

CERTIFIED BUT UNSEEN: GUEST AWARENESS OF SUSTAINABILITY INITIATIVES IN EUROPEAN HOTEL REVIEWS

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ABSTRACT

This study investigates the prevalence of environmental sustainability certifications among European hotels and examines how guests perceive these initiatives in online reviews. Such certifications are formal, third-party acknowledgments of a hotel's adherence to established sustainable operating standards. While acquiring these credentials can be costly and time-intensive, they offer hotels a potential competitive advantage by providing verifiable proof of their environmental commitment to increasingly conscientious travelers. Our research addresses three core questions: How does the rate of certification vary across European regions? What themes emerge in guest reviews of certified hotels, and to what extent do guests demonstrate awareness of sustainability practices? Does recognition of these practices correlate with higher ratings? Methodologically, we analyzed hotels listed on Booking.com across four European regions (North, East, South, and West/Central). Findings reveal that only 11.60% of listed hotels hold a sustainability certification, with stark regional disparities: Northern Europe leads (20.86%), while Eastern Europe has the lowest rate (2.90%). Next, we selected 16 hotels—four per region—from the country with the highest number of certified hotels in each area, choosing a mix of high- and low-rated properties with various certifications. From a sample of 50,387 reviews for these hotels, a mere 289 (0.57%) explicitly or implicitly mentioned environmental practices. This indicates minimal guest awareness or commentary on sustainability. Moreover, a significant portion of these mentions were negative, suggesting that certification does not automatically translate into positive guest recognition or higher ratings in reviews. The discussion contextualizes these results within existing literature and explores practical implications for hoteliers seeking to leverage sustainability credentials effectively.

Keywords: sustainability certifications, Europe, hotels, hotel reviews, guest awareness.

INTRODUCTION

In recent years, significant changes in the global environment and resource over-consumption have heightened the urgency for sustainable development [38]. The global tourism industry, while a vital engine of economic development, has increasingly come under scrutiny for its substantial environmental footprint [1]. Hotels are primary contributors within this sector, characterized as one of the most energy-intensive, water-consuming, and waste-producing subsectors [20]. Their operations consume vast natural resources and generate significant carbon emissions and solid waste [4] [38]. Consequently, the hospitality sector faces a dual imperative: to reduce its ecological

impact while maintaining financial viability [38], a challenge driven by strong competition, exigent customer demand, and reputation management concerns [32].

This imperative is reinforced by a significant shift in consumer behavior. Travelers have become increasingly environmentally conscious, seeking more sustainable, "green" accommodation options when planning trips [25]. Having realized the negative environmental effects of hotel operations, such as water consumption and CO₂ emissions, many travelers now prefer eco-friendly accommodations, a trend amplified in the post-pandemic era [26] [38; citing GSTC Council, 2021]. Customers increasingly want to minimize their footprint and signal their environmental concern through their consumption choices [4].

In response, hotels are showing increasing concern for managing their environmental and social impact [29] [32] and are making efforts to implement green practices and sustainable guidelines [4]. These practices often focus on energy conservation, waste reduction, and water conservation [29]. Such initiatives are implemented not only to "do the right thing" but also to respond to customer requests and improve customer perceptions of quality and satisfaction regarding environmental expectations [10] [29].

To institutionalize these efforts and credibly communicate them to the market, third-party environmental or green certifications have emerged as essential and influential tools [11] [30] [35]. These certifications provide a structured framework for hotels to reduce their environmental footprint [36]. They offer standardized benchmarks, enabling hotels to credibly signal their environmental commitments [38] while also allowing customers to signal their own values through their stay, thereby enhancing engagement and consumption intention [4]. As a result, certifications have become strategic assets for market competitiveness [38], and the global hotel industry has seen many properties earn certification for "green" operation [10]. These certifications can be regional, national, or international, and may cover a single product, service, or group of services [7].

Online travel platforms are increasingly spotlighting certified properties by displaying sustainable badges to communicate these efforts to guests [19] [38]. However, a crucial and underexplored question remains: How do these sustainability signals translate into online reputation—a central determinant of digital visibility and consumer trust? Unlike traditional reputation, online reputation is fluid, algorithmically ranked, and driven by user-generated content like reviews and ratings [23]. While the use of sustainable badges may increase the visibility of eco-friendly hotels and aid informed decisions, there is often an attitude-behavior gap [19]. Guests' positive attitudes may not translate into booking intentions or actual behavior, and consumer awareness of sustainability in tourism remains under-researched [19] [31]. Therefore, it is unclear if these labels actually influence guests' choices or if the perceived reputational returns from certifications materialize [19] [38].

Our research addresses three core questions: How does the rate of certification vary across European regions? What themes emerge in guest reviews of certified hotels, and to what extent do guests demonstrate awareness of sustainability practices? And, finally, does recognition of these practices correlate with higher ratings?

The paper begins with a literature review and a description of the methodology. It then presents the empirical findings, followed by a discussion of their implications, practical applications, and the study's limitations.

