. At the same time, the model also assumes a direct effect of green organizational culture on ecological performance, arising from internalized organizational values and practices oriented towards environmental protection. Furthermore, an indirect effect through eco-innovations is also assumed, thereby examining their mediating role in transmitting the effect of organizational resources on environmental outcomes. In this study, eco-innovations are operationalised in an aggregated manner, as an indicator of the extent of implementation of different types of eco-innovation activities at the hotel level, thereby enabling a more comprehensive understanding of their application within the hotel sector.

The proposed model integrates organizational, innovation, and ecological aspects of business operations and provides a theoretical framework for understanding how green

organizational culture contributes to the ecological performance of hotels both directly and indirectly through the implementation of eco-innovations.

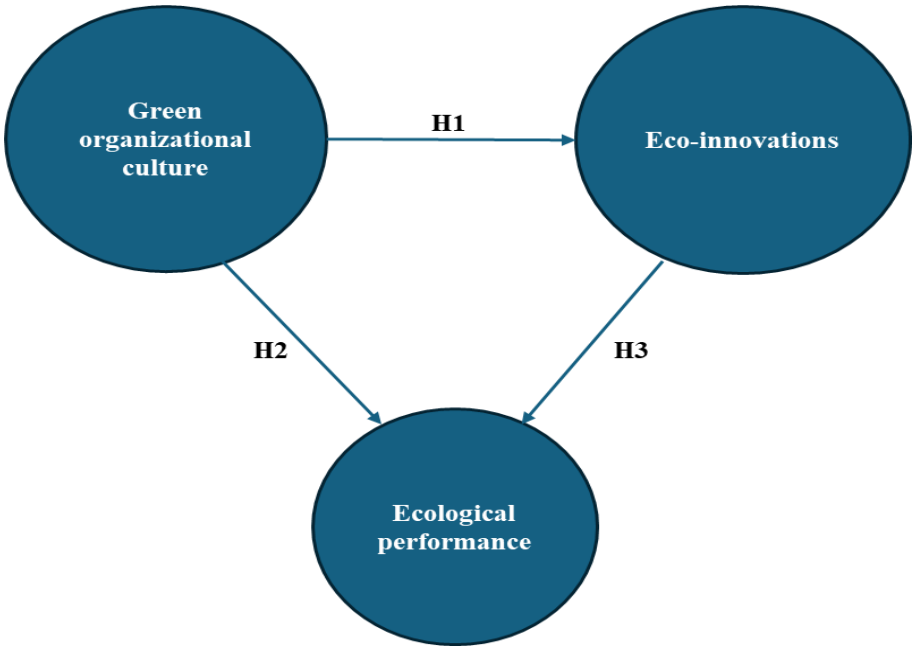

Figure 1 *Conceptual model*

Source: *author's own work*

METHODOLOGY

Data collection and sample

This study uses a subsample of three-, four-, and five-star hotels operating in the region of Dalmatia, extracted from a broader empirical study conducted within the hotel sector of the Republic of Croatia. The geographical scope of the study includes the areas of the Zadar, Šibenik-Knin, Split-Dalmatia, and Dubrovnik-Neretva counties. The spatial focus on Dalmatia was selected due to the specific characteristics of the region, marked by high tourism intensity, pronounced business seasonality, and a strong dependence of tourism competitiveness on environmental preservation, the quality of natural resources, and the efficient management of energy, water, and waste, which further emphasises the importance of sustainable business practices within the hotel sector.

The sampling frame included all registered hotels within the specified categories, resulting in the identification of a total of 308 hotels (123 three-star hotels, 157 four-star hotels, and 28 five-star hotels). Data was collected using an online survey questionnaire distributed via e-mail

to all identified hotels. The study was conducted between June and December 2023, and to increase the response rate, reminder e-mails and follow-up telephone contacts were used.

A total of 73 valid questionnaires were collected, representing a response rate of 23.7%. Hotel managers, directors, and owners participated in the study as individuals with an insight into the strategic and operational aspects of hotel business operations. The sample structure is presented in Table 1, showing that the largest proportion consists of small hotels (45.2%) and four-star hotels (63.0%), while most hotels operate as independent establishments (63.0%).

