

Bridging the sustainability communication gap in fine dining: a mixed-methods study of Italian Michelin Green Star restaurants

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Abstract

Purpose – This study examines how sustainable practices are implemented and communicated in Italian restaurants awarded the Michelin Green Star restaurant (MGSR). This study aims to assess the level of online transparency and identify the gap between operational sustainability and how it is communicated to the public.

Design/methodology/approach – A mixed-methods research approach was adopted. Firstly, a content analysis was carried out on the official websites of all 58 MGSR restaurants in Italy, with a view to examining six key dimensions of sustainability. Secondly, an in-depth case study was conducted through an interview with the chef at Casa Format, a restaurant renowned for its advanced sustainability practices.

Findings – The findings highlight a clear imbalance in sustainability communication. While high-profile practices, such as sustainable menus, are widely publicised (94%), more complex and less tangible aspects – such as energy efficiency (14%) and community engagement (28%) – continue to be poorly communicated. The case study also highlights a significant gap between implementation and communication, demonstrating that even the most advanced practices often fail to translate into effective signals for stakeholders. These findings suggest that sustainability communication in the luxury hospitality sector is selective and fails to fully capture the depth of operational commitment.

Research limitations/implications – The study is limited to website-based analysis and a single case study. Future research should broaden the empirical scope through more comprehensive qualitative and quantitative approaches and explore alternative communication channels, including interactions between customers and staff and on-site communication.

Practical implications – The findings provide practical guidance for restaurants, policymakers and industry bodies on how to improve transparency on the topic of sustainability. In particular, regarding the adoption of minimum disclosure standards and how the incorporation of communication practices into sustainability certification schemes could enhance the visibility and credibility of sustainable gastronomy.

Originality/value – This study contributes to the existing literature by conceptualising the gap between implementation and communication as a failure of reporting, demonstrating how limited disclosure prevents sustainability practices from gaining legitimacy and standing out. Furthermore, it expands research on luxury services by highlighting the challenges associated with communicating sustainability in experiential and intangible contexts.

Keywords Sustainable gastronomy, Michelin Green Star, fine, Fine dining, Sustainability communication, Signalling theory, Stakeholder engagement

Paper type Research paper

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1. Introduction

The hospitality sector is increasingly being called upon to play a leading role in the transition to more sustainable consumption and production patterns. As food systems are responsible for a significant share of environmental impact – such as greenhouse gas

emissions, land and water use and waste generation – the food service industry is a key area for operational and behavioural change (Crippa *et al.*, 2021; Gössling and Hall, 2022; Kim *et al.*, 2024; Nguyen and Lee, 2023). These concerns have intensified in the post-pandemic context, where consumer preferences have shifted towards home delivery and takeaway services, further complicating the sustainability of food service logistics and food packaging (Arunan and Crawford, 2021; Zhang and Wen, 2022; Lin and Yang, 2022).

Luxury gastronomy, traditionally associated with pleasure and the intensive use of resources, is now being redefined by a new paradigm in which sustainability plays a central role (Batat, 2019; Ho, 2021; Kim and Park, 2024). In this evolving landscape, the Michelin Green Star, launched in 2020, has become a symbolic recognition for those restaurants that implement exemplary environmental and ethical practices. Since its inception, the Green Star Award has been bestowed on over 500 establishments globally, establishing them as trailblazers in the realm of sustainable catering (Li and Wu, 2021). It is imperative that these restaurants not only reduce their ecological footprint, but also inspire others through transparency, innovation and stakeholder engagement (Luo and Qu, 2021; Chen and Chang, 2021).

Despite the increased visibility of sustainability in the high-end restaurant sector, recent studies have raised concerns about the credibility and depth of sustainability claims made by restaurants. The terms “eco-friendly” and “sustainable” are frequently used in promotional content without substantiation in genuine practices, a phenomenon referred to as “greenwashing” (Majeed and Kim, 2022). Moreover, empirical analyses demonstrate that a significant number of sustainability initiatives in restaurants take place behind the scenes, rendering them imperceptible to customers unless explicitly communicated (Charlebois *et al.*, 2015; Luo and Qu, 2021). The discrepancy between the implementation of these measures and the subsequent communication of the same has the potential to impede the educational and inspirational function that such restaurants could potentially fulfil. This divergence may also erode consumer trust.