LITERATURE REVIEW

An environmental certification refers to a “voluntary procedure that sets, assesses, monitors, and gives written assurance that a business, product, process, service, or management system conforms to a specific requirement,” and is often accompanied by a marketable logo or ecolabel (Black and Crabtree, 2007, p. 20; cited in [18]). For hotels, green certification is one approach to put sustainability into practice, representing a third-party organization’s acknowledgment that a company abides by a set of environmental standards and continually strives to have a positive environmental impact [9].

These certifications serve a critical function in the marketplace as tangible evidence that helps counteract potential “greenwashing” accusations by providing external validation of a hotel’s commitment [5] [18]. Consequently, hotels may adopt these awards to distinguish themselves and signal accountability to customers [9]. Although the process is typically time-consuming and expensive, it aims to address customers’ environmental consciousness and enhance the hotel’s perceived green value and brand image [9].

The business rationale for pursuing certification is compelling. A primary objective is to provide guests with accurate information about a hotel’s environmental performance during booking [18]. Hotels expect certification to boost perception, loyalty, and visitation, ultimately translating into higher bookings and revenue [6] [9] [32]. Certifications can serve as a crucial signal, decreasing a tourist’s perceived risk and increasing trust in the hotel’s claims [41]. Furthermore, the process often leads to more mature environmental management, which can enhance performance and lead to operational cost reductions [9] [18]. This operational advantage can translate into financial benefits, with some findings indicating a positive effect on market value, revenue efficiency, and competitive advantage [3] [5].

However, the path from certification to commercial success is fraught with complications. A significant challenge is the proliferation and inconsistency of certification schemes themselves. With over 140 different eco-labels in sustainable tourism, each with its own standards, the landscape is complex and can confuse rather than reassure consumers [28] [34]. Guests are generally not sufficiently aware of the different systems and do not understand the variety of hotel eco-labels [24]. This lack of consumer recognition is a likely factor in the low global adoption rates among hotels [28], a pattern evident in specific region like Africa (where less than 3.4% of hotels are certified) [34].

This confusion directly impacts consumer behavior, leading to a well-documented “green gap” where positive intent does not translate into action [10]. A consistent finding is that for most tourists, core factors like location, price, and quality take precedence over a sustainability label when booking [4] [18]. While a niche market of older, more educated travelers actively seeks certifications [21], the majority are not significantly influenced by them. Consequently, empirical results on financial performance are mixed, with some studies finding no significant impact on revenue or market performance [10] [39].

This gap underscores the critical role of communication and execution. Research suggests that the mere possession of a certificate is insufficient [29]. Hotels must explicitly and effectively communicate their initiatives. Experimental studies show that prominently displayed sustainability badges on booking platforms can positively influence attitudes and booking intention [19], and tailored messaging (e.g., highlighting certificates vs. ongoing efforts) can improve appeal to different traveler segments [39]. Positive guest

recognition of specific practices in reviews, such as linen reuse, is correlated with higher ratings [8].

Yet, the central question remains: How often do guests actually notice and value these practices in their post-stay evaluations? Existing evidence points to a stark disconnect. Studies analyzing online reviews find that even at certified hotels, guest discourse is overwhelmingly dominated by traditional themes like service and amenities, with eco-concerns being rarely mentioned [29]. This suggests a significant gap between the hotel's sustainable actions and active guest perception, indicating that certification does not automatically shape guest attitudes or review content.

It is within this context of low adoption, consumer confusion, and a glaring perception gap that the present study is situated. While the literature establishes the theoretical value and operational benefits of certification, and highlights the challenges in communication, there is a need for large-scale, regional analysis of actual guest discourse in Europe. This study directly addresses this by investigating: the prevalence of certification across European regions, the themes in guest reviews of certified hotels, the extent of guest awareness of sustainability practices, and whether such recognition correlates with higher ratings. The findings aim to move beyond stated intentions to examine the tangible, visible impact of certifications in the digital word-of-mouth that increasingly drives hotel choice.

DATA AND METHODOLOGY

The methodology involved a two-stage data collection process. On 1 November 2025, a search was conducted on Booking.com for hotel accommodation for two people from 17–20 March 2026 (three nights). This period was selected as it falls on weekdays and does not coincide with Easter or other major European holidays.

All European countries available on the platform (excluding Russia and Belarus) were queried. Using the platform's filter options, results were restricted to hotels holding recognized sustainability certifications.

The search results were compiled into a table and then visualized geographically using Mapchart.net. Europe was divided into four major regions for analysis: North, East, South, and West. From each region, the country with the highest number of certified hotels was selected: **Sweden** (North), **Poland** (East), **Spain** (South), and **France** (West). For each of these four countries, four hotels were selected for further analysis: two from the **highest-rated** properties and two from the **lowest-rated** properties. Selection criteria prioritized hotels with a higher volume of reviews, while also aiming for diversity in star ratings (from one to five stars) and types of sustainability certification.