Table 1 Sample characteristics of hotels

Variables	Hotel Characteristics	N (73)	%
Hotel size	Small hotels	33	45.2
	Medium hotels	24	32.9
	Large hotels	16	21.9
Hotel category	3-star	21	28.8
	4-star	46	63.0
	5-star	6	8.2
Business form	Independent hotels	46	63.0
	Hotel chain	27	37.0

Note: Small hotels (up to 50 rooms); Medium hotels (51–200 rooms); Large hotels (more than 200 rooms)

Source: Authors' calculation based on the research results.

Prior to participation, respondents were informed about the purpose and objectives of the study. Since the data were collected through self-assessment and from a single source, there is a potential risk of common method bias (CMB). To mitigate this risk, procedural approaches recommended in the literature were applied, including ensuring the anonymity and confidentiality of responses, as well as voluntary participation of respondents (Podsakoff et al., 2003). The study was conducted in accordance with relevant ethical guidelines for research involving human participants.

Given the relatively small sample size, the exploratory nature of the model, and the research objective focused on examining direct and indirect relationships among variables, the Partial Least Squares Structural Equation Modeling (PLS-SEM) approach was applied for data analysis. The selection of the PLS-SEM approach is further justified by the inclusion of different types of variable operationalisation, namely reflective latent constructs (green organizational culture and ecological performance) and an aggregated composite indicator of

eco-innovations, which is consistent with recommendations for applying the PLS-SEM approach in studies involving relatively small samples and models that include different measurement specifications (Hair et al., 2019). Additionally, sample size adequacy was assessed in accordance with recommendations for PLS-SEM modelling. According to the inverse square root method and the gamma-exponential method proposed by Kock and Hadaya (2018), models with a limited number of predictors can achieve adequate statistical power even with relatively small samples. Since the proposed model includes a simple structure of relationships among the constructs and a maximum of two predictors per endogenous construct, the sample size of 73 hotels was considered sufficient for the application of the PLS-SEM approach and for testing the proposed hypotheses.

The data were coded and analysed using Microsoft Excel and SmartPLS software. To assess the statistical significance of path coefficients, a bootstrapping procedure with 5,000 subsamples and two-tailed significance testing at the 5% significance level was applied.

Measurement of constructs

Green organizational culture was measured using items adapted from the studies of Fraj et al. (2011) and Wang (2019). The construct comprises four statements reflecting the degree of integration of environmental values and sustainability into hotel operations. Responses were measured using a five-point Likert scale (1 = strongly disagree to 5 = strongly agree).

Eco-innovations were operationalised through four types: product/service, process, organizational, and marketing innovations, in accordance with the *Oslo Manual* of the OECD and Eurostat), which represents one of the most frequently used frameworks for defining and measuring innovation in scientific research (OECD/Eurostat, 2005, 2018). Respondents were asked whether they had implemented these types of eco-innovations during the period from 2020 to 2022, with a definition of each type included in the questionnaire. Each type was measured using a dichotomous variable (0 = no; 1 = yes), indicating the presence of implementation of a particular form of eco-innovation within the hotel.

Since different types of eco-innovations are not necessarily interchangeable nor highly correlated, eco-innovations in this study were not operationalised as a reflective latent construct but rather as an aggregated composite indicator of eco-innovation implementation at the hotel level. The eco-innovation variable was operationalised as the total number of implemented types of eco-innovations, whereby a higher value indicates a greater extent of eco-innovation implementation activities within the hotel. Accordingly, eco-innovations were included in the PLS-SEM model as a single-item composite measure of eco-innovation implementation, for which the assessment of internal consistency and convergent validity, characteristic of reflective measurement models, was not applicable (Hair et al., 2019).

Ecological performance was measured using two items adapted from the study of Asadi et al. (2020), relating to the reduction of negative environmental impacts and the reduction of resource consumption. Responses were measured using a five-point Likert scale (1 = significantly deteriorated; 5 = significantly improved), thereby enabling the assessment of changes in key ecological outcomes of hotel operations. Although constructs are often measured using a larger number of indicators, the selected items capture key dimensions of ecological performance and have been used in previous studies.

