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Business Leadership Driven by Honesty and Transparency: Investigating the Nexus Between Sustainability Certifications, Customer Trust, and Satisfaction

Tetiana Zavalii, **ORCID:** https://orcid.org/0000-0002-6315-5646
Ph.D., Department of Management, Business and Marketing Technologies, Faculty of Business and Service Sector, Zhytomyr Polytechnic State University, Ukraine
Ramazan Eren, **ORCID:** https://orcid.org/0000-0002-6619-5360
Ph.D., Department of Tourism Management, Manavgat Tourism Faculty, Akdeniz University, Antalya, Türkiye
Serhii Lehenchuk, **ORCID:** https://orcid.org/0000-0002-3975-1210
Dr. of Economic Sciences, Professor, Department of Information Systems in Management and Accounting, Faculty of Business and Service Sector, Zhytomyr Polytechnic State University, Ukraine
Nataliya Zdyrko, **ORCID:** https://orcid.org/0000-0001-5968-3502
Dr. of Economic Sciences, Professor, Educational and Scientific Institute of Economics and Management, Vinnytsia National Agrarian University, Vinnytsia, Ukraine
Zuzana Kubaščikova, **ORCID:** https://orcid.org/0000-0001-6739-1278
Ph.D., Associate Professor, Department of Accounting and Audit, Faculty of Economic Informatics, Bratislava University of Economics and Business, Bratislava, Slovakia
Bogdan Svyd, **ORCID:** https://orcid.org/0009-0009-1066-4488
Ph.D. student, Department of Tourism, Faculty of Trade, Business and Customs Management, State Biotechnological University, Kharkiv, Ukraine

Corresponding author: Serhii Lehenchuk, legenchyk2014@gmail.com
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Abstract: *Business leadership driven by sustainability certifications has become a critical approach for signaling environmental responsibility and building customer trust in the hospitality industry. However, their effectiveness in enhancing guest satisfaction remains poorly understood, particularly regarding whether the quantity of certification or specific credential types drives positive outcomes. This study examines the relationship between sustainability certifications, customer trust, and satisfaction among certified hotels and resorts in Türkiye's Mediterranean region, a destination experiencing significant environmental pressures and intense tourism competition. The research analyzes 95 eco-certified properties across 15 districts during June 2025, selected through purposive sampling to ensure representation of diverse certification types and hotel characteristics. Customer satisfaction data were aggregated from three major digital platforms (Booking.com, Google Reviews, and TripAdvisor) providing a comprehensive multi-platform assessment of guest perceptions. The study employs ordinary least squares regression analysis to test hypotheses derived from signaling theory, examining both cumulative certification effects and individual credential impacts while controlling organizational and locational factors. Results reveal that the quantity of certifications shows no significant association with customer satisfaction, challenging the assumption that cumulative signalling effects are present. However, internationally recognized certifications (Green Key, Travelife for Accommodation, and LEED) demonstrate statistically significant positive associations with guest ratings, while regional mandatory programs show no measurable impact. Review volume emerges as the strongest predictor of satisfaction scores, indicating that operational excellence and guest engagement outweigh formal credentials. These findings provide actionable insights for business leadership in hotel managers developing certification strategies, policymakers promoting sustainable tourism, and certification bodies seeking to enhance program effectiveness through transparency-focused business leadership and trust-building mechanisms in competitive hospitality markets.*

Keywords: business leadership, customer satisfaction, Mediterranean region, professional ethics, quality, sustainability certification, tourism, trust, Türkiye.
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INTRODUCTION

In recent decades, sustainability has become a pivotal dimension of strategic management in the hospitality industry. Business leadership in this context increasingly emphasizes transparency and honesty as foundational principles for building customer trust. Hotels, as prominent actors within tourism, face mounting pressures to mitigate their environmental impact while appealing to increasingly eco-conscious consumers. As a response, numerous properties have adopted sustainability certifications to visibly demonstrate their commitment to environmentally responsible operations and build customer trust.

The hospitality industry's adoption of sustainability certifications reflects a broader trend of businesses engaging in environmental initiatives, thereby signaling their eco-position. This trend is particularly noticeable in the tourism industry, which, on the one hand, is a significant factor in environmental degradation and climate change (Preziosi et al., 2022), and on the other hand, can significantly contribute to the achievement of the Sustainable Development Goals by promoting sustainable practices that improve local economies while minimizing environmental impacts (Aall, 2014; Olszewski-Strzyżowski, 2022). This is particularly true of the Mediterranean region of Türkiye.

While primarily focused on supporting the United Nations Sustainable Development Goals, these certifications represent business leadership practices that give hotels a competitive advantage through demonstrated transparency and professional ethics. They are visible indicators of a hotel's environmental and social responsibility, making them attractive to guests who prioritize sustainability (Velaoras et al., 2025).

Yet the relationship between certificationism, customer trust, and satisfaction remains poorly understood. Despite the growing importance of sustainability in the hotel industry, the extent to which different certification levels influence guest satisfaction remains unclear (Goodarzi et al., 2025). Such uncertainty complicates decision-making processes for hotel enterprises regarding the feasibility of certification investments. The effectiveness of eco-certification in tourism remains highly debated, with no agreement on whether eco-certification increases tourist demand among the general population or whether specific market segments are influenced by eco-labels (Karlsson & Dolnicar, 2016). The ambiguity of previous research suggests that further investigation is necessary to understand the impact of sustainability certifications on various customer perceptions, including satisfaction levels. It is worth noting that information asymmetry poses significant challenges to tourism e-commerce, particularly due to the intangible and experiential nature of tourism services (Elshaer et al., 2025). Thus, guests can trust quality indicators such as sustainability certificates.

The Mediterranean region of Türkiye presents significant interest for conducting such research due to its high tourism importance and wide representation of hotels and resorts with various sustainability certifications. This study examines the associations between different sustainability certifications and customer ratings among certified Mediterranean hotels and resorts in Türkiye, identifying which certification characteristics are linked to higher guest satisfaction. By employing signaling theory as the theoretical framework, this research seeks to understand how sustainability certifications function as quality signals and their associations with customer perceptions and satisfaction outcomes, providing quantifiable indicators to assess rating differences among different types of certified establishments. The study contributes to the sustainability and hospitality literature by providing empirical evidence on the associations between environmental certifications and customer satisfaction in a significant tourism destination, offering insights for business leadership focused on client-oriented management through honesty and transparency standards. It offers actionable insights for hotel managers seeking to understand the potential relationships between their sustainability certifications and customer ratings.

This study examines associations between different certification types among certified properties only. Without comparison to non-certified hotels, the study cannot assess the overall impact of certification possession versus absence.

LITERATURE REVIEW

Signaling Theory and Sustainability Certifications

Signaling theory, developed by Michael Spence in 1973, explains the mechanisms of information transmission under conditions of asymmetric information distribution between market agents (Spence, 1973). The core postulate of the theory is that informed parties can credibly convey hidden information about their quality through costly signals that low-quality agents cannot afford to imitate due to the economic unfeasibility of such expenditures. The effectiveness of a signal depends on its ability to create a separating equilibrium, where only high-quality agents have incentives to signal. In contrast, low-quality agents refrain from doing so due to excessive costs relative to the benefits received.

The hotel sustainability certifications represent a practical application of signaling theory, where the combination of certification costs, continuous standard adherence, and periodic verification creates an economic mechanism that separates genuinely sustainable hotels from those with superficial environmental claims. Environmental certifications signal the voluntary implementation of environmental initiatives by hospitality providers, thus giving credibility through conformity assessments that a hotel has taken concrete actions toward its environmental commitment (Bernard & Nicolau, 2022). This proactive approach can minimize market skepticism toward hotel companies' ecological initiatives since it signals that a commitment is being made to implement actions to reduce environmental impact.

The relationship between signaling and trust formation is crucial for understanding certification effectiveness. Research confirms that trust acts as a mediator between information asymmetry and customer satisfaction, enhancing reliability, integrity, and competence among exchange partners. This demonstrates that sustainability certifications can build trust by reducing information gaps between hotels and guests (Elshaer et al., 2025). This suggests that certifications serve not only as informational tools but also as trust-building mechanisms that influence guest perceptions and subsequent booking decisions. Business leadership in hospitality increasingly recognizes that effective certification strategies require more than symbolic compliance – they demand transparent communication of genuine environmental commitments that align professional ethics with consumer interests.

The effectiveness of such signals can be empirically measured through customer satisfaction ratings, as demonstrated in hospitality research where ratings serve dual functions as both market signals and outcome measures of actual service quality (Sayfuddin & Chen, 2021). This dual nature of ratings provides researchers with a valuable tool for assessing the real-world impact of sustainability certifications.

Empirical evidence from destination-level studies supports the economic value of environmental signaling. Blackman et al. (2014) found that Costa Rica's Blue Flag Program eco-certification generates substantial private economic benefits for local hotels, leading to increased hotel construction and room development in Blue Flag Program communities. The authors identified signaling as the primary causal mechanism, where this certification provides tourists with a credible signal of the environmental quality of beach communities, thereby increasing demand for hotel rooms at certified destinations. This case study illustrates how signaling effects can extend beyond individual hotels to influence destination competitiveness.

Building on this destination-level perspective, contemporary research confirms the multidimensional impact of sustainability certifications on the hotel industry. Kaithlin (2024) establishes through theoretical synthesis that effective green certifications simultaneously perform functions of quality signaling, trust building, and competitive advantage creation.

This multifunctional significance of certifications explains why their effectiveness may vary depending on certification type, implementation level, and market context, thus necessitating empirical investigation of specific effects of individual certification types on customer satisfaction.

Effectiveness and Implementation of Sustainability Certifications

Sustainable practices are becoming standard in hospitality as both authorities and travelers expect more environmentally responsible operations. Research indicates that customers appreciate the hotel's commitment to the natural environment, which serves as a significant differentiation strategy in the market (Preziosi et al., 2022). The adoption of sustainability certifications represents a strategic choice for tourism providers, reflecting business leaders' commitment to quality standards and client-oriented management. This can be a key factor in achieving success, as it enhances the image of the service provider while improving internal processes in terms of quality and efficiency (Leroux & Pupion, 2017). This signaling function becomes particularly important in addressing information asymmetries between hotels and potential guests regarding environmental quality and sustainable practices.

However, research on environmental certification schemes reveals that their effectiveness is not straightforward. Geerts (2014) identified three primary objectives of environmental certification schemes in the hotel industry: promoting the adoption of sustainable practices, enhancing profitability, and providing more transparent information to guests. Through interviews with 21 London hotel managers and analysis of 196 hotel websites, the study revealed that not all of these objectives are achieved. While certification schemes provide knowledge to hoteliers and help counter accusations of "greenwashing", their impact on profitability is questionable, and due to limited communication of certifications by hotels, different certifications often fail to provide guests with more accurate information.

Moreover, companies do not perceive enough external benefits to justify greater involvement in more extensive and effective communication. Companies that simply introduce the certification logo somewhere take the risk that it will not be identified and therefore will not serve as a distinctive element, given the

saturation of existing certification schemes (Heras-Saizarbitoria et al., 2020). This suggests that the mere possession of certifications may not automatically translate into improved customer experience without proper integration into service delivery.