Subsequently, we analyzed guest reviews for all sixteen hotels to identify comments pertaining to their environmental practices. Online reviews, a form of user-generated content (UGC), are the cornerstone of electronic word-of-mouth (eWOM) in the travel industry [13] [14] [15] [16] [17] [40]. With the development of Web 2.0 platforms, consumers have taken a more active role in sharing opinions [27]. This eWOM has revolutionized travel planning, empowering independent travelers to select destinations and book accommodations by using advice shared by fellow travelers online [22] [37].

Compared to classical word-of-mouth, eWOM possesses distinct advantages that make it a powerful marketing tool [33]. It has a vastly greater reach, is permanent, and is easy for consumers to understand [42]. In the hospitality sector—where evaluating service quality

in advance is difficult—online reviews play a particularly influential role [38], creating a critical online reputation [23] [38].

Crucially, online reviews from peers are generally perceived as more reliable and trustworthy than marketing materials provided by service providers themselves [2]. This makes UGC an essential tool for attracting tourists and marketing tourism products [12]. As manually reading all reviews was not feasible, we employed keyword analysis. Using terms such as “sustainable,” “green,” “energy,” “water,” “recycling,” “waste,” and “plastic,” we screened each identified review to confirm its relevance to the hotels' environmental practices—or lack thereof.

Some socio-demographic and travel behavior data of reviewers are available from the platform, along with individual hotel experience ratings. This quantitative data was first examined using descriptive statistics.

Subsequently, a sentiment analysis was performed to evaluate the textual content of the reviews. This process determines the emotional tone of the text, classifying the writer's attitude toward the hotel as positive or negative.

Finally, a qualitative content analysis was conducted to identify key themes and patterns. An initial set of dimensions and codes, derived from the existing literature, was applied to the text. Through an iterative process, certain themes were consolidated or refined, while others were eliminated. Representative quotations from the reviews were then selected to illustrate the findings.

ANALYSIS OF RESULTS

A total of 83,629 European hotels had availability for the queried period. Of these, 9,699 were certified for sustainability practices, representing 11.6% of the total (table 1).

Northern Europe leads the continent in environmentally friendly practices, with 20.86% of its hotels certified. In contrast, Eastern Europe lags well behind, with only 2.9% certified (table 1).

Table 1. Number and percentage of hotels with sustainability certification in Europe

Region of Europe	Country	Total hotels	Hotels with Sustainability Certification	% hotels with sustainability certification
North	Iceland	227	17	7.45
	Norway	786	109	13.87
	Sweden	1310	319	24.35
	Finland	652	202	30.98
	Denmark	645	188	29.15
	Estonia	200	36	18.00
	Latvia	224	20	8.93
	Lithuania	252	7	2.78
Total North		4296	896	20.86
West	The Netherlands	2091	436	20.85
	Belgium	1136	182	16.02
	Luxembourg	129	15	11.63
	Germany	14,117	1636	11.58
	Switzerland	2458	166	6.75
	Austria	3213	323	10.05
	Liechtenstein	19	2	10.53
	UK	8699	1153	13.25
	Ireland	666	116	17.42
	France	12,160	1974	16.23
Total West		44,868	6003	13.38
East	Poland	2737	138	5.04
	Czechia	1985	47	2.37
	Slovakia	519	5	0.96
	Hungary	924	42	4.55
	Romania	1269	35	2.76
	Bulgaria	966	8	0.83
	Moldova	106	0	0
	North Macedonia	163	1	0.61
	Serbia	433	5	1.15
	Bosnia-Herzegovina	268	1	0.37
	Croatia	403	26	6.45
	Slovenia	335	71	21.19
	Kosovo	154	0	0
	Montenegro	209	11	5.26
	Albania	1077	2	0.19
	Ukraine	1007	13	1.29
	Georgia	1266	9	0.71
	Azerbaijan	370	7	1.89
	Armenia	455	4	0.88
Total East		14,646	425	2.90
South	Andorra	125	9	7.20
	Spain	7367	1421	19.29
	Portugal	1992	465	23.34
	Italy	10,076	457	4.54
	San Marino	16	0	0
	Monaco	9	6	66.67
	Malta	234	17	7.36
Total South		19,819	2375	11.98
Total Europe		83,629	9699	11.60

At the country level, Finland (31% of hotels certified), Denmark (29%), and Sweden (nearly 25%) are the most advanced (table 1; figure 1). In Western Europe, only the Netherlands exceeds a 20% certification rate. In Southern Europe, Portugal (over 23%) and Spain (nearly 20%) are at the forefront of the green hotel movement. One notable exception is Monaco, where two-thirds of hotels are certified; however, this figure is based on only nine hotels in the sample.