RESULTS

Descriptive results of eco-innovation implementation

The descriptive results presented in Table 2 indicate that product/service eco-innovations (71.2%) and process eco-innovations (68.5%) are the most prevalent, whereas organizational (34.2%) and marketing eco-innovations (38.4%) have been implemented in a smaller proportion of hotels. The largest proportion of hotels implemented two types of eco-innovations (28.8%), while 24.7% of hotels implemented all four types.

Table 2 Distribution of eco-innovation implementation in hotels

Variable	Category	N (yes)	%	N (no)	%
Type of eco-innovation	Product/service eco-innovations	52	71.2	21	28.8
	Process eco-innovations	50	68.5	23	31.5
	Organizational eco-innovations	25	34.2	48	65.8
	Marketing eco-innovations	28	38.4	45	61.6
Number of implemented eco-innovation types	No eco-innovations implemented	13	17.8	–	–
	One type of eco-innovation implemented	11	15.1	–	–
	Two types of eco-innovation implemented	21	28.8	–	–
	Three types of eco-innovation implemented	10	13.7	–	–
	Four types of eco-innovation implemented	18	24.7	–	–
	Total	73	100.0	–	–

Source: Authors' calculation based on the research results.

Assessment of the measurement model

The measurement model was assessed in terms of internal consistency, convergent validity, and discriminant validity, in accordance with the guidelines of the PLS-SEM approach. The assessment included an analysis of construct reliability, indicator outer loadings, and the evaluation of discriminant validity using complementary criteria.

Internal consistency and convergent validity

The results indicate that the reflective constructs of green organizational culture and ecological performance meet the criteria for reliability (Cronbach's α, rho_A, and composite reliability > 0.70) and convergent validity (AVE > 0.50). Eco-innovations were operationalised as an aggregated composite indicator representing the number of implemented eco-innovation types. Since eco-innovations do not constitute a reflective latent construct, the assessment of reliability and validity typical of reflective measurement models was not applicable.

Table 3 Measurement model: reliability, convergent validity, and outer loadings

Construct	Variable Description	Item	Loading	Cronbach's α	rho_a	rho_c	AVE
Green Organizational Culture (GOC)	Employees understand the importance of environmental protection	GOC1	0.914	0.954	0.961	0.966	0.878
	Environmental protection is a high priority	GOC2	0.963				
	Environmental protection is an important corporate value	GOC3	0.932				
	The hotel develops products/processes that minimise environmental impact	GOC4	0.938				
Ecological Performance (EP)	Reduced negative environmental impact	EP1	0.916	0.816	0.816	0.916	0.845
	Reduced energy/resource consumption	EP2	0.922				

Source: Authors' calculation based on the research results.

Discriminant validity

Discriminant validity was assessed using two complementary approaches: the heterotrait–monotrait ratio (HTMT) and the Fornell–Larcker criterion.

The HTMT ratio values for the reflective constructs, including the aggregated indicator of eco-innovations as an observed variable, are below the recommended threshold of 0.85, indicating satisfactory discriminant validity among the variables included in the model.

Table 4 Discriminant validity: heterotrait–monotrait ratio

Construct	Ecological Performance	Eco-Innovations	Green Organizational Culture
Green Organizational Culture	0.468	0.618	
Eco-Innovations	0.587		
Ecological Performance			

Source: Authors' calculation based on the research results.

Discriminant validity of the reflective constructs was further assessed using the Fornell–Larcker criterion. The results confirm satisfactory distinctiveness between green organizational culture and ecological performance, whereby the square roots of AVE exceed the corresponding

correlations. Since eco-innovations were operationalised as an aggregated implementation indicator rather than as a reflective latent construct, the Fornell–Larcker criterion for this variable should be interpreted with caution and is not considered the primary indicator of discriminant validity.

Table 5 Fornell–Larcker criterion

Construct	Green Organizational Culture	Ecological Performance
Green Organizational Culture	0.937	
Ecological Performance	0.416	0.919

Source: Authors' calculation based on the research results.

Assessment of the structural model

The structural model was assessed through the analysis of collinearity, overall model fit (SRMR), coefficients of determination (R^2), and effect sizes (f^2).

Collinearity among constructs was assessed using the Variance Inflation Factor (VIF) indicators of the structural model. All VIF values were below the recommended threshold of 3.3, with the highest recorded value being 1.586, confirming the absence of multicollinearity issues among the constructs. The Standardized Root Mean Square Residual (SRMR) value is 0.046, indicating a satisfactory level of model fit, as it is below the recommended threshold value of 0.08 for PLS-SEM models.