This study explores how Michelin Green Star restaurants (MGSRs) in Italy communicate their sustainable practices online to determine whether there is a measurable gap between what is implemented at the operational level and what is publicly disclosed. Drawing on the theoretical foundations of signalling and stakeholder theories, this study hypothesises that communication is not merely instrumental, but is in fact fundamental to the legitimisation and dissemination of sustainable practices within the hospitality sector.

The paper adopts a mixed-methods approach, combining a content analysis of all 58 Italian MGSR with a case study on Casa Format, a model of operational sustainability recognised for its energy independence, zero-waste approach and commitment to the community. The study has three main objectives:

1. to assess the scope and nature of sustainability communication on MGSR official websites;
2. to identify potential discrepancies between implemented practices and their digital representation; and
3. to draw interpretative insights from a best-practice example to understand the possible reasons behind the lack of communication.

Accordingly, the investigation was guided by three research questions:

R1. To what extent do Italian MGSRs communicate their sustainability practices online?

R2. Is there evidence of a gap between actual sustainability efforts and their online communication?

R3. What insights can be drawn from the case of Casa Format to explain this potential communication gap?

Furthermore, the study develops a concise conceptual model of sustainability communication within the MGSR sector. The model distinguishes between different modes of communication and explains how these contribute to the emergence of a gap between implementation and communication.

By analysing how sustainability is – or is not – communicated, this research helps to raise consumer awareness. Improving the visibility of sustainable practices in the high-end catering sector has the potential to create a more informed consumer base, thereby promoting environmentally responsible consumption patterns. The study makes a significant contribution to the literature on sustainability in the hospitality sector by highlighting both the practical challenges and the theoretical implications associated with improving the visibility, credibility and impact of sustainable gastronomy. It also contributes to the broader debate on the role of high-end restaurants in accelerating the transition towards sustainable food systems and offers concrete recommendations for industry stakeholders, policymakers and researchers.

The manuscript is organised as follows. The next section reviews the literature, followed by a description of the research design and methodology. The results are then presented, and the article concludes with a discussion of the findings and implications.

2. Literature review

2.1 Sustainability in luxury services: the case of luxury restaurants

Although the literature on luxury goods and brands is now well established, research on luxury services remains comparatively underdeveloped (Kapferer and Bastien, 2009; Giglio *et al.*, 2020). Some studies have begun to explore value creation in luxury services (Giglio *et al.*, 2020) or the symbolic and ritual dimensions of high-end consumption (Dion and Arnould, 2011) and the role of experiential value in shaping customer satisfaction (Wu and Liang, 2009). Nowadays there is still a lack of in-depth research on how sustainability is integrated and communicated in luxury dining.

The study of sustainable luxury services remains limited despite its growing relevance (Batat and De Kerviler, 2020; Batat, 2021a, 2021b). Existing evidence suggests that communication plays a fundamental role in shaping how sustainability is perceived by consumers. For example, Ko *et al.* (2019) demonstrate that when restaurants fail to clearly communicate their sustainability practices, customers are often unaware of such initiatives. This highlights the importance of transparent communication in reinforcing the value of operational sustainability.

Up to now academic research on the luxury sector has predominantly focused on tangible products, such as fashion, jewellery and automobiles. However, there is an increasing need to investigate how sustainability is embedded within luxury services, particularly in high-end hospitality and dining contexts. This is especially relevant in luxury restaurants, where the experiential and symbolic nature of the service introduces additional complexity. Unlike physical goods, services are characterised by intangibility, heterogeneity, perishability and inseparability (Lovell and Gummesson, 2004). This makes sustainability more difficult to assess and communicate. Furthermore, the high degree of human interaction and co-creation inherent in luxury services amplifies their subjectivity and uniqueness (Wirtz and Lovell, 2016; Atwal and Williams, 2009). This requires more nuanced approaches in both implementation and communication.

In this context, sustainability research needs to broaden its scope to better understand how sustainable practices are implemented and communicated in luxury dining. The relationship between customers and the dining experience extends beyond purely economic

dimensions and includes psychological, socio-cultural and symbolic elements (Marcilhac and Moriniaux, 2012). In recent years, consumer expectations have evolved accordingly: alongside quality and enjoyment, diners increasingly seek alignment with personal values, particularly those related to sustainability and ethical responsibility. Kim and Hall (2020) confirm that consumers attribute growing importance to environmental transparency, ingredient traceability and value consistency, recognising sustainability as a core component of the dining experience.