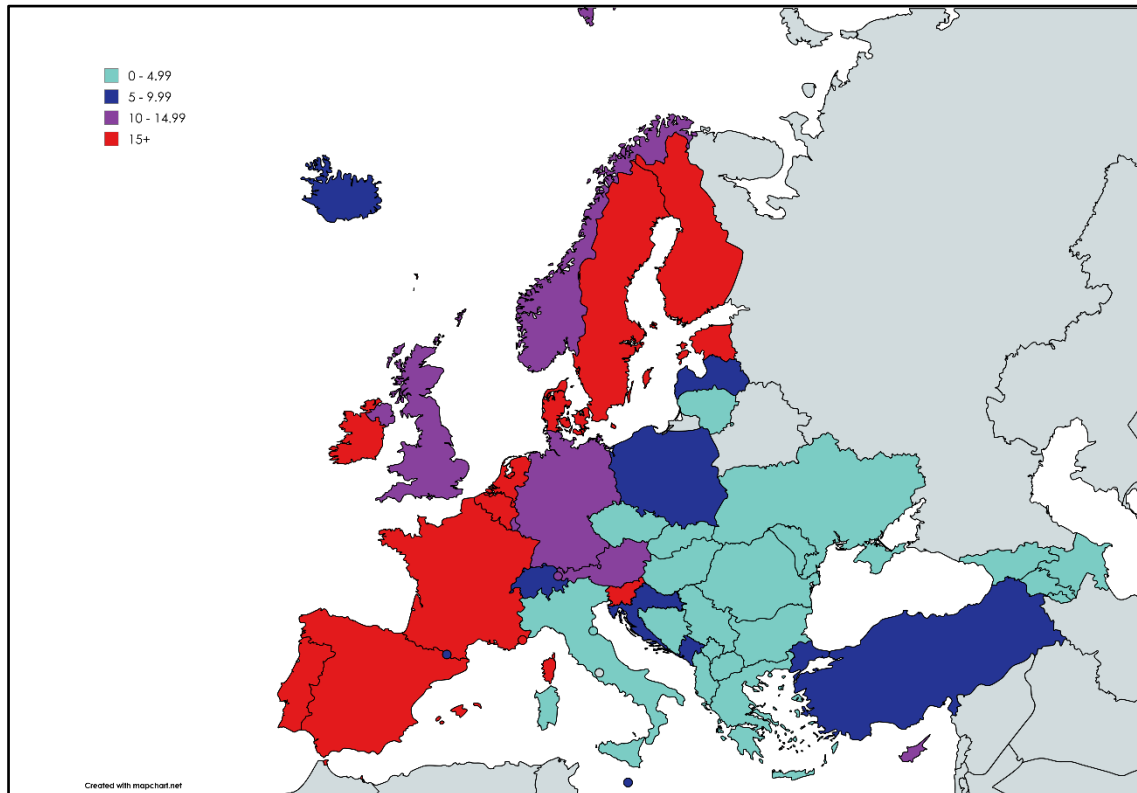


Figure 1. Rate of hotels with sustainability certifications

In Eastern Europe, Slovenia is a standout, with a certification rate exceeding 21%. Elsewhere in the region, percentages are very low, culminating in Moldova and Kosovo, where none of the hotels were certified (table 1; figure 1).

For the second part of the analysis, 16 hotels were selected from four countries based on criteria outlined in the methodology chapter. These hotels are detailed in Table 2 below.

Table 2. Hotels included in this study

Region - Country	Name of hotel	Location of hotel	Hotel categ.	Average review score	Certification Type	Total # of reviews	# of reviews mentioning env. practices
North - Sweden	Hotell St. Clemens	Visby	***	9.9	Nordic Swan Ecolable	581	8
	Hotel Royal	Gothenburg	***	9.1	Green Key (FEE)	4677	12
	Sure Hotel Studio by Best Western	Bromma (Stockholm)	***	6.6	Green Key (FEE)	434	3
	Scandic Stortorget	Malmö	****	7.1	Nordic Swan Ecolabel	1453	3
	Total Sweden			8.61		7145	26
East - Poland	Raffles Europejski	Warsaw	*****	9.6	Green Globe	1038	1
	PURO Centrum	Łódź	****	9.5	LEED	5219	10
	Ibis Styles	Bielsko-Biała	***	7.5	Green Key (FEE)	471	2
	Ibis Budget Warszawa West Station	Warsaw	*	7.9	Green Key (FEE)	11,991	7
	Total Poland			8.43		18,719	20
South - Spain	Seda Club Hotel	Granada	*****	9.6	Ecostars	707	8
	ARTIEM	Madrid	****	9.5	Ecostars	2021	52
	Eurostars Central	Madrid	****	8.4	Bioscore	4652	86
	Negresco Princess	Barcelona	****	8.4	Biosphere Certification	4918	26
	Total Spain			8.65		12,298	172
West - France	Hotel Leonor	Strasbourg	****	9.3	Green Key (FEE)	4711	22
	Château Hôtel Grand Barrail	Saint Emilion, Bordeaux	*****	9.2	EU Ecolabel	1137	12
	Best Western Hotel Opera Drouot	Paris	***	8.1	Green Key (FEE)	1454	10
	MOB Hotel Lyon Confluence	Lyon	***	8.1	Green Key (FEE)	5151	27
	Total France			8.65		12,453	71
Europe	Total			8.56		50,615	289

In total, guests left over 50,000 reviews for the 16 hotels studied. Among these, only 289—a mere 0.57%—contained any explicit or implicit references to the hotels' environmental practices (table 2). Significant regional disparities exist within this low overall figure. The rate was lowest in Poland (Eastern Europe) at just 0.11%, followed by Sweden (Northern Europe) at 0.36%. Guests in France (Western Europe) mentioned environmental practices at a rate (0.57%) matching the overall European average. The highest awareness was observed in Spain (Southern Europe), where the rate reached 1.40%—though this figure remains still notably low.