Digital Transformation and Customer Experience Measurement

In today's digitally mediated hospitality market, customer satisfaction is increasingly evaluated through online platforms, where guest reviews and ratings serve dual roles, as outcomes reflecting actual service quality and as signals influencing future customer decisions (Sayfuddin & Chen, 2021). The presence of sustainability certifications on platforms such as Booking.com or TripAdvisor may enhance a hotel's pre-purchase appeal, especially when certifications are accompanied by visual markers or filtering functions. The reputation that reviews create should be a concern for the accommodation business (Kolesárová et al., 2024).

The temporal dimension of this signaling process reveals how sustainability certifications function as quality indicators throughout the customer journey. Information about hotel certifications, including eco-certifications, is actively sought and processed by potential customers during the pre-travel research and booking phase through online platforms. Major booking platforms have implemented specialized filtering systems that enable customers to identify certified sustainable properties, as evidenced by the Booking platform's certification filtering feature, which allows users to search specifically for hotels with sustainability certifications. These platforms also display visual sustainability badges directly on individual hotel pages, highlighting certified properties.

After experiencing hotel services, customers typically express their satisfaction levels through online review scores on various platforms. This creates a temporal separation between the certification signal (pre-travel) and the satisfaction outcome (post-travel), establishing a measurable cause-and-effect relationship where sustainability certifications serve as quality signals that potentially influence subsequent customer satisfaction ratings (positive and negative) as reflected in online reviews.

Consumer Attitudes Toward Green Hotel Practices

Hotel consumers display positive attitudes toward green hotel practices, which provides a starting point for motivating hotels to continue improving their environmental impact performance (Fuentes-Moraleda et al., 2019). However, Cembruch-Nowakowski (2020) emphasizes the critical need for easily accessible and visible eco-labels to bridge the information gap between environmentally conscious consumers and green hotel practices, noting that access to information regarding that dimension of hotel activity is not easy.

This signal-to-outcome pathway represents a fundamental shift in how customer satisfaction is both communicated and measured in the digital era, making online review scores critical indicators for assessing whether sustainability certifications translate into tangible improvements in guest satisfaction levels.

Based on signaling theory and a review of the literature on sustainability certifications and customer satisfaction, this study proposes the following hypotheses. Hypothesis H1 is tested through Model 1, which examines the cumulative effect of certification quantity, while hypotheses H2a–H2g are tested through Model 2, which analyzes the individual effects of specific certification types:

H1: *Among certified Mediterranean hotels and resorts in Türkiye, there is a positive association between the quantity of sustainability certifications and customer satisfaction ratings.*

H2a: *Within the certified hotel sample, hotels with Green Key (FEE) certification are associated with higher customer satisfaction ratings.*

H2b: *Within the certified hotel sample, hotels with Travelife for Accommodation certification are associated with higher customer satisfaction ratings.*

H2c: *Within the certified hotel sample, hotels with Türkiye Sustainable Tourism Program certification are associated with higher customer satisfaction ratings.*

H2d: *Within the certified hotel sample, hotels with LEED certification are associated with higher customer satisfaction ratings.*

H2e: *Within the certified hotel sample, hotels with ISO Bundle certification (ISO 14001:2015, ISO 50001:2018, ISO 9001:2015) are associated with higher customer satisfaction ratings.*

METHODOLOGY

Research Design and Sampling

This study employs a quantitative, cross-sectional research design to investigate the relationship between sustainability certifications and customer satisfaction in the hospitality sector. The unit of analysis consists of individual hotels and resorts located in the Mediterranean region of Türkiye that possess at least

one formal sustainability certification. The sampling frame was constructed using Booking.com's sustainability-certified property filter. Hotels were included in the sample if they were located in the Mediterranean coastal provinces of Türkiye, publicly declared at least one sustainability certification, and had accessible customer ratings on three major online platforms: Booking.com, Google Business Profile (Google Reviews, hereafter Google Reviews), and TripAdvisor.

A total of 95 certified properties met these criteria and were selected through purposive sampling across 15 districts in Türkiye's Mediterranean region. The sample encompasses coastal properties distributed across major Mediterranean tourism destinations, including Antalya, Muğla, Mersin, and other provinces along Türkiye's southern coastline, representing diverse geographic locations from eastern to western Mediterranean zones.

The study analyzed establishments with active profiles on three major digital platforms: Booking.com, Google Reviews, and TripAdvisor. The empirical basis consisted of secondary data collected from multiple sources during June 2025. Customer rating data were extracted from the aforementioned digital platforms, while hotel characteristics (room count, star rating, location attributes) were obtained from official tourism digital media, hotel websites, and hotel factsheets. Only hotels and resorts with complete information across all three rating platforms were included in the sample. The sample included properties with star ratings ranging from 3 to 5 stars. Independent properties and international chain hotels were both included to ensure sample representativeness of the Mediterranean coastal hospitality market in Türkiye's key tourism destinations.

Variables

Regression analysis enables testing the hypotheses about causal relationships by measuring how independent variables explain variations in a dependent variable. In this study, regression analysis is employed to examine the association between hotel eco-certification parameters and customer satisfaction. A statistical method such as multiple regression analysis allows researchers to simultaneously examine the relationship between one dependent variable and one or more independent variables. Financial performance indicators are most frequently the object of study in multifactor regression analysis in the hotel industry, particularly hotel room price (Hung et al., 2009; Chatibura, 2023). Other key indicators include revenue per available room (Bresciani et al., 2019; Jiang & Taylor, 2020) and occupancy rate (Xie et al., 2017).

Additionally, operational performance metrics such as energy use intensity (Tang et al., 2016), efficiency score (Kaya, 2023), and average transaction value (Jenq, 2019) are also commonly used dependent variables in hotel industry regression analyses. Customer satisfaction, as measured through online review platforms, has emerged as a key dependent variable in hospitality regression analysis, with researchers examining how hotel amenities and service characteristics influence digital customer feedback scores (Radojević et al., 2017; Arzaghi et al., 2023; Singh et al., 2023).

Within this digital valuation context, sustainability certification gains increasing recognition as a factor influencing customer satisfaction. Evidence suggests that hotel managers are starting to recognize the significance of green practices in influencing clients' purchasing decisions and levels of satisfaction (Qubbaj et al., 2023). Given that most hotel bookings now occur online through booking platforms, these digital marketplaces play a crucial role in signaling environmental commitment through promoting environmentally friendly initiatives (Foris et al., 2020). However, despite the growing importance of sustainability in the hotel industry, the extent to which different LEED certification levels influence guest satisfaction remains unclear (Goodarzi et al., 2025). This ambiguity necessitates further investigation into the relationship between individual sustainability certifications and customer satisfaction measures.

To address this research gap, the present study employs multiple regression analysis to examine the relationship between sustainability certifications and customer satisfaction in Mediterranean hotels and resorts. This analytical approach enables the quantification of individual impacts of specific certifications on customer ratings while controlling other relevant factors, providing actionable insights for hospitality management decision-making.

Dependent Variable

The dependent variable, *average customer reviews score* (ACRS), was calculated as the arithmetic mean of customer satisfaction ratings obtained from three major digital platforms: Booking.com, Google Reviews, and TripAdvisor. While previous studies have utilized customer satisfaction ratings from individual online platforms as dependent variables (Arzaghi et al., 2023; Kim & Kim, 2022; Peiró-Signes et al., 2014), this aggregated approach combining ratings from multiple platforms represents a novel methodological contribution to existing literature.

Given that the platforms use different rating scales (Booking.com: 1–10, Google Reviews: 1–5, TripAdvisor: 1–5), all ratings were normalized to a 0–100 scale before calculating the arithmetic mean. This approach ensures equal weighting of ratings across platforms and maintains the relative differences within each platform's original scale.

Independent Variables

The independent variable, *quantity of sustainability certificates*, represents the total number of sustainability certifications possessed by each hotel or resort property. Seven types of sustainability certificates were identified (Green Key (FEE), Travelife for Accommodation, Türkiye Sustainable Tourism Program, LEED, ISO 14001:2015 Environmental management system, ISO 50001:2018 Energy management systems, and ISO 9001:2015 Quality management systems), with quantities ranging from 1 to 7 certifications per property. This aggregate measure captures the overall sustainability commitment intensity of each establishment. To examine the differential impact of specific sustainability certifications on customer satisfaction, the study employs dummy variables for each certification type. Each certification was coded as a binary variable (1 = *certified*, 0 = *non-certified*), which is particularly appropriate since sustainability certifications are discrete, mutually non-exclusive categories that hotels either possess or do not possess.

This approach enables examination of individual certification contributions to customer satisfaction while controlling other factors. The regression coefficients represent the average difference in customer satisfaction scores between certified and non-certified properties for each specific certification type, providing insights into which certifications demonstrate the strongest positive impact on customer satisfaction scores.

Green Key (FEE)

This certification from the Foundation for Environmental Education evaluates hotels across 13 criteria encompassing environmental aspects (water, energy, waste, indoor environment), operational practices (environmental management, cleaning, food & beverage), social responsibility (staff involvement, guest information, corporate social responsibility), and territorial management (green areas, green activities, administration). This third-party certified international ecolabel represents the world's leading standard of excellence for environmental responsibility and sustainable operations in the travel industry, demonstrating that companies make more effort than required by law to achieve environmental sustainability (Buunk & van der Werf, 2019; Wszendybył-Skulska & Panasiuk, 2024).

The certification emphasizes continuous improvement through periodic reassessments, ensuring that hotels remain committed to sustainability over time (Velaoras et al., 2025). Research by Tüfek and Çalhan (2024) found that Antalya had the highest concentration of certified hotels in Türkiye, with 62 out of 126 Green Key certified hotels located in this region in 2023.

Travelife for Accommodation

Developed by Travelife, this leading sustainability certification system is specifically designed for accommodation providers, focusing on the social, environmental, and economic impact of hotels while offering a balanced perspective on sustainability (Velaoras et al., 2025). The program evaluates properties across multiple dimensions of sustainability. It requires continuous improvement, as well as annual verification of sustainability practices. It assesses hotels on criteria including fair labor practices, community engagement, and support for local economies. According to Bogdanova et al. (2024), who researched the Burgas Region (Bulgaria), tour operators impose requirements on hoteliers and make them an integral part of their contracts, with higher-class hotels (4 and 5 stars) being required to have sustainability certificates such as Travelife in order to accept foreign tourists.

Türkiye Sustainable Tourism Program Certification

Established by the Turkish government in partnership with the Global Sustainable Tourism Council (GSTC), this mandatory national sustainable tourism program marks a fundamental shift in sustainable tourism governance. Türkiye became the first country worldwide to establish a government-mandated national sustainable tourism program through an official GSTC partnership agreement in 2022. The legal foundation was established through Directive 2022/2, issued on November 15, 2022, which transformed sustainability from a voluntary concept into a mandatory regulatory requirement, requiring all accommodation establishments to obtain at least Stage 1 Verification by December 31, 2023, with progressive compliance requirements leading toward full GSTC standards implementation by 2030 (Demir & Denk, 2025).