As shown in Table 6, the model explains 37 % of the variance in eco-innovations, indicating relatively good explanatory power. Furthermore, 29.5 % of the variance in ecological performance is explained by the included variables, which may be considered a moderate level of explanatory power. The small differences between the R^2 and adjusted R^2 values further confirm the stability of the model.

Table 6 Explained variance

Endogenous Construct	R^2	Adjusted R^2
Eco-innovations	0.370	0.361
Ecological performance	0.295	0.275

Source: Authors' calculation based on the research results.

The results indicate that green organizational culture has a large effect on the implementation of eco-innovations ($f^2 = 0.586$). On the other hand, its direct effect on ecological performance is small ($f^2 = 0.020$), while the implementation of eco-innovations exerts a moderate effect on ecological performance ($f^2 = 0.173$).

Table 7 Effect sizes

Path	**f^2**
Green organizational culture → eco-innovations	0.586
Green organizational culture → ecological performance	0.020
Eco-innovations → ecological performance	0.173

Source: Authors' calculation based on the research results.

Following the assessment of the structural model quality, the next step involved testing the direct and indirect relationships among the constructs in order to verify the proposed hypotheses.

Hypothesis testing

The results of hypothesis testing for direct and indirect relationships are presented in Tables 8 and 9.

Direct effects

On the one hand, the results of the structural model indicate a positive and statistically significant effect of green organizational culture on eco-innovations ($\beta = 0.608$; $p < 0.001$), thereby confirming Hypothesis H1. Furthermore, eco-innovations have a positive and significant effect on ecological performance ($\beta = 0.440$; $p < 0.001$), confirming Hypothesis H3. On the other hand, the direct effect of green organizational culture on ecological performance

is not statistically significant (β = 0.149; p = 0.155), and therefore Hypothesis H2 is not supported.

Table 8 Results of hypothesis testing (direct effects)

Hypothesis	Path	β	t	p	Result
H1	Green organizational culture → Eco-innovations	0.608	8.718	<0.001	Supported
H2	Green organizational culture → Ecological performance	0.149	1.422	0.155	Not supported
H3	Eco-innovations → Ecological performance	0.440	4.033	<0.001	Supported

Source: Authors' calculation based on the research results.

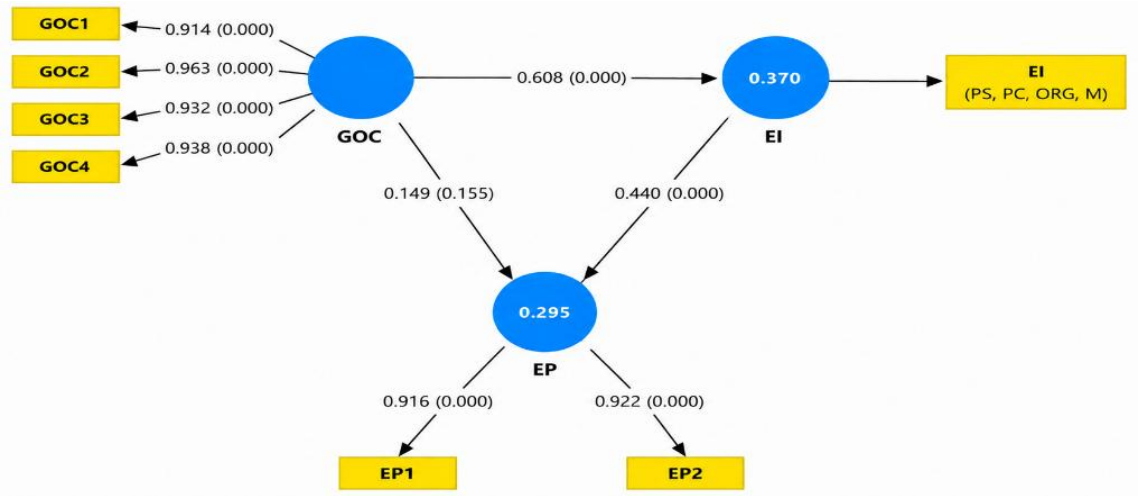

Figure 2 *Structural model results with standardized path coefficients (β), p-values, and R^2*

Source: author's calculation based on the research results.