As shown in Table 3, most reviews referencing environmental practices were submitted by couples who stayed at the hotel for one to two nights, typically in 2023 or 2024.

Table 3. Socio-demographic and travel attributes of reviewers

Attribute		Frequency	% of total
Travel companionship	Solo	66	22.83
	Couple	151	52.25
	Family	38	13.15
	Group	34	11.76
Nights spent	1	91	31.49
	2	88	30.45
	3	64	22.14
	4+	25	8.65
Year of staying at the hotel	2022	7	2.42
	2023	107	37.02
	2024	110	38.06
	2025	65	22.49

They rated their hotel experience an average of 7.94, which is considerably lower than the overall average rating of 8.56 for all reviews of the 16 hotels (Table 2). This indicates that when mentioning environmental practices, guests at these certified hotels expressed lower satisfaction than when evaluating other features. This pattern is corroborated by the sentiment analysis (Figure 2), which shows that nearly two-thirds of comments specifically about hotels' environmental practices were negative.

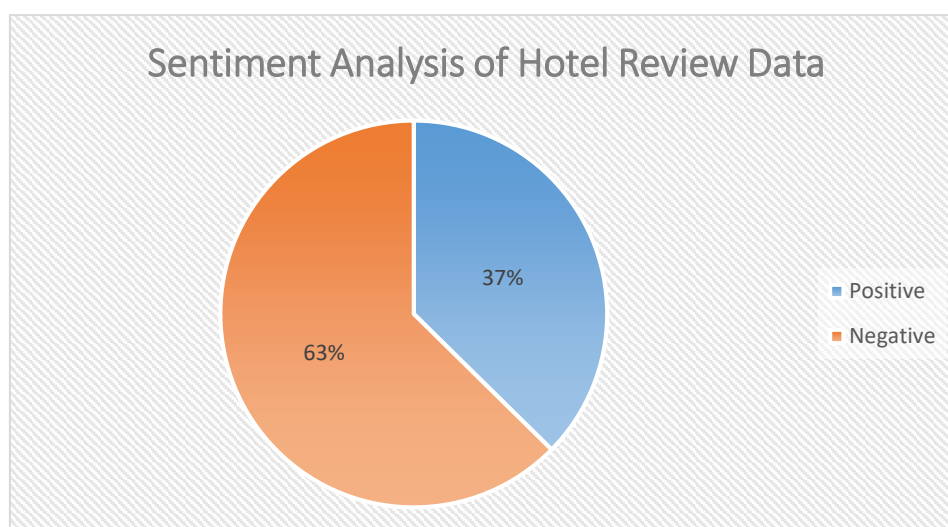


Figure 2. Sentiment analysis of hotel review data

Quantitative and qualitative analysis of reviews

Next, we analyzed the review texts to identify recurring themes and sub-themes. This analysis revealed five major themes (or dimensions) and 14 sub-themes (or codes), which are presented in Table 4.

Table 4. The main themes and subthemes resulting from the qualitative analysis of reviews

Dimension	Frequency	% of total	Codes
Water	69	23.88	Shower
			Leakage
			Towel reuse
Energy	149	51.56	Heating
			Cooling
			Lighting
Waste reduction & separation	14	4.84	Refill
			Recycling
Food origin	40	13.84	Organic
			Local
General practices	36	12.46	Environment
			Sustainable/-bility
			Green
			Eco-friendly

Theme 1: Energy Consumption

More than half of all comments referencing hotel environmental practices concerned energy consumption (Table 4), with a majority of these assessments being negative.

The primary complaint centered on the inability to adjust room temperatures. In Spanish hotels, an energy-saving policy kept the cooling system off during winter, leaving only heating active. This created a "greenhouse effect" in sun-exposed rooms, causing them to become excessively hot—a problem that persisted through the night. Ironically, guests reported being forced to open windows to sleep, negating the intended energy savings (e.g., cases 166, 168, 244). Numerous other reviews cited non-adjustable heating (e.g., cases 113, 114, 116, 118, 127, 129, 135, etc.) and non-functional air conditioning (e.g., cases 87, 89, 90, 91, 94, 98, 101, 108, 110, 119, 120, 122, 123, 124, 128, etc.), highlighting a widespread issue with climate control.