Despite the increasing adoption of sustainable practices in fine dining, empirical studies consistently highlight a gap between implementation and communication. Ko *et al.* (2019) demonstrate that insufficient communication undermines customer trust and perceived authenticity. Similarly, Tölkes, 2018; Sung *et al.* (2021) find that, although many restaurants adopt sustainable practices, these are rarely emphasised on websites or menus, limiting their influence on consumer choices. Testa *et al.* (2015) further argue that sustainability in hospitality often remains “behind the scenes”, due either to limited integration into marketing strategies or concerns about being perceived as engaging in greenwashing.

These findings suggest that sustainability must not only be implemented but also strategically communicated, particularly in luxury dining contexts where storytelling and intangible value are central to the customer experience. This evolving landscape requires restaurant managers to address the multidimensional expectations of consumers, balancing excellence with ethical responsibility. For prosocial consumers – those who prioritise sustainable and ethical consumption – sustainability has become a fundamental component of the luxury dining experience (Foster *et al.*, 2000). These consumers expect restaurants to reduce waste, improve energy efficiency and adopt environmentally responsible sourcing practices (Jackson, 2010; Rishi and Gaur, 2012). However, the limited visibility of such efforts in customer-facing communication channels remains a significant barrier to fully realising their value.

In response to these changing expectations, many luxury restaurants have begun to adopt sustainability-oriented practices, including local sourcing, energy efficiency, waste reduction and plant-based menu options (Batat, 2021a, 2021b). A key institutional signal of this transformation is the Michelin Green Star, which was introduced in 2020 to give recognition to restaurants with an exceptional commitment to environmental sustainability (Michelin Guide, 2020). This recognition has gained global prominence and complements the traditional Michelin star system, reflecting the increasing importance of sustainability in high-end gastronomy. The rise of sustainable haute cuisine has influenced Michelin-starred chefs, who are progressively integrating ethical and ecological concerns into their culinary philosophy (Batat, 2021a, 2021b). This evolution signals a paradigm shift, in which environmental responsibility is no longer optional, but an integral component of customer satisfaction and brand value (Giglio *et al.*, 2020).

2.2 Luxury dining as a growing research field

Luxury dining can be understood as an immersive and engaging experience orchestrated by the chef, in which each dish conveys a narrative (Batat and De Kerviler, 2020). It is typically characterised by exclusive locations, creative culinary expression and the use of high-quality and distinctive ingredients, offering guests a memorable and emotionally rich gastronomic experience (De Kerviler, 2019). Within this paradigm, food is no longer perceived as a mere commodity, but rather as a sophisticated artistic expression that embodies authenticity, aesthetics and emotion, deeply embedded in cultural traditions and culinary heritage (Batat, 2019).

Luxury gastronomic restaurants differ significantly from traditional and fast-food establishments in their emphasis on creativity, complex and diverse menus, refined preparation techniques, distinctive atmospheres and the expertise of Michelin-starred

chefs, who are often regarded as creative designers rather than simply cooks (De Kerviler, 2019). In this context, the Michelin Guide – functioning in the same way as a luxury brand – plays a pivotal role in enhancing the symbolic and reputational value of gourmet restaurants through its star-based classification system (Batat, 2021a, 2021b).

Within this evolving landscape, Michelin-starred restaurants are increasingly adapting their practices to respond to growing sustainability expectations. This transformation reflects broader shifts in consumer demand towards ethical, environmentally responsible and health-conscious dining experiences. Recent studies highlight how luxury gastronomy is undergoing a values-driven transition, with chefs progressively integrating sustainability into their culinary identity (Batat, 2021a, 2021b). The introduction of the Michelin Green Star in 2020 further reinforced this shift, providing formal recognition to restaurants demonstrating a strong commitment to environmental sustainability (Michelin Guide, 2020).

As a result, sustainability is becoming a defining dimension of luxury dining. Practices such as local and organic sourcing, energy efficiency and food waste reduction are increasingly embedded in restaurant operations, reflecting a broader reconfiguration of the sector. The sustainability movement is reshaping the chef's approach to food, aligning the pursuit of culinary excellence with ethical and environmental responsibility. Recent research on MGSR has shown that sustainability communication in haute cuisine tends to revolve around recurrent themes such as sustainable technologies, diversified culinary offerings, community initiatives, sustainable supply chains, entrepreneurial values and sustainability certifications (Olivieri *et al.*, 2025). This evolution mirrors a wider industry trend towards responsible gastronomy, driven in part by the growing relevance of prosocial consumers – those who prioritise ethical, environmental and social values in their consumption choices (Foster *et al.*, 2000). These consumers expect luxury restaurants to adopt practices such as waste reduction, energy efficiency and sustainable sourcing, thereby reinforcing the transition towards more sustainable models of high-end gastronomy (Jackson, 2010; Rishi and Gaur, 2012).