Note: EI (eco-innovations) represents an aggregated composite measure of the implementation of different types of eco-innovations, including product/service (PS), process (PC), organisational (ORG), and marketing (M) eco-innovations.

Indirect effect

The results indicate that the indirect effect of green organizational culture on ecological performance through the implementation of eco-innovations is positive and statistically significant (β = 0.267; p < 0.001), thereby confirming Hypothesis H4. Since the direct effect of green organizational culture on ecological performance is not statistically significant, while the indirect effect is significant, the results indicate a pattern of full mediation of eco-innovation

implementation in the relationship between green organizational culture and ecological performance.

Table 9 Mediation effect results

Hypothesis	Path	β	t	p	Result
H4	Green organizational culture → Eco-innovations → Ecological performance	0.267	3.476	<0.001	Supported

Source: Authors' calculation based on the research results.

DISCUSSION

The findings of this study provide an important contribution to understanding the relationship between green organizational culture, eco-innovations, and ecological performance in the hotel sector, while also shedding light on the mechanisms through which organizational factors contribute to the achievement of ecological outcomes. Unlike approaches that view ecological performance as a direct consequence of organizational values, the findings suggest a more complex relationship in which the implementation of eco-innovations plays a mediating role. This further clarifies the mechanism through which internal organizational resources translate into tangible environmental outcomes.

The results confirm that green organizational culture has a positive and statistically significant effect on the implementation of eco-innovations, which is consistent with previous studies (Asadi et al., 2020; Gu, 2023; Roespinoedji et al., 2019; Wang, 2019). The findings suggest that the integration of environmental values into organizational culture increases the likelihood of implementing different types of eco-innovations in hotels. Since eco-innovations in this study were operationalised as an aggregated composite indicator of implementation, the results indicate that green organizational culture positively affects the extent of implementation across multiple types of eco-innovations. In other words, hotels with a more developed green organizational culture are more inclined to implement a broader range of eco-innovative solutions.

Furthermore, the results demonstrate that eco-innovations exert a positive and statistically significant effect on the ecological performance of hotels, in line with previous research

(Alsughayir, 2017; Elzek et al., 2021; Fatoki, 2021; Marfo et al., 2024; Tseng et al., 2013). This finding suggests that the implementation of eco-innovations represents an important operational mechanism through which hotels improve ecological performance by enabling more efficient resource utilisation and reducing negative environmental impacts. Given that eco-innovations were operationalised as an aggregated indicator of different types of innovation activities, the findings further suggest that a broader scope of implementation may contribute to improved ecological performance in hotels. This highlights the importance of systematically implementing different types of eco-innovations, whereby the combined application of product/service, process, organizational, and marketing innovations may be more effective than the partial adoption of individual innovation activities.

One of the significant findings of this study relates to the fact that green organizational culture did not demonstrate a statistically significant direct effect on ecological performance, which deviates from the findings of Wang (2019), Fatoki (2021), and García-Machado and Martínez-Ávila (2019). This result provides important insight into the nature of the relationship between organizational values and ecological outcomes. The findings suggest that green organizational culture may not be sufficient to achieve measurable ecological outcomes but rather functions primarily as an organizational precondition that stimulates the development and implementation of eco-innovations. In other words, organizational values oriented towards environmental protection must be translated into concrete activities and investments in order to result in reduced resource consumption and diminished environmental impacts.

The divergence from previous studies may be partially explained by the specific characteristics of the hotel sector in Dalmatia. More specifically, the findings may indicate that pronounced business seasonality and operational constraints hinder the direct translation of green organizational values into measurable environmental outcomes unless they are supported by the systematic implementation of eco-innovations. Furthermore, the absence of a direct effect may also be associated with the measurement of ecological performance, which is based

on respondents' subjective assessments, as well as with a potential time lag between the development of organizational culture and the achievement of measurable ecological outcomes. The results of the mediation analysis further reinforce this interpretation, demonstrating that the indirect effect of green organizational culture on ecological performance through eco-innovations is positive and statistically significant. Given that the direct effect is not significant, while the indirect effect is significant, the findings indicate a pattern of full mediation within this sample. The results demonstrate that green organizational culture does not exert a direct influence on ecological performance but rather affects it indirectly through eco-innovations. Such a finding may be interpreted in the context of organizational culture as a distal variable, whose effects on performance require operationalisation through specific organizational capabilities and activities. In this regard, eco-innovations represent a key mechanism through which organizational values are transformed into measurable environmental outcomes, which is fully aligned with the assumptions of the NRBV perspective.