The framework encompasses comprehensive sustainable management across environmental stewardship, socio-economic development, and cultural heritage preservation, ensuring accommodation facilities maximize social and economic benefits for local communities, enhance cultural heritage protection,

preserve biodiversity and ecosystems, reduce environmental pollution, and optimize resource conservation (GoTürkiye). Certified facilities undergo independent auditing and verification processes, with mandatory annual re-evaluation to maintain their certification status. The complete list of certified Turkish hotels, along with their certification expiry dates, is publicly available on the official GoTürkiye website. Implementation includes comprehensive monitoring requirements that cover water and energy consumption, waste volume management, carbon footprint assessment, and tracking of greenhouse gas emissions (Hazarhun et al., 2023).

The program represents a fundamental transformation of Türkiye's tourism industry standards and establishes a competitive advantage for Turkish hospitality businesses in the global sustainable tourism market. In comparison with Mediterranean competitors, Türkiye's approach to sustainable tourism certification is notably more comprehensive and mandated, while France focuses primarily on regulatory modernization and accommodation classification standards, Spain emphasizes green transition and digital transformation through its Tourism Sustainability Strategy, and Italy targets specific segments like healthy living tourism and sustainable tourism for the elderly while addressing overtourism through innovative itineraries and de-seasonalization initiatives (Demir & Denk, 2025).

LEED (Leadership in Energy and Environmental Design)

Developed by the U.S. Green Building Council (USGBC), this globally recognized green building rating system provides a framework for healthy, highly efficient, and cost-saving green buildings across various project types, including hospitality facilities (USGBC). The system evaluates buildings across nine categories: Integrative Process, Location and Transportation, Sustainable Sites, Water Efficiency, Energy and Atmosphere, Materials and Resources, Indoor Environmental Quality, Innovation, and Regional Priority (LEED Scorecard). LEED operates on a point-based system with four certification levels: Certified, Silver, Gold, and Platinum, allowing properties to demonstrate varying degrees of environmental performance and sustainability achievement (İlban et al., 2022). The program emphasizes measurable results through mandatory performance monitoring, usage tracking for water and energy, and indoor air quality assessments, making it particularly valuable for hospitality properties seeking to demonstrate quantifiable environmental benefits to stakeholders.

Research on six LEED-certified hotels in Istanbul reveals significant operational advantages: hotels achieve up to 70% water savings through efficient irrigation systems and 24% energy savings through energy-efficient equipment, while 75% of construction waste is directed to recycling (Aydoğan, 2024). Such properties typically achieve substantial operational cost savings through reduced energy and water consumption, improved indoor air quality, and enhanced guest satisfaction resulting from healthier indoor environments. Studies indicate that guests increasingly recognize and value sustainable hotel practices, with LEED serving as a preference factor for both domestic and international travelers (İlban et al., 2022; Çakır Kıasıf, 2020). According to research by Tuna Arslan et al. (2023), Gold LEED certification creates a synergistic effect for hotels, transforming environmental responsibility into economic and marketing advantages without any disadvantages for the establishment.

Buildings must recertify every five years to maintain their LEED status, ensuring continued commitment to environmental excellence. In the hospitality sector, LEED has become increasingly important for attracting environmentally conscious travelers and meeting corporate sustainability requirements. Major hotel chains are implementing these standards as part of their global sustainability strategies to reduce operational costs and environmental impact while enhancing their brand reputation. However, despite holding LEED certification, analysis of hotel websites revealed a lack of comprehensive information about sustainability certifications, environmental and waste management, water and indoor air quality management, and green marketing, indicating insufficient use of digital channels to communicate environmental benefits to guests (Aydoğan, 2024).

ISO Certification

ISO certification represents a comprehensive framework of internationally recognized standards that enables organizations to demonstrate systematic excellence in environmental management, energy efficiency, and quality systems. This research examines three specific ISO certifications most relevant to hospitality sustainability: ISO 14001:2015, Environmental Management Systems; ISO 50001:2018, Energy Management Systems; and ISO 9001:2015, Quality Management Systems.

ISO 14001:2015 provides organizations with a systematic approach to environmental stewardship, requiring comprehensive management of environmental impacts, including waste reduction, water conservation, and carbon footprint minimization. The standard emphasizes risk-based thinking, leadership commitment, and stakeholder engagement to achieve continuous environmental performance improvement.

ISO 50001:2018 establishes frameworks for systematic energy management, enabling organizations to improve energy performance, increase efficiency, and reduce operational costs. The standard requires the establishment of an energy baseline, the development of performance indicators, and the implementation of data-driven energy management plans that target areas of significant energy consumption.

ISO 9001:2015 focuses on quality management systems that ensure consistent service delivery and customer satisfaction. The standard adopts a process approach emphasizing leadership engagement, customer focus, and continual improvement to meet regulatory requirements and exceed customer expectations. ISO 9001 represents the main global standard for quality management in the hospitality industry and has been adopted by more than one million organizations worldwide (Heras-Saizarbitoria et al., 2015).

For hospitality establishments, integrated ISO certification provides significant competitive advantages through operational cost savings, enhanced guest satisfaction, improved environmental credentials, and systematic risk management. The synergistic implementation of these standards creates comprehensive management frameworks that address sustainability, efficiency, and service excellence while meeting increasingly stringent regulatory requirements and stakeholder expectations.

ISO-certified properties demonstrate measurable commitment to environmental responsibility, operational excellence, and quality service delivery, making certification increasingly valuable for attracting environmentally conscious travelers and meeting corporate sustainability requirements in the competitive hospitality market.

Nevertheless, the precise mechanisms through which ISO certifications influence customer perceptions remain underexplored. As noted by Peiró-Signes et al. (2014), there is still a research gap in the understanding of what part (or how much) of the higher rankings is due to the implementation of the ISO 14001 and to what extent other attributes are acting as moderating factors. This observation highlights the importance of examining not only individual certification impacts but also the cumulative effects of multiple sustainability credentials on guest satisfaction ratings.

Control Variables

According to Nazari et al. (2020), the researchers regarded four major factors (star ratings, size, hotel age, and location) as control variables, as they affected the hotel's performance. The widespread use of independent/control variables related to the categories of *size*, *age*, *location*, and *star rating* is confirmed by examples from hotel business research (Appendix A).

The study also includes the *quantity of reviews* as a control variable to account for the volume dimension of guest feedback, given that the dependent variable focuses on the qualitative aspect of service ratings. Each of these control variables requires detailed examination to understand its specific impact on hotel performance.

Size

Firm size significantly impacts an organization's performance (Hui et al., 2024). It is a complex, multidimensional concept that lacks a single, unambiguous definition (Zavalii et al., 2025). Firm size can be measured in various ways, ranging from conventional financial and operational indicators to industry-specific proxies. The most commonly used measures include market capitalization (Jung & Shegai, 2023), total assets, number of employees, and sales (Zavalii et al., 2025), growth rate (Hung et al., 2021), etc.

The size of hotels may determine many characteristics of the hotel operations (Kim et al., 2011). The size of the hotel also affects decision-making in revenue management functions and practices (Murimi et al., 2021). In hospitality research, scholars have developed industry-specific proxies that better capture the operational capacity and scale of hotel operations.

When analyzing hotel size as a variable, researchers most frequently employ the following indicators:

- Number of rooms (Bresciani et al., 2015; Chatibura, 2023; Hung et al., 2009; Israeli, 2002; Jenq, 2019; Jiang & Taylor, 2020; Karunarathne & Silva, 2021; Kaya, 2023; Lee & Jang, 2012; Radojević et al., 2017; Şamkar, 2018; Tang et al., 2016; Xie et al., 2014; Xie et al., 2017);
- Number of employees (Kaya, 2023; Şamkar, 2018; Tang et al., 2016; Valenzuela-Ortiz et al., 2022);
- Number of beds or hotel bed capacity (Sainaghi & Baggio, 2013; Şamkar, 2018);
- Hotel area (Şamkar, 2018; Tang et al., 2016);
- Number of swimming pools in the hotel (Şamkar, 2018);
- Total assets (Valenzuela-Ortiz et al., 2022);
- Operating revenue (Valenzuela-Ortiz et al., 2022).

This study uses the *number of rooms* as the hotel & resort size proxy, as this measure most accurately reflects the accommodation capacity and operational scale of hospitality establishments.

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Age

Hotel age is a significant control variable that affects various aspects of hotel operations and performance outcomes. Researchers have employed various measures of hotel age, including the time a hotel has been operating (Hung et al., 2009), the construction year (Tang et al., 2016), and the number of years since the hotel's inception (Xie et al., 2017). Research demonstrates that newer hotels tend to have higher prices (Jiang & Taylor, 2020). Some scholars employ dual metrics to capture both operational longevity and modernization cycles: hotel age, representing the time a hotel has been operating (number of years the hotel has been in operation), and retrofit period, indicating the number of years after the last major renovation or modernization (years elapsed since the most recent major retrofit) (Hung et al., 2009). In this study, *hotel age* is measured as the age of the hotel and resort since its opening, expressed in years.

Quantity of Reviews

Online reviews have become the fundamental trigger for consumer choice in the hospitality industry and a key determinant of hotel success. Business travelers tend to read an average of five online reviews, while leisure travelers typically consult six or seven reviews before making a decision (Mathur, 2025). These consumer-generated assessments are posted on platforms such as TripAdvisor, Booking.com, and other online travel agencies (Karunarathne & Silva, 2021). Accommodation facilities should care about the reputation that the reviews create (Kolesárová et al., 2024).

Previous studies have extensively utilized *review volume* as a key variable in hospitality research, with scholars such as Zhao et al. (2015) examining this metric as an independent variable affecting booking intentions, Gavilan et al. (2017) investigating it as a moderator in hotel consideration decisions, and Xie et al. (2014, 2017) incorporating TripAdvisor review counts as a control variable in revenue analysis. The volume of reviews serves as a crucial indicator of customer engagement and property visibility in digital marketplaces. Evidence shows that hotels with higher review volume tend to achieve better market positioning and increased booking intentions, as this factor significantly correlates with consumer behaviors and market performance (Zhao et al., 2015). Given that the dependent variable focuses on online service ratings as a qualitative measure of review content, this study incorporates *review quantity* as a control variable to account for the volume dimension of guest feedback.

Star Rating

The literature analysis reveals that *star classification* emerges as a crucial determinant in hotel pricing models. This classification system has been consistently identified as a still stable and consistent predictor of room prices (Israeli, 2002), with empirical evidence indicating that star classification represents the most significant determinant in the room rate, which generally dictates pricing behavior and service quality (Karunarathne & Silva, 2021). Research shows that guests must pay 18% more for hotels with one more star grade when all other variables remain constant, reflecting the substantial premium associated with higher classifications (Karunarathne & Silva, 2021). Five-star hotels represent the pinnacle of luxury and service quality, with "corporate affiliation most popular among high-quality, five-star hotels, of which 84% are chain-affiliated" (Israeli, 2002), underscoring their distinctive market position.