One guest left the following comment regarding the excessive heating in the room:

"The room was boiling hot—so hot that, ironically in the middle of winter, we had to sleep with the window open. The heating could not be turned off or lowered. We asked at reception, but no solution was offered."

Another disgruntled guest left a lengthy comment from which we are reproducing only a few fragments (case 115):

"I had an awful stay at [Hotel Name]. The heating was broken, so it was blasting at full power the entire time. My room felt like a sauna. I contacted the front desk, and someone came to try to help. He advised me that the system was broken and he couldn't log in to change anything due to a system issue. His solution was to give me a bottle of water. I had the windows wide open all night, but as it was very mild outside, it made no difference. I had a terrible night overall. In the morning, I spoke to the manager and explained that the uncontrollable heating had led to a miserable night. [...] Later, I received a reply stating that the heating system wasn't broken—it was simply on because it was winter. I countered by pointing out that hotel staff had told me it was broken, and

that individual room controls should still be available, citing regulations that confirm this. I received no further response. Overall, I was very unimpressed. I will never stay here again. The customer service was terrible, showing a complete lack of care or consideration for guests and for the environment. Heating an enormous hotel when it's 15 degrees Celsius outside, without giving guests the option to turn it off, is absolutely appalling for both customer comfort and the current climate emergency."

In other instances, the reported problem was the opposite: some hotels, in an effort to conserve energy, provided insufficient heating, leaving rooms uncomfortably cold. For example, one guest remarked (case 242):

"Although the outside temperature was 13 degrees Celsius in the mornings and evenings, the heating was off and the room was cold. We complained, and a staff member explained that 'it is the system.' It has nothing to do with the system, but is simply a way to reduce energy costs at the expense of our comfort. They later brought in a small electric heater to warm the room."

This approach sometimes led to undesirable consequences, as noted by a guest at the same French hotel (case 252): *"It was so cold in our room the first night that I got sick."*

These were not isolated incidents, with similar complaints noted in several other reviews (e.g., cases 93, 95, 99, 113, 228, 259, 260).

Of course, not all comments were negative. A number of guests provided positive feedback, noting that the air conditioning functioned properly (e.g., cases 96, 100, 261) and that room temperatures were adjustable (e.g., cases 11, 56).

Another energy-related issue noted in guest reviews was the lighting system. The primary problem was not inadequate lighting, though a few guests mentioned malfunctioning (case 218) or poor lighting (cases 54, 278). Instead, the chief complaint centered on the automated technology controlling the lights—and in some instances, the heating and television. This system's complexity frustrated many guests who could not determine how to operate it (e.g., cases 27, 31, 34, 48, 52, 54), although a minority found it innovative and exciting (case 33).

This frustration is exemplified by one guest's remarks (case 34):

"The lighting system is a joke—and torture. A simple light switch would be a perfect solution, but apparently, that's too straightforward for this hotel. It would take multiple paragraphs to describe the idiocy of this system and how it deprived me of sleep, so I will just say it sucks and should be ripped out and replaced with a few working light switches. PS: If you book this hotel, plan on staying at least three nights—that's how long it will take you to figure out the lighting."

Theme 2: Water saving

Most comments in this section dealt with shower pressure, water leakage and towel reuse. Guest feedback on shower pressure was predominantly positive, with many praising its strength (e.g., cases 15, 47, 56, 58, 60, 63, 102, 184, 187, 193–196). While some noted low pressure (e.g., cases 14, 186, 197, 263), the prevailing sentiment aligns with sustainability goals, as higher pressure can reduce overall water usage. One guest's enthusiasm was captured in the remark: *"Water pressure in the shower is the best I've ever experienced anywhere in the world"* (case 59).

Several water-related inefficiencies were noted in guest reviews. These included leaking fixtures, particularly from shower heads (e.g., cases 39, 61, 185, 192, 221), with one guest specifying: *"Shower head broken spreading water in every direction."* Guests also

reported long wait times for hot water, resulting in significant waste (e.g., cases 16, 107, 112).

Despite these issues, some guests positively acknowledged the hotels' sustainability efforts regarding water conservation, as illustrated by one review: *"Loved the sustainability push at the hotel with a focus on reusing and not wasting water"* (case 64). One of the most common "green" initiatives in hotels worldwide is encouraging guests to reuse towels, a simple measure that conserves water and energy. However, guest reviews reveal significant inconsistencies in the execution of this policy.

Many guests reported that their towels were changed daily against their wishes, undermining the sustainability intent. For example, one noted, *"Replaced towels daily even though we hung them up"* (case 203), while others cited similar experiences (e.g., cases 42, 211). Some expressed frustration that staff did not follow the hotel's own guidelines: *"Only towels on the floor were supposed to be removed and washed, yet all of my towels were taken for no reason. Don't pretend to be 'green'!"* (case 34).