3. Methodology

This study adopts a mixed-methods research design combining a quantitative Web content analysis of all MGSR in Italy with a case study based on an in-depth interview with the head chef of Casa Format. The analysis was carried out in September 2024. It is important to note that websites are dynamic and content can change without notice; the study thus reflects the state of communication present during the data collection window.

3.1 Web content analysis

The present research is grounded in the most recent list of MGSR in Italy. These restaurants are internationally recognised as exemplars of excellence in promoting sustainable gastronomic practices (Ho, 2021). The Michelin Guide currently lists 1,985 Italian restaurants, only 58 of which have been awarded the Green Star, thus constituting the sample for the study.

The first stage of the research involved a systematic analysis of the official websites of all 58 restaurants awarded Italian MGSR, as listed in the 2024 Michelin Guide.

To guide the Web content analysis, the study adopted a producer-to-consumer sustainability framework, inspired by the life cycle approach to food systems (UK Sustainable Development Commission; Sloan *et al.*, 2013). This framework allowed for the systematic classification and interpretation of sustainability practices as communicated on the MGSR websites. The analysis focused on six main dimensions: (1) local food sourcing, (2) use of organic ingredients, (3) energy efficiency, (4) food waste management, (5)

sustainable menu offerings and (6) community outreach. A brief description and justification of each dimension is outlined below, supported by relevant literature:

1. *Local food*: The definition of local food includes factors such as distance, political boundaries and specialty criteria, including geographical designations and indications (Feldmann and Hamm, 2015). The proximity of local food sources makes them more likely to have lower cumulative energy and carbon footprints for production, transportation and distribution to consumers compared to imported food items, thereby contributing to environmental sustainability. However, the environmental impacts of local food can vary based on factors such as food variety, regions and the time of year (Notarnicola *et al.*, 2017). Restaurants that rely heavily on locally grown and foraged food are sometimes referred to as “terroir restaurants,” emphasising the significance of the relationship between food, culture, history and geography for customers (Tresidder, 2015). These terroir restaurants have the potential to contribute to rural development and foster a sense of community, representing a significant element of social sustainability (Ackerman-Leist, 2013).
2. *Organic food*: Organic food involves the utilisation of food ingredients that are free from chemicals, non-genetically modified and produced with a focus on being as “natural” as possible (Gössling and Hall, 2022). Generally considered environmentally friendly, organic food is known to consume nearly 50 percent less non-renewable energy than conventional food (Pérez-Neira and Grollmus-Venegas, 2018). Organic farming practices contribute to reducing pesticide usage, enhancing soil production, conserving biodiversity and promoting animal welfare (Hanks and Mattila, 2016).
3. *Energy use*: Restaurants stand out as one of the most energy-intensive categories of commercial buildings. In the context of average energy consumption in a full-service restaurant (Refrigeration Design Technologies, 2020), the highest energy costs can be attributed to cooking and food preparation. This is followed by heating, ventilation and cooling, sanitation, lighting and refrigeration. Fine-dining restaurants tend to serve a smaller number of customers while consuming more energy compared to casual dining establishments. This can be attributed to the complex cooking technologies often used and the presence of a large, well-maintained physical dining environment (Harrington *et al.*, 2011).
4. *Food waste*: Food waste encompasses both food loss and spoilage during post-harvest, processing and production, as well as discarded food at retail, consumption and production stages (Stirnemann and Zizka, 2021). According to the UNEP (2021), approximately 242 million tons of food, constituting 26% of total annual waste, is generated globally from foodservice businesses. In full-service restaurants, food waste can occur during procurement and storage (suboptimal food), production (unsold meals and meal parts) and consumption (Filimonau *et al.*, 2020). In fine-dining restaurants, food waste is more likely to occur during food preparation rather than from customer plates. This is due to quality assurance and aesthetic considerations (Charlebois *et al.*, 2015). Chefs play a crucial role in determining food quality, making them key in preventing, reusing, recycling or recovering value from food waste (Papargyropoulou *et al.*, 2014). In addition, food waste may be generated along the supply chain before reaching the restaurant, depending on the chef’s preference for pre-prepared versus raw food products (McAdams *et al.*, 2019). Prioritising quality assurance, chefs are more inclined to order desired processed food ingredients from trusted suppliers.
5. *Sustainable menu*: Promoting a more environmentally friendly and sustainable diet through menus can significantly enhance a restaurant’s image of sustainability and contribute to reducing the negative environmental impact within the tourism and hospitality sector (Remar *et al.*, 2022). The menu serves as an early impression of the