The inclusion of a binary "*5-star hotel*" variable (1 = *yes*, 0 = *no*) as a control variable is essential for isolating the premium effect of the highest service category from other pricing factors. This control becomes particularly important as high-star classifications consistently support price premiums that are increasing and relatively insensitive to competitive environment changes (Israeli, 2002).

Location

The following researchers used an independent variable related to *location or distance*: Israeli, 2002; Hung et al., 2009; Lee and Jang, 2012; Sainaghi and Baggio, 2013; Mayzlin et al., 2014; Xie et al., 2014; Radojević et al., 2017; Şamkar, 2018; Jiang and Taylor, 2020; Karunarathne and Silva, 2021; Valenzuela-Ortiz et al., 2022; Arzaghi et al., 2023; Chatibura, 2023; Singh et al., 2023 (Appendix A). The inclusion of location as a control variable is essential for isolating the effects of other determinants on hotel performance, as geographical positioning represents one of the most critical and immutable competitive advantages in the hospitality industry.

Location measurement varies by destination type. Coastal hotels focus on sea proximity (Valenzuela-Ortiz et al., 2022). Mountain resorts prioritize ski access (Sainaghi & Baggio, 2013). The hotel's proximity to key infrastructure and attractions significantly affects its pricing power and revenue generation capacity. Hotels located near shopping centers benefit from increased foot traffic and extended guest stays, while proximity to historical monuments and cultural heritage sites enhances the destination appeal and allows for premium pricing strategies. Airport accessibility represents another critical location factor (Şamkar, 2018; Jiang & Taylor, 2020; Karunarathne & Silva, 2021; Valenzuela-Ortiz et al., 2022; Arzaghi et al., 2023;

Chatibura, 2023), as it directly impacts guest convenience and influences booking decisions, particularly for international travelers who prioritize transportation efficiency.

The focus on Mediterranean hotels in Türkiye led to measuring location through airport proximity. A value of "1" to hotels in cities with airports and "0" to those without airports. In this sample, Antalya is the only city with a major international airport, and consequently, only 10 hotels from the entire sample are in Antalya. This *airport* dummy variable serves as a control for the location premium effect, capturing the competitive advantage that hotels in Antalya may have due to superior transportation accessibility compared to hotels in non-airport cities along the Turkish Mediterranean coast.

Variables Summary

Table 1 provides an overview of all variables (dependent, independent, control) used in this study. The table is also supplemented with information on the abbreviations used.

Table 1. Summary of all Dependent, Independent, and Control Variables, Calculation Methods, and Abbreviations Used in the Study

Variable	Calculation Method	Abbreviation		
		Variable Name	Dummy*	Logarithm
Dependent Variables				
Average customer reviews score	(Booking.com Score+Google Reviews Score+TripAdvisor Score)/3, %	ACRS	–	–
Independent Variables				
Quantity of sustainability certificates	total number of certificates	Q_SCert	–	–
Green Key (FEE)	certified/non-certified	Gr_Key	DGr_Key_2	–
Travelife for Accommodation	certified/non-certified	TrLife	DTrLife_1	–
Türkiye Sustainable Tourism Program	certified/non-certified	TurkSust	DTurkSust_2	–
LEED	certified/non-certified	LEED	DLEED_2	–
ISO Bundle (14001:2015 Environmental management system; 50001:2018 Energy management systems; 9001:2015 Quality management systems)	certified/non-certified	ISO_Cert	DISO_Cert_2	–
Control Variables				
Hotel and resort size	total number of rooms	Size	–	–
Hotel and resort age	hotel & resort's age since opening, years	Age	–	–
Quantity of reviews	total number of reviews from Booking.com, Google Reviews, and TripAdvisor	Q_Rev	–	l_Q_Rev
5-star hotel	yes or no	Stars	DStars_1	–
Airport city location	yes or no	Airport	DAirport_2	–

*Note: * dummy variable = binary variables (1 = yes/present, 0 = no/absent).*

Source: compiled by the authors.

Table 1 illustrates a comprehensive approach to variable selection employed in this study, which considers both quantitative and qualitative aspects of sustainability certification, as well as controls for key factors that may hypothetically have a significant impact on customer satisfaction. The dependent variable represents a balanced measure of customer satisfaction by averaging ratings across three major digital platforms. This approach to dependent variable selection is justified by the fact that different review services have distinct verification policies: while anyone can leave a review on TripAdvisor and Google Reviews, Booking.com allows reviews only from those who spent at least one night in a hotel booked through their system. The issue of the impact of different verification policies on review authenticity was highlighted by Mayzlin et al. (2014) using the example of TripAdvisor and Expedia.

The independent variables capture both the quantity dimension of sustainability commitment and the qualitative aspects through specific certification types. The inclusion of seven distinct sustainability certifications enables detailed analysis of how different certification standards influence customer satisfaction.

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The ISO Certifications Bundle variable allows for examination of synergistic effects when multiple ISO standards are implemented simultaneously. The control variables address key factors identified in hospitality literature as significant determinants of customer satisfaction and hotel performance. *Hotel size* and *age* control for operational capacity and modernization effects, while *review quantity* accounts for the volume dimension of guest feedback.

The *5-star rating* variable controls for luxury positioning effects, and *airport accessibility* captures location-based competitive advantages specific to the Turkish Mediterranean context.

RESULTS

Descriptive Statistics

The descriptive statistics reveal important characteristics that guided variable transformation decisions. The number of reviews variable (Q_Rev) exhibited significant right-skewed distribution with values ranging from 467 to 40,611 reviews, necessitating logarithmic transformation to normalize the distribution and reduce the influence of extreme outliers. Natural logarithm transformation was applied to stabilize variance and capture the diminishing marginal effects of additional reviews on customer satisfaction ratings.

Table 2 shows the descriptive statistics of all variables for the research.

Table 2. Descriptive Statistics

Variables	Mean	Median	Standard Deviation	Minimum	Maximum
ACRS	90.14	90.33	3.44	81.33	97.00
Q_SCert	1.40	1.00	0.64	1.00	3.00
DGr_Key_2	0.22	0.00	0.42	0.00	1.00
DTrLife_1	0.33	0.00	0.47	0.00	1.00
DTurkSust_2	0.61	1.00	0.49	0.00	1.00
DLEED_2	0.01	0.00	0.10	0.00	1.00
ISO_Cert_2	0.07	0.00	0.26	0.00	1.00
Size	387.55	357.00	211.33	13.00	1094.00
Age	22.00	20.00	15.05	1.00	106.00
l_Q_Rev	8.65	8.90	0.96	6.15	10.61
DStars_1	0.84	1.00	0.37	0.00	1.00
DAirport_2	0.11	0.00	0.31	0.00	1.00

Source: compiled by the authors using the Gretl statistical software package.

The descriptive statistics reveal several key characteristics of the study sample. The dependent variable, ACRS, demonstrates high customer satisfaction levels, with a mean of 90.14 and a median of 90.33 on a 100-point scale. This is consistent with the sample selection criteria, which included only properties with Booking.com ratings above 8.0 out of 10.0, ensuring that the analysis focuses on well-performing eco-certified establishments. The quantity of sustainability certifications (Q_SCert) shows a mean of 1.40 certifications per property, with most hotels holding a single certification (median = 1.00) and some properties having up to three certifications.

Among individual certification types, the Türkiye Sustainable Tourism Program exhibits the highest adoption rate with 61% of properties certified, followed by Travelife for Accommodation at 33% and Green Key at 22%. The remaining certifications (LEED, ISO standards) show substantially lower adoption rates of 1-7%, indicating their limited prevalence in the Mediterranean hospitality market.

The control variables reveal significant diversity in property characteristics, with *hotel sizes* ranging from 13 to 1,094 rooms (mean = 387.55) and *ages* spanning from 1 to 106 years (mean = 22.00). The logarithmically transformed *review* variable (l_Q_Rev) shows normalized distribution characteristics with mean and median values of 8.65 and 8.90, respectively.

Star ratings indicate that 84% of properties are classified as 5-star establishments, while only 11% are located near Antalya airport, suggesting the sample predominantly consists of luxury coastal resort properties rather than urban business hotels.

Model 1

Model 1 investigates the cumulative effect of sustainability certification quantity on customer ratings, testing whether hotels with multiple certifications achieve systematically higher customer satisfaction scores. To determine the strength and direction of the influence of the quantity of sustainability certificates on customer satisfaction for hotels and resorts in Türkiye, the following model was examined, where the quantity of sustainability certificates was used as the main independent variable in Model 1.

The analysis tests Hypothesis H1. Equation (1) specifies Model 1 as follows:

Model 1: $DV_i = \alpha + \beta_1 Q_SCert_i + \beta_2 Size_i + \beta_3 Age_i + \beta_4 Q_Rev_i + \beta_5 Stars_i + \beta_6 Airport_i + \varepsilon_i$, (1)

where *DV* is the dependent variable (ACRS); *i* is the entity (hotel/resort); α is the intercept; β denotes the regression coefficient; *Q_SCert* denotes the independent variable; *Size, Age, Q_Rev, Stars,* and *Airport* are control variables, and ε_i is the error term.

The correlation matrix analysis (Figure 1) reveals acceptable correlation levels between all variables, with no evidence of multicollinearity issues that could compromise the model's validity.

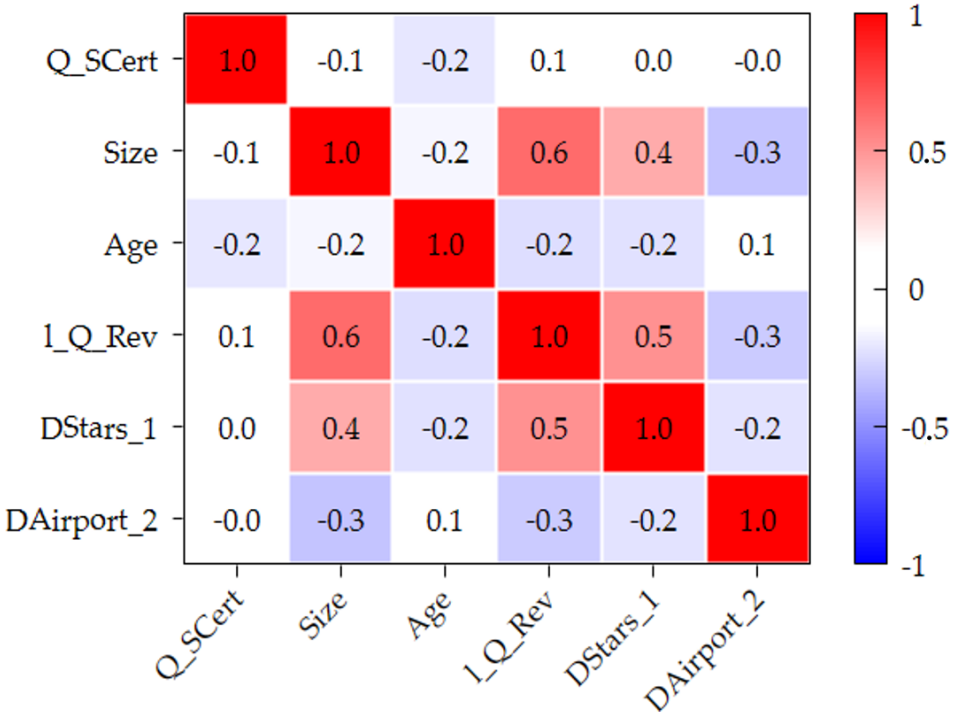


Figure 1. Correlation Matrix for Model 1

Source: compiled by the authors using the Gretl statistical software package.