Conversely, other guests experienced the opposite problem: towels were not changed even after multiple days, leading to complaints about hygiene and convenience (e.g., cases 22, 23, 43, 201, 202, 205, 206, 207, 214, 208, 256). One guest explained a confusing interaction: *"We didn't ask for the towels to be changed for 2 days, and on the 3rd day we put them on the floor... and they picked them up and hung them back up for us"* (case 209).

This inconsistency was summarized by one reviewer, who observed, *"Some rooms offer replacement of towels, others do not"* (case 286). Despite these operational flaws, the policy itself received praise from guests who valued its environmental purpose, with one stating, *"I also think it's excellent and progressive that the towels are only replaced if you explicitly request it!!!"* (case 215).

Theme 3: Food and beverage origin

Guest feedback on the hotels' food and beverage sustainability practices reveals a spectrum of awareness and appreciation. Many guests were pleased with the emphasis on local sourcing, particularly at breakfast (e.g., cases 1, 2, 5, 7, 26, 233, 240) and lunch (case 51), recognizing it as a key sustainable practice. One guest noted, *"We love that breakfast buffet comes with local products only as we believe in supporting the local community whenever this is possible"* (case 236).

However, the execution was sometimes inconsistent. Some guests observed that staff did not actively promote local options, as one review pointed out: *"The wine bar waiter seemed to know nothing about local wine and kept pushing New Zealand Sauvignon"* (case 241). Others were indifferent or dissatisfied with the local focus, preferring more international offerings: *"Unfortunately, breakfast isn't very international, with too many local dishes"* (case 36).

Feedback on organic products was similarly mixed. Several guests positively noted the use of organic food (cases 19, 240) and bathroom amenities (case 266). One comprehensive review praised, *"Fantastic organic breakfast... [and] the use of organic shampoos and soaps"* while suggesting further amenities like guest bicycles (case 18). Conversely, others criticized the lack of visible organic or ethical options, with one guest stating, *"For a hotel that's supposed to offer organic, ethical, local options... I saw absolutely none of that"* (case 279).

Theme 4: Waste reduction and separation

Several guests acknowledged and appreciated specific hotel initiatives to reduce waste and promote recycling. Positive feedback highlighted conscious efforts to minimize food waste. Guests approved of replacing buffet service with à la carte menus, with one noting, *"Liked ordering from menu. Dislike the waste of food on big buffets"* (case 53). Others supported smaller buffet selections designed to avoid excess, though some felt pricing should reflect the scaled-back offering: *"I'm totally OK with a smaller array of food to avoid waste, but it should be priced accordingly"* (case 289).

The provision of refillable amenities was also well-received. Guests valued water refill stations to avoid single-use plastic bottles (e.g., cases 103–105) and praised the use of refillable soap dispensers (case 21).

Opinions on recycling programs were divided. Some guests were impressed by innovative commitments, such as one who remarked, *"Impressed with their commitment to recycle, especially the cool glasses that are made out of their wine bottles"* (case 216). However, others experienced practical failures in execution, as illustrated by a guest who was prevented from using indoor recycling bins: *"I tried to recycle paper, plastic bottles and aluminum cans into the bin in front of the elevator but the receptionist didn't let me and indicated to me to put them into the bin outside ([which was] not for recycling)"* (case 46).

Theme 5: Overall evaluation of "green" practices

Overall, a number of reviews show that some guests acknowledge and approve of hotels' commitments to environmentally friendly practices (e.g., cases 9, 10, 44, 64, 71, 80–82, 85), particularly when these initiatives do not compromise comfort (e.g., cases 65, 78). However, others felt that certain hotels took the concept to an extreme, leading to perceptions of inconvenience or poor value (e.g., cases 68, 281). One critical review encapsulates this sentiment:

"The eco-concept taken to the extreme... sometimes ridiculous (no TV, instead 2 meager books in the rooms.) a library decor of books in the living room, but inaccessible behind a fence. A breakfast that was way too expensive... despite the variety of products on offer. Pay attention to quality more than to decor.... Orange juice of dubious quality despite its presentation in a lemonade bottle, watered-down and flavorless coffee: offer real espressos, etc." (case 281)

DISCUSSION AND CONCLUSIONS

This study set out to map the landscape of environmental sustainability certifications among European hotels and to understand the extent and nature of guest awareness and valuation of these practices as expressed in online reviews. The findings paint a complex and somewhat contradictory picture, revealing a significant gap between the strategic adoption of certifications by hoteliers and their operational execution and subsequent recognition by guests.

The pronounced regional disparity in certification prevalence—from over 20% in Northern Europe to under 3% in Eastern Europe—confirms that sustainability is not a uniformly integrated priority across the continent. This pattern aligns with broader socio-economic and policy landscapes, where Northern and Western European nations often exhibit stronger environmental governance and consumer awareness. The leading

positions of countries like Finland, Denmark, Sweden, the Netherlands, and Portugal suggest that certification uptake is influenced by a combination of regulatory pressure, market demand, and industry leadership. Conversely, the exceptionally low rates in much of Eastern Europe highlight a significant area for development, though the standout case of Slovenia demonstrates that progress is possible within the region. These disparities present a challenge for platforms and travelers seeking consistent sustainable options across Europe and underscore the need for targeted support and incentives in lagging regions.