The findings should also be interpreted considering the specific characteristics of the hotel sector in Dalmatia, marked by pronounced seasonality and a strong dependence of tourism competitiveness on the quality of natural resources. In such an environment, where intensive tourism activity during the season increases pressure on energy, water, and waste management systems, the findings suggest that the sustainability of hotel operations does not arise solely from organizational values oriented towards environmental protection but requires their transformation into concrete innovative solutions. The results indicate that hotels in Dalmatia achieve superior ecological outcomes when green organizational culture is translated into product/service, process, organizational, and marketing innovations that enable more efficient resource management.

From a theoretical perspective, the results provide additional empirical support for the assumptions of the RBV and NRBV approaches. In line with RBV theory, green organizational culture may be regarded as a valuable and difficult-to-imitate internal resource that fosters the development of organizational capabilities. However, the findings particularly underscore the

importance of the NRBV perspective, according to which organizational resources do not affect performance directly but rather exert their influence through the development of specific capabilities and innovations. In this case, eco-innovations represent precisely such a mechanism, thereby empirically confirming the transformational role of organizational capabilities in linking resources to environmental outcomes.

In addition to its theoretical contribution, the findings also carry important practical implications for the hotel sector. The results clearly suggest that the development of green organizational culture, although important, is not sufficient to achieve improved ecological outcomes unless accompanied by concrete innovation activities. Hotel managers should therefore systematically invest in the implementation of product/service, process, organizational, and marketing eco-innovations. In the context of Dalmatia, where environmental preservation constitutes a key resource for tourism competitiveness, the ability to transform organizational values into innovation activities becomes a critical prerequisite for the long-term sustainability and competitiveness of the hotel sector.

CONCLUSION

The findings of this study confirm that green organizational culture has a positive and statistically significant effect on eco-innovations, while eco-innovations significantly contribute to the ecological performance of hotels. Conversely, the direct effect of green organizational culture on ecological performance was not confirmed.

The findings suggest that green organizational culture represents an important organizational resource. However, it is not sufficient to generate measurable ecological outcomes. Its contribution to ecological performance is achieved primarily through the development and implementation of eco-innovations, which function as a key operational mechanism for translating organizational values into tangible environmental outcomes. This confirms that sustainability in the hotel sector is not solely the result of declarative commitment but requires the systematic implementation of innovation activities aimed at more efficient resource management and the reduction of negative environmental impacts.

This paper contributes to the literature by empirically confirming the mechanism through which internal organizational resources influence ecological performance, in accordance with the assumptions of the Resource-Based View and Natural Resource-Based View approaches. The findings particularly emphasise the transformational role of eco-innovations as organizational capabilities that connect organizational culture with environmental outcomes.

From a practical perspective, the findings highlight the need for hotel management to view sustainability not exclusively through the development of organizational values but through the implementation of concrete eco-innovation activities. In the context of Dalmatia, where environmental preservation represents a key resource for tourism competitiveness, the ability to transform green organizational values into innovative practices becomes an important prerequisite for the long-term sustainability and market success of hotels.

Despite its significant findings, the study has certain limitations that should be taken into consideration. The relatively small and geographically limited sample may affect the generalisability of the findings, while the measurement of ecological performance is based on respondents' perceptual assessments. Furthermore, eco-innovations were operationalised as an aggregated indicator that does not capture the intensity of their implementation. Future research should include larger and more diverse samples, utilise objective indicators of ecological performance, and provide a more detailed analysis of specific types of eco-innovations and their differentiated effects.

In conclusion, the findings suggest that the sustainability of hotel operations is not solely a matter of organizational values but of the ability to transform these values into concrete eco-innovation activities. This highlights the importance of organizational capabilities as a key mechanism through which hotels can achieve measurable ecological outcomes and strengthen sustainable competitiveness in the long term.

Data Availability Statement: Data are available from the authors upon request.

Conflict of Interest: The author declares no conflict of interest.

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