As shown in Figure 1, the highest correlation coefficients are observed between *hotel size* and *review quantity* (0.6) and between *star ratings* and *review quantity* (0.5). Despite these moderate positive correlations, all coefficients remain well below the critical threshold of 0.7, confirming the absence of multicollinearity issues in the dataset.

Table 3 presents the results of the regression analysis for Model 1 via ordinary least squares (OLS).

Table 3. OLS regression results for Model 1 (N=95)

Model	Const	Q_SCert	Size	Age	l_Q_Rev	DStars_1	DAirport_2	R^2
Model 1	76.09***	0.21	–0.006***	0.013	1.87***	–0.38	–2.43*	21.6

*Note: * – significant at the 10% level; *** – significant at the 1% level.*

Source: compiled by the authors using the Gretl statistical software package.

The *F*-test confirms the model is statistically significant (F (6,88) = 3.48, $p < 0.01$). The *quantity of sustainability certifications* does not have a statistically significant effect on *customer ratings* among eco-certified Mediterranean hotels and resorts of Türkiye. Consequently, Hypothesis H1 is rejected. Having more sustainability certifications does not translate into better customer satisfaction outcomes within the studied sample. The analysis of control variables incorporated into Model 1 to strengthen the regression reveals three statistically significant factors influencing customer satisfaction ratings among eco-certified Mediterranean hotels and resorts (Table 3).

Hotel size demonstrates a statistically significant but practically negligible negative relationship with customer ratings, where even a 100-room difference between hotels would result in only a 0.4-point decrease in ratings, suggesting minimal practical impact despite statistical significance.

The *reviews* show a highly significant positive relationship with *ratings*, where hotels with more customer reviews achieve higher average satisfaction scores; for example, a hotel with 1000 reviews would

have a rating approximately 3% higher than a hotel with 200 reviews, demonstrating that greater review volume is associated with higher ratings within this eco-certified sample.

Airport proximity exhibits a significant negative effect on customer satisfaction, with hotels located near Antalya Airport receiving ratings approximately 2.43% lower than those located in other Mediterranean destinations within the sample. These findings demonstrate that while operational and locational characteristics have measurable impacts on customer satisfaction outcomes, only review volume and airport proximity show meaningful practical effects, while the primary variable of interest – the quantity of sustainability certifications – shows no statistically significant effect on customer ratings.

Model 2

Unlike Model 1, where the independent variable was the *quantity of certificates*, in Model 2, it is assumed that individual certifications may have statistically significant effects (Hypotheses H2a–H2e). This approach enables identifying specific certifications that have the greatest impact on customer satisfaction, eliminating the limitations of aggregate measures that may obscure significant differences between different certification types.

Prior to analysis, examination of certification patterns revealed that three ISO certifications (ISO 14001:2015 Environmental management system, ISO 50001:2018 Energy management systems, and ISO 9001:2015 Quality management systems) do not appear individually but exclusively together among the studied hotels, indicating that hotels adopt them as an integrated management system package rather than pursuing separate certification strategies. Therefore, these three certifications were consolidated into a single indicator – ISO Certifications Bundle. Equation (2) presents Model 2:

$$\begin{aligned} \textit{Model 2: } DV_i = \alpha + \beta_1 Gr_Key_i + \beta_2 TrLife_i + \beta_3 TurkSust_i + \beta_4 LEED_i + \beta_5 + \\ + ISO_Cert_i + \beta_6 Size_i + \beta_7 Age_i + \beta_8 Q_Rev_i + \beta_9 Stars_i + \beta_{10} Airport_i + \varepsilon_i \end{aligned} \quad (2)$$

where DV is the dependent variable (ACRS); i is the entity (hotel/resort); α is the intercept; β is the regression coefficient; *Gr_Key, TrLife, TurkSust, LEED,* and *ISO_Cert* denote the independent variables; *Size, Age, Q_Rev, Stars,* and *Airport* are the control variables; and ε_i is the error term.

The correlation matrix analysis (Figure 2) reveals acceptable correlation levels between all variables, with no evidence of multicollinearity issues that could compromise the model's validity.

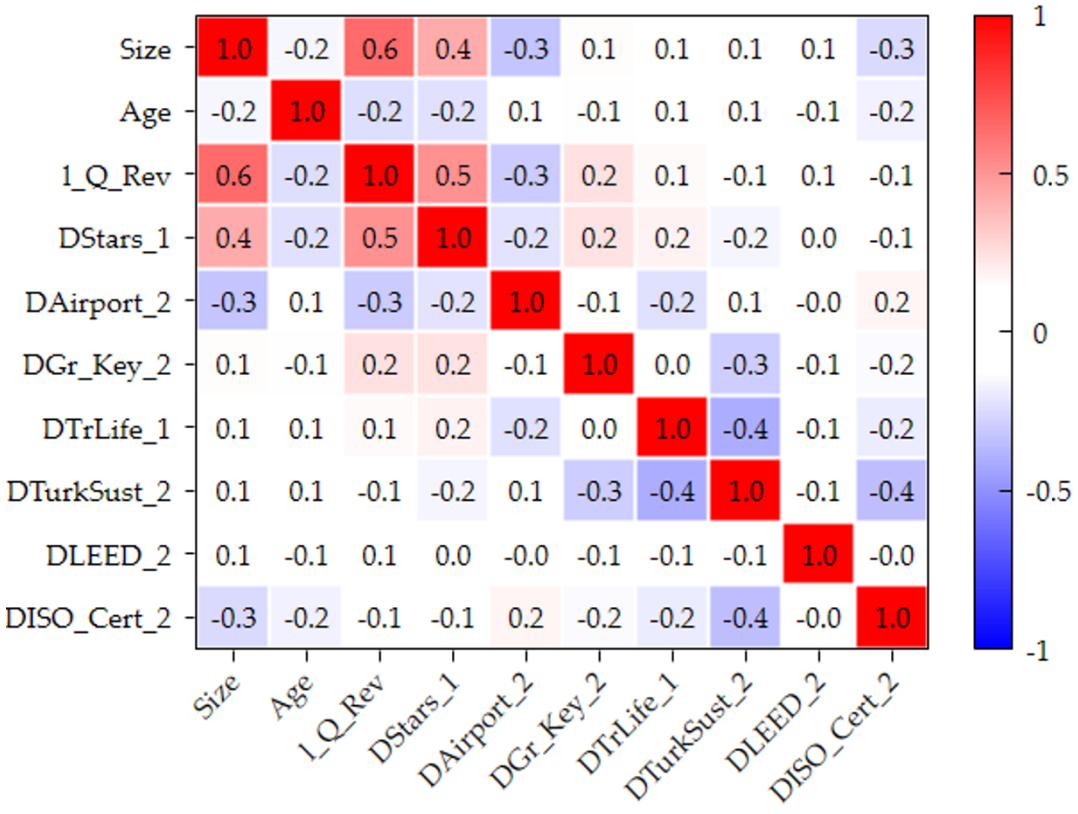


Figure 2. Correlation Matrix for Model 2

Source: compiled by the authors using the Gretl statistical software package.

Figure 2 confirms acceptable correlation levels across all variables in Model 2, with the highest coefficients observed for *size-review quantity* (0.6) and *stars-review quantity* (0.5) relationships, indicating no multicollinearity issues.

Table 4 presents the results of the regression analysis for Model 2 via OLS.

Table 4. OLS Regression Results for Model 2 (*N*=95)

Model	Const	Size	Age	l_Q_Rev	DStars_1	DAirport_2	DGr_Key_2	DTrLife_1	DTurkSust_2	DLEED_2	DISO_Cert_2	R^2
Model 2	77.98***	–0.006***	0.004	1.74***	–1.04	–1.75*	1.40*	1.48*	–0.59	2.97**	–1.22	31.9

*Note: * – significant at the 10% level; ** – significant at the 5% level; *** – significant at the 1% level.*
Source: compiled by the authors using the Gretl statistical software package.

The *F*-test confirms that the model is statistically significant ($F(10, 84) = 10.38$, $p < 0.01$). The analysis of Model 2 reveals that specific sustainability certifications demonstrate varying effects on customer satisfaction ratings among eco-certified Mediterranean hotels and resorts in Türkiye. Three certifications show statistically significant positive effects: Green Key (FEE), Travelife for Accommodation, and LEED certification, with LEED demonstrating the strongest positive impact on customer ratings. However, two certifications show no statistically significant effects on customer satisfaction: Türkiye Sustainable Tourism Program certification and ISO Bundle certification, suggesting that these certifications do not translate into measurably higher guest satisfaction outcomes within the studied sample.

Among control variables, the patterns observed in Model 1 remain consistent: *hotel size* maintains its statistically significant negative relationship with ratings, *review quantity* continues to show a highly significant positive effect, and *airport proximity* remains negatively associated with customer satisfaction. Model 2 demonstrates improved explanatory power with an R^2 of 31.9%, representing a substantial increase from Model 1 results of 21.6%.

Empirical Results

Table 5 presents the comprehensive analysis of the tested models to provide a detailed breakdown of the hypothesis testing results and statistical evidence supporting these conclusions.

Table 5. Hypothesis Testing Results of Models (via OLS, *N*=95)

Hypothesis	Dependent variable	Independent variable / variables	Hypothesis status	Effect type
H1	ACRS	Q_SCert	rejected	insignificant
H2a	ACRS	DGr_Key_2	accepted	significant, positive
H2b	ACRS	DTrLife_1	accepted	significant, positive
H2c	ACRS	DTurkSust_2	rejected	insignificant
H2d	ACRS	DLEED_2	accepted	significant, positive
H2e	ACRS	DISO_Cert_2	rejected	insignificant

Source: compiled by the authors.

The empirical analysis reveals important patterns regarding how sustainability certifications influence customer satisfaction in Mediterranean hotels and resorts of Türkiye (Table 5). Results show that the effectiveness of certifications varies significantly depending on whether they are measured as aggregate quantities or examined individually. Findings from Model 1 contradict the expectation that multiple sustainability certifications have cumulative positive effects on guest satisfaction. The quantity-based approach shows no statistically significant relationship with customer ratings, indicating that hotels cannot simply collect certifications to improve guest experience. This outcome suggests fundamental limitations in aggregate measurement approaches for sustainability research.

Individual certification analysis through Model 2 uncovers substantial variation in effectiveness across different certification types. Three certifications – Green Key (FEE), Travelife for Accommodation, and LEED – demonstrate statistically significant positive effects on customer satisfaction, while the Türkiye Sustainable Tourism Program and ISO Bundle certifications show no measurable impact. The superior performance of internationally recognized standards versus regional programs may reflect differences in guest awareness, certification rigor, or implementation quality among participating hotels.