The most striking finding is the profound disconnect between hotel certification and guest discourse. With only 0.57% of over 50,000 reviews containing any reference to environmental practices, it is evident that sustainability credentials are not a primary driver of online review content for the vast majority of guests. This suggests that, for most travelers, such certifications either go unnoticed, are considered a basic expectation, or are simply less salient than core experiential factors like service, location, cleanliness, and comfort. This is consistent with earlier findings by [29] [18] [4]. The low mention rate challenges the assumption that certification automatically translates into enhanced brand communication through user-generated content. It indicates that while a segment of "conscious travelers" exists, they constitute a vocal minority in the review ecosystem. Perhaps more consequential than the low volume of mentions is their predominantly negative sentiment. The finding that mentions of environmental practices correlate with a significantly lower average rating (7.94 vs. 8.56) is critical. It reveals that when sustainability initiatives *are* noticed, they are often perceived as detracting from the guest experience. The thematic analysis provides a clear explanation: guests become aware of sustainability primarily when it causes inconvenience or perceived discomfort.

The dominant theme of problematic energy conservation—specifically, non-adjustable climate control leading to rooms that are excessively hot or cold—turns a well-intentioned practice into a major source of dissatisfaction. This frustration is exacerbated by poor communication and inflexible systems, as vividly detailed in the review excerpts. Similarly, inconsistent towel reuse policies and overly complex automated systems generate guest irritation by creating confusion and a sense of lost autonomy. These findings underscore a crucial principle: **operational implementation is as important as strategic intent**. A certification standard may mandate energy-saving systems, but if their deployment disregards fundamental guest comfort and control, it risks backfiring, creating negative associations with the hotel's "green" identity.

Positive recognition does occur, but it is more nuanced and often tied to initiatives that enhance the experience or align with guest values without imposing sacrifices. Guests appreciate tangible quality and ethical benefits, such as strong water pressure (which aligns with efficiency), high-quality local and organic food, and thoughtful waste-reduction measures like refillable amenities. These practices are perceived as adding value rather than restricting it. This distinction highlights a pathway for effective communication: hotels should emphasize sustainability initiatives that have a clear, positive guest-facing benefit.

Theoretical Implications

This research contributes to the literature on sustainable tourism and service management by empirically demonstrating the weak link between formal environmental certification and guest-generated electronic Word-of-Mouth (eWOM). It challenges the simplistic assumption that "green" credentials directly yield positive online reputation. Instead, it

supports a more complex model where guest awareness is low and sentiment is contingent on the seamless integration of sustainable practices into the service experience. The study highlights the role of online reviews as a rich, unsolicited data source for auditing the real-world, guest-perceived effectiveness of sustainability policies.

Practical Implications for Hoteliers

1. Certification should not be an end in itself. Hotel managers must rigorously evaluate how mandated practices affect the guest experience. Climate control systems must retain reasonable guest autonomy. Sustainability policies, like towel reuse, require consistent staff training and execution to avoid perceived hypocrisy.
2. The negative sentiment often stemmed from confusion and frustration. Hotels must clearly explain the *purpose and benefit* of any practice that might alter the traditional guest experience. Empowering front-line staff to explain and, where possible, offer solutions or compromises is essential.
3. Marketing and branding efforts should foreground sustainability measures that guests inherently appreciate, such as locally sourced gourmet food, high-efficiency showers, or refillable premium amenities. These are more likely to generate positive reviews and enhance the brand's value proposition.
4. If certain sustainable choices involve a trade-off (e.g., a smaller breakfast buffet to reduce waste), this should be communicated clearly, and pricing should be perceived as fair.

Limitations and Future Research

This study has limitations. The analysis was confined to reviews on a single platform (Booking.com) and to a select sample of hotels within leading countries. The manual text-mining approach, while efficient, may have missed extremely implicit references to sustainability. Future research could expand the geographic and platform scope, employ in-depth interviews to understand guest perceptions beyond reviews, and conduct longitudinal studies to track changes in awareness and sentiment.

CONCLUSION

In conclusion, this study reveals that environmental sustainability certification among European hotels remains uneven and that its impact on the guest experience, as reflected in online reviews, is minimal and often counterproductive. While a certification may serve as a valuable internal management framework and a signal to a segment of the market, it does not guarantee positive guest recognition or competitive advantage in the digital reputation sphere. The low awareness suggests that certifications alone are not powerful differentiators in the crowded online marketplace. More critically, the prevalence of negative mentions serves as a stark warning: poorly implemented sustainability measures can actively damage guest satisfaction and online ratings. Therefore, the key to leveraging sustainability credentials effectively lies not merely in acquiring them, but in implementing them with unwavering attention to guest comfort, clear communication, and operational consistency. For the European hotel industry, the journey towards sustainability must be one that guests are willing to take—and enjoy—not one they are forced to endure.

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