The analysis confirms the importance of control variables in explaining customer satisfaction variations. *Review quantity* consistently demonstrates a highly significant positive relationship with *ratings*

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across all models, while *airport proximity* shows a negative association with guest satisfaction. *Hotel size* maintains a statistically significant but practically negligible negative effect on ratings.

This improvement is particularly meaningful considering that Model 1 explanatory power reflects the contribution of control variables, as the single independent variable (quantity of certifications) proved statistically insignificant. In contrast, Model 2 incorporates five independent variables representing individual certifications, with three demonstrating statistically significant positive effects on customer satisfaction.

The enhanced explanatory capacity indicates that examining specific certification impacts provides substantially better insights than treating all certifications as equivalent contributors to customer satisfaction. The substantial improvement in explanatory power from Model 1 (21.6%) to Model 2 (31.9%) demonstrates that disaggregated analysis of individual certification effects provides substantially better insights than aggregate certification quantity measures.

DISCUSSION

Signaling Theory and the Certification Quantity Paradox

The rejection of Hypothesis H1 in this study presents a compelling challenge to traditional signaling theory expectations. Within the sample of certified hotels, the quantity of sustainability certifications is not associated with statistically significant differences in customer satisfaction ratings when comparing hotels with different numbers of certifications.

Analysis of the 95 certified properties reveals that certification quantity shows no association with customer satisfaction among Mediterranean hotels in Türkiye. This finding aligns with Bernard and Nicolau's (2022) analysis, which revealed a U-shaped relationship for accumulated environmental awards in American hotel chains, with initial certifications demonstrating the highest positive market impact followed by diminishing effects from additional certifications.

Similarly, Heras-Saizarbitoria et al. (2015) found that ISO 9001-certified hotels did not receive significantly better customer ratings and actually scored lower on value-for-money assessments compared to non-certified hotels (such comparisons with non-certified properties represent a potential direction for future research, as the current study focuses exclusively on certified establishments). The theoretical foundations of these empirical patterns receive comprehensive support from Kaithlin (2024), whose multi-theoretical analysis integrating institutional theory, resource-based view, and signaling theory explains why this study reveals significant effects for specific international certifications (LEED, Green Key, and Travelife) while showing no aggregate quantity effects. This multifunctional significance of certifications explains why their effectiveness varies depending on certification type, implementation level, and market context.

The absence of cumulative effects in the Model 1 analysis (R^2 = 21.6%) contrasts with traditional signaling theory predictions. Spence's foundational framework (1973) proposed that costly signals effectively separate high-quality providers through the economic unfeasibility of imitation. However, the Mediterranean hotel data reveal that sustainability certifications face unique challenges in this mechanism. Unlike professional certifications that directly correlate with operational skills, the study's findings indicate that sustainability certifications represent organizational commitments that may not be immediately visible or experiential to guests during their stay.

The findings that internationally recognized certifications (LEED, Green Key, Travelife) demonstrate significant positive effects while certification quantity shows no impact suggest temporal and quality-based mechanisms in certification effectiveness. This interpretation receives partial support from Chen (2018), who found that green certification in Taiwanese hotels demonstrates positive effects only after sufficient implementation time. However, this study's results challenge the assumption that accumulation alone drives effectiveness, as Heras-Saizarbitoria et al. (2020) describe saturation effects where multiple certification logos risk going unidentified.

Given this challenge of certification proliferation, the findings suggest that signaling theory assumptions about information asymmetry may not be fully applicable to the hospitality context. Elshaer et al. (2025) argue that information asymmetry presents exceptional challenges to tourism e-commerce due to the intangible experiential nature of tourism services. In this environment, customers may rely more heavily on experiential indicators, such as actual service quality, facility conditions, and staff competence, rather than certification-based signals when forming satisfaction judgments.

This complexity is confirmed by research from Kang et al. (2012), who found that while American hotel guests with higher environmental concerns declared a greater willingness to pay premiums for green initiatives, this relationship was significantly moderated by hotel type, with luxury and mid-priced hotel guests showing a higher willingness to pay. Their findings reveal a gap between stated preferences and actual behavior, indicating that signaling effectiveness varies significantly across different consumer segments.

The absence of cumulative signaling effects suggests that sustainability certifications may serve more as threshold signals than as graduated quality indicators. Achieving a minimum threshold of credible sustainability commitment may be sufficient for signaling purposes, with additional certifications providing negligible marginal signaling value. This threshold effect explains why the analysis revealed significant positive effects for specific, well-recognized certifications while showing no aggregate quantity effects. Supporting this pattern, the consumer preference analysis by Assaker and O'Connor (2023) found that green certification labels ranked lowest among seven hotel attributes in terms of booking influence, despite 44% of respondents expressing a willingness to pay premiums for certified properties.

The findings suggest that while signaling mechanisms exist, they function as secondary rather than primary decision drivers in the actual booking process. The convergence of findings across different performance metrics – market value in Bernard and Nicolau (2022), theoretical frameworks in Kaithlin's (2024) analysis, and customer satisfaction in this research – reinforces the need for nuanced approaches that consider signal quality over signal quantity. This creates the foundation for detailed analysis of the effectiveness hierarchy of different certification types in the Mediterranean tourism context.

Certification Effectiveness Hierarchy in Mediterranean Tourism

The results demonstrate that mandatory certifications lose their signaling value, as evidenced by the absence of significant impact from the Türkiye Sustainable Tourism Program, despite its high adoption rate. This phenomenon aligns with signaling theory, which posits that signal effectiveness depends on creating a separating equilibrium between high- and low-quality providers. When certification becomes mandatory, it ceases to serve as a quality differentiator among competitors.

The findings of Radojevic et al. (2017) establish a fundamental basis for understanding certification hierarchies, demonstrating that star classification remains the most reliable predictor of customer satisfaction. This finding establishes a fundamental hierarchy where formal classification systems significantly outperform individual amenity certifications. The study shows that while specific amenities such as free Internet, suites, and wheelchair access contribute positively to satisfaction, their cumulative impact remains substantially lower than the star classification effect. A similar hierarchical structure is identified by Cembruch-Nowakowski (2020) in green hotel certification systems, noting that only a small fraction of analyzed certification programs are directly devoted to the hotel industry. The most established certifications include the EU Ecolabel developed in 1992, the international Green Globe Certificate used across multiple countries, and the Green Key label awarded to hotels worldwide, demonstrating varying levels of rigor from basic environmental management requirements to comprehensive sustainability management systems.

A comparative analysis with neighboring Mediterranean markets confirms regional variations in the effectiveness of certification. Tüfek and Çalhan (2024) revealed that Greece maintains substantially higher numbers of hospitality-specific certifications, while Türkiye leads in broader sustainability frameworks, suggesting that the effectiveness of certifications depends on regional market preferences rather than universal rankings. This is supported by Rodríguez-García et al. (2023), who, through a comparative analysis using the Global Sustainable Tourism Council (GSTC) criteria as a benchmark, revealed that only two certifications meet all GSTC criteria. The study demonstrates significant variations in coverage across different sustainability dimensions, with environmental criteria achieving higher compliance than cultural heritage aspects. Velaoras et al. (2025) complement this picture by identifying LEED, EarthCheck, and Green Key as top-tier certifications based on their comprehensive approach and measurable outcomes.

Research by Fuentes-Moraleda et al. (2019) in boutique hotels in Spain reveals that environmental management systems generate differential impacts based on customer characteristics and hotel positioning, with age, income, and environmental commitment serving as key determinants of willingness to pay premiums for certified properties. Millennial customers, particularly those with higher incomes and stronger environmental awareness, demonstrate greater willingness to pay for hotels with environmental certifications. This segmentation effect is further reinforced by research demonstrating different approaches to quality communication for different hotel tiers, with premium properties benefiting more from high-quality but limited customer feedback, while economy segments derive greater value from volume-based validation (Blal & Sturman, 2014).

The critical gap between certification possession and effective communication further complicates the effectiveness hierarchy. Analysis of Turkish hotels revealed that less than half of certified establishments displayed their certificates on websites (Hazarhun et al., 2023), indicating that certification effectiveness depends not merely on obtaining credentials but on strategic integration into customer-facing operations.

The effective hierarchy also reflects certification maturity and market recognition. Karlsson and Dolnicar (2015) found that established certifications like Blue Flag had greater market penetration compared

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to newer schemes, while eco-certification appealed primarily to a niche segment characterized by higher education and environmental awareness. This aligns with findings from Central European research (Kolesárová et al., 2024), which demonstrates that despite cultural and economic differences among countries, customer evaluation patterns remained remarkably consistent, suggesting that certification hierarchies may transcend national boundaries in similar tourism development contexts. The research demonstrates that multidimensional rating systems covering staff, equipment, cleanliness, comfort, price/quality ratio, and location provide more nuanced evaluation frameworks than single-dimensional approaches.

Comparative Analysis with Mixed-Sample Studies

The methodological approach of aggregating customer ratings from three platforms (Booking.com, Google Reviews, TripAdvisor) builds upon Mayzlin et al. (2014), who demonstrated platform-specific biases in review systems. This multi-platform aggregation proved critical for the key finding that review quantity ($\beta = 1.74$, $p < 0.001$) consistently emerges as the strongest predictor of customer satisfaction across all models.

While Mayzlin et al. (2014) focused on detecting review manipulation, the approach reveals that volume-based validation mechanisms fundamentally outweigh certification status in determining guest satisfaction, suggesting that operational engagement strategies matter more than formal credentials. The temporal evolution of certification effectiveness directly explains contradictory findings in existing literature. Peiró-Signes et al. (2014) found statistically significant positive effects of ISO 14001 certification on Spanish hotel customer satisfaction, particularly for four-star properties. However, the results show no significant impact from the ISO Bundle ($\beta = -1.22$, $p > 0.10$) in contemporary Turkish Mediterranean hotels. This stark contrast validates the central finding that certification effectiveness has fundamentally shifted over the past decade. The results support Buckley's (2002) prediction that internationally recognized certifications would dominate, as evidenced by the three significant positive effects: Green Key ($\beta = 1.40$, $p < 0.10$), Travelife ($\beta = 1.48$, $p < 0.10$), and LEED ($\beta = 2.97$, $p < 0.05$), while regional and standardized systems prove ineffective.

Cross-cultural research provides crucial context for understanding the differential certification effectiveness results. Yang et al. (2024) revealed that demographic factors significantly influence certification perception, with female guests responding 28.7% more strongly to green hotel messaging. This demographic sensitivity helps explain why the mandatory Türkiye Sustainable Tourism Program (adoption rate: 61%) shows no significant impact ($\beta = -0.59$, $p > 0.10$), while internationally recognized certifications with lower adoption rates demonstrate positive effects. The cultural dimensions identified by Radojevic et al. (2017) suggest that international guests in Mediterranean Türkiye respond differently to regional versus global certification signals, directly supporting the finding that international certifications outperform mandatory national programs.

Comparative results suggest potential differences in implementation quality, though this interpretation requires further investigation. Leroux and Pupion (2017) found that 58% of certified French establishments reported cost reductions, while only 26% experienced profit increases, indicating a possession-versus-implementation gap. The present analysis provides quantitative evidence for this gap: the rejection of Hypothesis H1 (certification quantity effect) combined with the acceptance of three specific international certification hypotheses confirms that implementation quality, not accumulation, drives customer satisfaction. The substantial improvement in explanatory power from Model 1 ($R^2 = 21.6\%$) to Model 2 ($R^2 = 31.9\%$) quantifies the value of disaggregated certification analysis versus aggregate approaches.

Importantly, the results challenge the universal applicability assumptions in existing certification literature. While Kolesárová et al. (2024) found consistent evaluation patterns across V4 countries, the Mediterranean findings reveal significant certification hierarchy effects that transcend simple cultural explanations. The fact that LEED certification (1% adoption rate) exhibits the strongest positive effect ($\beta = 2.97$, $p < 0.05$), while the most widely adopted certification shows no impact, fundamentally challenges volume-based certification strategies prevalent in existing literature and supports scarcity-enhanced signaling mechanisms in the Mediterranean tourism context.

Implementation Quality Versus Certification Possession

The critical distinction between mere certification possession and effective implementation emerges as a fundamental determinant of certification success. Buunk and van der Werf's (2019) analysis shows that Green Key certified properties are systematically larger and have higher revenues, indicating that certification effectiveness correlates with implementation capability. This study confirms this thesis, as Green Key displays a statistically significant positive effect on customer satisfaction.

Goodarzi et al. (2025) reveal diminishing returns at higher certification levels. This pattern receives empirical support: LEED certification, despite its low adoption rate (1% of hotels), produces the strongest

positive effect among all studied certifications. The communication gap between certification possession and customer recognition represents a critical implementation failure. Karlsson and Dolnicar (2015) and İlban et al. (2022) found minimal guest awareness of certifications. This gap explains the research findings, where the Türkiye Sustainable Tourism Program, despite high adoption (61% of hotels), shows no significant impact on customer satisfaction. Heras-Saizarbitoria et al. (2015) found that certified hotels did not receive better customer evaluations. These findings are corroborated by the present analysis: ISO Bundle certifications show no significant impact on customer satisfaction.

Radojevic et al. (2017) establish the superiority of comprehensive systems over individual certifications. This understanding is extended through the current analysis: Model 2 (individual certification effects) achieves higher explanatory power (R^2 = 31.9%) compared to Model 1 (certification quantity, R^2 = 21.6%). Bernard and Nicolau (2022) show a U-shaped relationship for environmental awards. Evidence supports this observation: the rejection of hypothesis H1 indicates that certification accumulation does not create cumulative positive effects on customer satisfaction. Successful environmental certification implementation requires an integrated service quality enhancement strategy. Analysis reveals that this is achieved through specific international certifications (Green Key, Travelife, LEED), rather than through accumulating multiple certifications.

Control Variables as Primary Satisfaction Determinants

The critical role of demographic and behavioral control variables emerges as a fundamental determinant of certification effectiveness rather than merely statistical adjustments. Karlsson and Dolnicar (2015) revealed that eco-certification primarily influences a niche segment characterized by older age, higher education levels, and significantly higher propensity to read environmental magazines. This pattern receives confirmation, as review quantity shows a highly significant positive relationship with customer ratings across all models, suggesting that guest engagement serves as a primary satisfaction determinant beyond certification status.

Organizational characteristics function as fundamental drivers of operational performance, often superseding certification status itself. Buunk and van der Werf's (2019) analysis reveals that certified establishments differ systematically across multiple dimensions, including size, age, and operational complexity, with these characteristics proving more predictive than certification possession.

The Mediterranean findings support this conclusion, as hotel size consistently exhibits a statistically significant relationship with customer ratings, indicating that organizational capacity constitutes a primary satisfaction determinant. Traditional operational factors often exert a stronger influence on customer satisfaction than sustainability certifications themselves. Arzaghi et al. (2023) establish that basic hotel amenities consistently emerge as primary satisfaction determinants, while Ban et al. (2019) reveal that core factors, including access, food quality, and staff service, remain the most important satisfaction drivers. Consistent with these observations, airport proximity exhibits a significant negative effect on customer satisfaction, illustrating that location factors can override certification benefits.

Cultural and experiential factors create systematic variations in certification effectiveness. Radojevic et al. (2017) document that reviewer experience and cultural dimensions create substantial rating variations, while Yang et al. (2024) reveal significant demographic differences in green hotel attitude sensitivity. The research reinforces these considerations, as the substantial improvement in explanatory power from Model 1 (21.6%) to Model 2 (31.9%) confirms that individual certification analysis provides superior insights when properly controlling demographic and operational variables.

Kolesárová et al. (2024) show that accommodation facilities with higher review volumes maintain more stable satisfaction ratings, suggesting that operational experience serves as a quality moderator beyond formal certifications. Gavilan et al. (2017) reveal how online reputation indicators function as critical control variables that moderate certification effectiveness. Similar patterns emerge from the Mediterranean data, where review quantity serves as the strongest predictor of customer satisfaction, suggesting that Mediterranean hotels must integrate certification strategies with comprehensive guest experience management approaches rather than relying on certification signals as isolated quality indicators.

Strategic Implications for Hotel Management

Certification Investment Strategy

Strategic certification investment requires alignment with organizational capabilities rather than pursuing prestigious certifications that may exceed implementation capacity. Cembruch-Nowakowski (2020) emphasizes that certification schemes vary dramatically in requirements and costs, while Leroux and Pupion (2017) reveal that successful adoption depends on compatibility with existing environmental values. These findings support this approach, as LEED certification exhibits the strongest positive impact despite low

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adoption, suggesting hotels should focus on certifications matching their implementation capabilities rather than pursuing multiple credentials simultaneously.

Effective certification investment demands comprehensive operational integration rather than symbolic compliance. Aydoğan (2024) shows that successful hotels achieve substantial resource savings through systematic redesign encompassing energy management and indoor air quality improvements. Study results reinforce this principle, as the rejection of Hypothesis H1 indicates that accumulating multiple certifications without deep implementation fails to generate proportional customer satisfaction returns.

Strategic guidance emerges from clear return-on-investment hierarchies. Radojevic et al. (2017) establish that comprehensive certification systems deliver substantially higher satisfaction returns than fragmented certifications. The findings confirm this hierarchy, as internationally recognized comprehensive standards (Green Key, Travelife, LEED) produce statistically significant positive effects, while regional mandatory programs show no measurable impact. Hotels should prioritize comprehensive over fragmented certification approaches. Rodríguez-García et al. (2023) demonstrate that only comprehensive certifications achieve full GSTC compliance. The empirical evidence supports this direction, as the three effective certifications represent comprehensive sustainability frameworks rather than specialized single-issue credentials, creating strategic opportunities for Mediterranean hotels to differentiate through comprehensive portfolios addressing multiple sustainability dimensions simultaneously.

Communication and Marketing Strategy

Effective communication of sustainability achievements represents a critical gap in hotel marketing strategies across Mediterranean destinations. Demir and Denk's (2025) comparative analysis reveals that hotels consistently underutilize their websites for communicating environmental protection activities, despite significant investments in sustainability certifications. Hotels often lack comprehensive information about sustainability certifications, environmental management practices, and green marketing initiatives, suggesting a disconnect between the investment in certifications and the execution of marketing initiatives. The present analysis reinforces this communication deficit, as effective certifications (Green Key, Travelife, LEED) require strategic promotion to translate into customer satisfaction benefits.

Gavilan et al. (2017) reveal critical asymmetric perception effects: negative ratings are perceived as reliable regardless of review quantity, while positive ratings require confirmation by numerous reviews. This creates strategic challenges for certified hotels, as positive sustainability messages require significantly more guest confirmations than negative reviews to maintain trust. Empirical evidence supports this pattern, showing that review quantity serves as a strong predictor of customer satisfaction, indicating that hotels should actively encourage certified guests to emphasize ecological aspects in their reviews.

The effectiveness of sustainability certifications depends on strategic communication that aligns credentials with customer priorities. Fuentes-Moraleda et al. (2019) demonstrate that younger, environmentally conscious customers show greater willingness to pay premiums for certified properties. However, Arzaghi et al. (2023) reveal substantial discrepancies between official ratings and guest value perceptions. Study findings confirm this misalignment, as mandatory regional certifications show no impact, while internationally recognized comprehensive standards demonstrate positive effects, suggesting that communication must bridge this perception gap.

Certification communication effectiveness varies significantly across demographic segments. Yang et al. (2024) identify that female guests respond more strongly to green hotel messaging, while younger consumers show higher attitude-satisfaction correlations. Radojevic et al. (2017) demonstrate that cultural dimensions have a significant influence on certification effectiveness. The research supports segmented approaches, as the three effective certifications appeal to different market segments requiring tailored messaging strategies to build customer trust across diverse consumer groups.

Velaoras et al. (2025) emphasize that consumer awareness of certification schemes remains limited, creating opportunities for certified hotels to educate guests about specific sustainability practices rather than simply displaying certification logos. Analysis suggests that communication should focus on implementation quality rather than badge accumulation, converting certification investments into tangible guest value propositions.

Operational Excellence Focus

Achieving operational excellence in certified hotels requires prioritizing fundamental service quality dimensions. According to Ban et al. (2019), operational excellence is primarily driven by empathy factors, including staff service quality and interpersonal interactions. Intangible service elements, particularly staff behavior and customer care, emerged as the most critical operational factors. This pattern receives empirical

confirmation, as the review quantity demonstrates a highly significant positive relationship with customer ratings, indicating that guest engagement serves as a primary determinant of satisfaction.

The relationship between operational excellence and guest engagement emerges as a critical factor in certification effectiveness. The present study demonstrates that hotels with higher review volumes achieve better satisfaction scores, suggesting that operational strategies should focus on creating opportunities for guest engagement in sustainability initiatives. This approach transforms passive certification display into active guest involvement.

According to Kolesárová et al. (2024), operational excellence transcends certification possession, with guest feedback management as a critical competitive differentiator. Analysis confirms this observation, showing that effective certifications (Green Key, Travelife, LEED) require operational integration to translate into measurable improvements in satisfaction. The strategic implication is that operational excellence should drive certification strategy, not vice versa. Hotels must develop comprehensive guest experience management systems, using certifications as operational frameworks. Successful hotels create engagement ecosystems where sustainability certifications enhance core hospitality excellence, ensuring that environmental achievements complement fundamental service quality and stimulate positive review generation.

CONCLUSIONS

Study Limitations

Most importantly, this study included only certified properties, preventing direct comparisons between certified and non-certified hotels. Without a non-certified control group, the study cannot assess the overall impact of certification possession versus absence, limiting the findings to comparisons among different types of certified establishments. This study provides valuable insights into sustainability certification effectiveness in Mediterranean hospitality, yet several limitations warrant acknowledgment. The cross-sectional design captures certification effects at a single time point, limiting understanding of certification impact dynamics. Additionally, the focus on high-performing properties (ratings above 8.0) may introduce selection bias, as certified hotels with ratings below this threshold were excluded from analysis.

The study's concentration on Türkiye's Mediterranean region, while providing contextual depth, limits generalizability to other tourism destinations with different regulatory environments, cultural contexts, or certification adoption patterns. The unique context of Türkiye's mandatory Sustainable Tourism Program may not reflect certification dynamics in purely voluntary systems.

The aggregation of ratings from three platforms (Booking.com, Google Reviews, TripAdvisor) represents a methodological innovation but potentially masks platform-specific certification effects. Different platforms serve partially distinct user segments that could vary in environmental consciousness and certification awareness. Additionally, the binary certification variables (certified/non-certified) do not capture certification quality, implementation depth, or guest awareness levels, which the discussion identifies as critical moderating factors. This study measures certification possession but not implementation quality or communication effectiveness, which emerged as critical factors in the analysis. The rapidly evolving sustainability landscape, including new certification schemes, changing consumer preferences, and regulatory developments, suggests the findings may have temporal limitations.

Future Research Directions

The present study provides an empirical foundation for understanding how sustainability certifications are associated with customer satisfaction in the hospitality industry; however, several avenues for future research remain open. First, future research should include non-certified hotels as a control group to enable direct assessment of certification impact versus absence, addressing a key limitation of the current design. Second, longitudinal studies could examine how the relationship between certifications and customer satisfaction evolves, especially as consumer awareness and sustainability standards change. Third, while this study employed aggregate customer ratings as a proxy for satisfaction, future research should incorporate qualitative guest feedback or sentiment analysis from review texts to capture more nuanced perceptions of sustainability practices. Fourth, the role of customer-level moderating variables, such as environmental concern, nationality, or prior green hotel experience, deserves attention to assess heterogeneity in signal reception. Fifth, additional contextual variables such as platform interface design or algorithmic badge placement could be studied to understand how digital environments mediate the signaling power of certifications. Finally, implementation quality studies could examine how the depth and authenticity of sustainability practices behind certifications influence guest perceptions, moving beyond simple possession measures to assess actual environmental performance and guest awareness.

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Final Remarks

This study provides empirical evidence of relationships between sustainability certifications and customer satisfaction in Mediterranean hotels and resorts in Türkiye and reveals important patterns for hotel management practice. The findings demonstrate how business leadership driven by honesty and transparency in certification practices influences customer trust and satisfaction outcomes.

The research makes several significant methodological and theoretical contributions. For the first time, an aggregated approach to measuring customer satisfaction is applied through combining ratings from three major digital platforms, providing a more balanced and reliable assessment of guest satisfaction compared to traditional single-platform studies. The results show that the quantity of sustainability certifications is not associated with cumulative positive effects. This reveals a certification paradox, where accumulating multiple certifications does not translate into proportionally improved customer satisfaction outcomes, indicating threshold signaling effects rather than graduated quality indicators.

Analysis of 95 certified hotels revealed a clear certification effectiveness hierarchy: business leadership through internationally recognized standards demonstrates statistically significant positive associations with customer ratings, while regional and mandatory programs show no measurable association with guest satisfaction. The Türkiye Sustainable Tourism Program shows no significant association with customer satisfaction despite widespread adoption, illustrating how mandatory certifications lose effectiveness as trust-building quality signals. Mandatory programs cannot differentiate quality levels between competitors since all properties must comply.

The Mediterranean tourism sector experiences environmental challenges and strong competitive forces requiring strategic approaches to sustainability. Properties that successfully implement internationally recognized certifications alongside strong operational performance are associated with higher customer trust, satisfaction, and market position. The research shows that control variables, such as review volume and location characteristics, demonstrate stronger associations with customer satisfaction than certification type differences among certified hotels.

This study contributes to a deeper understanding of how sustainability certifications function as trust-building mechanisms in the hospitality sector, particularly within Türkiye's environmentally sensitive Mediterranean tourism zone. The research highlights the critical role of business leadership in selecting and implementing certifications that genuinely demonstrate honesty, transparency, and professional ethics rather than merely accumulating credentials. Drawing upon signaling theory, the findings reveal that while the number of certifications is not associated with customer satisfaction, specific internationally recognized schemes, such as Green Key, Travelife, and LEED, are associated with higher guest ratings. These results highlight the critical role of signal visibility and recognition in shaping post-consumption evaluations.

From a theoretical standpoint, the study refines the application of signaling theory by demonstrating the importance of signal differentiation in service settings where symbolic attributes intersect with experiential quality. Practically, the findings underscore the need for targeted certification strategies, platform-based visibility, and effective reputation management to translate sustainability investments into perceived value and customer trust. Although limited by its cross-sectional design, focus on certified properties only, and reliance on aggregated review scores, the study lays the groundwork for more granular and behaviorally focused investigations. Future research should examine individual-level moderators, incorporate qualitative guest narratives, and investigate the platform dynamics that influence signal reception. Overall, this research advances both academic and managerial understanding of sustainable hospitality by identifying which certifications matter most for building customer trust and why.

Practical Implications

These recommendations apply to comparisons among certified properties and should be interpreted cautiously without comparison to non-certified alternatives. This study provides several actionable insights for hospitality practitioners seeking to improve customer satisfaction through sustainability signaling. First, the results demonstrate that not all certifications contribute equally to guest evaluations. Among certified properties, managers might consider focusing on widely recognized certifications such as Green Key, Travelife, and LEED, which demonstrated positive association with customer satisfaction in this study sample, though causality cannot be inferred from these cross-sectional associations. These certifications not only carry reputational value but also show stronger associations with customers' satisfaction ratings in the sample.

Second, investing in multiple certifications without a coherent communication strategy may yield diminishing returns. Instead of pursuing quantity, hotels should adopt a selective certification strategy, emphasizing the visibility, credibility, and narrative fit of each certification with their brand identity and target market. Third, the findings underscore the importance of strategically integrating certifications into digital

platforms. As many guests rely on booking websites and review aggregators to form pre-stay impressions, hotels must ensure that sustainability credentials are prominently displayed and consistently communicated across all channels, including official websites, third-party platforms, and in-room messaging.

Fourth, customer satisfaction ratings are also associated with review volume in the sample. Encouraging satisfied guests to leave reviews and explicitly mention green initiatives can reinforce the perceived authenticity of sustainability claims. Finally, hotel groups and policymakers promoting green tourism in Türkiye and similar regions should support consumer education efforts, ensuring that travelers can distinguish between types of certifications and their meanings. Increased public understanding may enhance the signaling effectiveness of lesser-known but operationally rigorous programs.

Author Contributions

Conceptualization: T. Z., R. E., S. L., N. Z., Z. K., B. S.; data curation: N. Z.; formal analysis: N. Z., R. E.; funding acquisition: Z. K., B. S.; investigation: T. Z., N. Z., Z. K.; methodology: T. Z., S. L.; project administration: R. E., T. Z.; resources: Z. K.; software: B. S.; supervision: T. Z., S. L.; validation: N. Z., Z. K.; visualization: N. Z., Z. K., B. S.; writing – original draft: T. Z., R. E., S. L., N. Z., Z. K., B. S.; writing – review & editing: T. Z., R. E., S. L., N. Z., Z. K., B. S.

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Conflicts of Interest

The authors declare no conflict of interest.

Data Availability Statement

The data is available and can be provided on request.

Informed Consent Statement

Not applicable.

List of abbreviations

ACRS – average customer reviews score.
FEE – Foundation for Environmental Education.
Google Reviews – Google Business Profile (Google Reviews).
GSTC – Global Sustainable Tourism Council.
ISO – International Organization of Standardization.
LEED – Leadership in Energy and Environmental Design.
OLS – ordinary least squares.

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APPENDIX

Table A1. Systematic Overview of Variables in Hotel Industry Research by Size, Age, Location, Star Rating, and Consumer Rating Categories

Source	Dependent variable	Independent or control variables				
		Size	Age	Location / Distance	Star rating	Consumer rating / online reviews
Arzaghi et al., 2023	Star Rating, Customer Review Score	–	–	Distance to center, distance to metro, distance to airport	–	–
Bresciani et al., 2019	Revenue per available room	Number of rooms	–	–	Star rating	–
Chatibura, 2023	Hotel room rate	Number of rooms	Hotel age	Distance to international airport / Distance to Gaborone Game Reserve	–	–
Gavilan et al., 2017	Hotel consideration	–	–	–	–	Number of reviews
Jenq, 2019	Average transaction value	Number of rooms	–	–	Formal star rating	Number of reviews, consumer rating (TripAdvisor)
Jiang & Taylor, 2020	Average daily rate / Revenue per available room	Number of rooms	Years of hotel operations were collected	Location (urban, suburban, airport, interstate, resort, and town)	Hotel class (luxury, upper upscale, upscale, upper midscale, midscale, and economy)	–
Hung et al., 2009	Hotel room price	Number of rooms	Time a hotel has been operating	The distance from hotel to city center	–	–
Israeli, 2002	Room rack rate dollar prices	Number of rooms	–	–	Star rating	–
Karunarathne & Silva, 2021	Room rate	Number of rooms	–	Distance to international airport / Distance to city center	Star grade	Visitor rating (Booking.com)
Kaya, 2023	Efficiency score / Effectiveness score	Number of rooms / Number of employees	–	–	–	–
Lee & Jang, 2012	Room rates	Number of rooms	–	Distance to city center	–	–
Mayzlin et al., 2014	Cross-platform review share differential	–	Hotel age	Hotel location controls*	Site rating	–
Peiró-Signes et al., 2014	Customer rating (Booking.com)	Number of rooms	–	–	Star rating	–
Radojević et al., 2017	Hotel Rating Score	Number of rooms	–	Distance from city center	Star classification	–
Sainaghi & Baggio, 2013	Occupancy	Number of beds	–	Distance to ski infrastructure / Distance to city center	Star rating	–
Şamkar, 2018	Number of tourists staying at hotels	Number of hotel employees / Hotel bed capacity / Number of rooms / Hotel area/ Number of swimming pools	–	Distance from hotel to airport (km) / Distance from hotel to city center (km)	–	–
Singh et al., 2023	Overall guest satisfaction	–	–	Location attribute	–	–

Tang et al., 2016	Energy use intensity	Number of guest rooms / Number of workers / Gross floor area	Building construction year	–	Hotel star-rating	–
Valenzuela-Ortiz et al., 2022	Hotel revenue	Operating revenue, total assets and number of employees	–	Distance to airport / Distance to coast / Distance to UNESCO heritage sites	Number of hotel star	Consumer rating (Booking.com)
Xie et al., 2014	Revenue per available room	Number of guest rooms	Hotel age	Location	–	Number of reviews (TripAdvisor)
Xie et al., 2017	Revenue, average daily rate, occupancy	Number of guest rooms	Hotel age	–	–	Number of reviews, average consumer-generated review ratings (TripAdvisor)
Zhao et al., 2015	Online hotel booking intentions	–	–	–	–	Volume of online reviews, valence (negative and positive), etc.

*Note: * – dummy variables for airport, resort, and interstate/suburban locations (with urban locations as the reference category).*

Source: compiled by the authors.