restaurant, offering direct visual communication with customers and influencing their consumption decisions (Ozdemir and Caliskan, 2015). A sustainable menu therefore plays a pivotal role in informing and influencing consumers' choices regarding sustainable food in full-service restaurants (Babakhani *et al.*, 2020). Importantly, it provides a lower-cost, simpler and more scalable alternative to large-scale educational campaigns promoting sustainable diets (Attwood *et al.*, 2020). In addition, an informative menu with detailed information about the food can showcase traditional food practices, culinary heritage and various elements of the food supply chain to customers, further enhancing their dining experience (Hall, 2020).

6. *Community outreach*: Community outreach in the context of restaurants is characterised by actively encouraging improved sustainable behaviours within the community. This involvement may include initiatives such as community-based gardens, cooking events, charity work and promoting sustainable forms of eating, as well as engaging in various forms of community-based activism. These efforts contribute to both environmental and social sustainability (Gössling and Hall, 2022, p. 250). Many restaurants perceive themselves as integral parts of local communities, deeply rooted in their regions. They often emphasise a reliance on local products and play roles in representing and shaping the identity of the place (Hall and Gössling, 2016). Moreover, restaurants offer significant opportunities to showcase local food, thereby reinforcing the local economy (Ackerman-Leist, 2013).

To ensure methodological transparency and replicability, the Web content analysis was conducted according to the following structured procedure:

- *Website selection*: Each website serves as a unit of analysis.
- *Development of the coding framework*: Drawing on sustainability frameworks (e.g. UK Sustainable Development Commission; Sloan *et al.*, 2013), each dimension was operationally defined using criteria based on the literature (e.g. Feldmann and Hamm, 2015; Gössling and Hall, 2022; Remar *et al.*, 2022).
- *Coding protocol*: A binary “Yes/No” coding scheme was applied – identifying the presence or absence of each sustainability dimension on the websites – mirroring procedures used in previous hospitality studies (e.g. Yoon *et al.*, 2020). A detailed code with definitions and examples was prepared for each dimension. Two independent researchers were involved in the coding. Prior to the full analysis, a pilot test was conducted on five randomly selected websites. Discrepancies were resolved through discussion and refinement of the coding.
- *Data collection and analysis*: Data on presence/absence were systematically recorded on a spreadsheet. The information was then evaluated in terms of percentages, calculating the frequency with which each criterion was present on the official websites examined (Marzo-Navarro and Pedraja-Iglesias, 2021). To ensure objectivity, three people cross-checked the analysis to verify the accuracy of the recorded data.

This methodology allows for the identification and description of the patterns of content displayed on official websites, which represent a fundamental communication tool in the restaurant industry (Marzo-Navarro and Pedraja-Iglesias, 2021; Zhang *et al.*, 2018).

3.2 Case study – interview with Casa Format

The second stage of the study consisted of a case study focusing on Casa Format, a MGSR located in Piedmont. The case was selected due to its strong reputation as a sustainability pioneer in the Italian fine dining landscape. Casa Format is notable for its full energy self-sufficiency, on-site vegetable garden, use of seasonal and local ingredients and commitment to waste minimisation. These characteristics make it a representative example

of best practice in sustainable gastronomy and an ideal case for exploring the implementation–communication gap.

To gain deeper insight into the sustainable practices implemented in a fine dining restaurant, a recorded interview was conducted, followed by a transcription of the answers based on 10 questions exploring various aspects of sustainable practices. The responses were then qualitatively analysed through a manual content analysis to explore and enhance the comprehension of the sustainable strategies and practices adopted by Casa Format. The themes emerging from the chef's responses were identified and coded (Krippendorff, 2018; Hsieh and Shannon, 2005). This method enabled the identification of recurring patterns in the responses. The interview responses were segmented into relevant categories, including ingredient sourcing, waste management, energy efficiency, social sustainability practices and community initiatives. A review of the interview transcript was conducted to identify the main approaches adopted by the restaurant regarding sustainability, as well as the challenges and opportunities perceived by the chef. Emerging themes were categorised according to the same sustainability dimensions used in the Web analysis, allowing for direct comparison and triangulation of findings.

4. Results

The findings of this study are presented in two sections corresponding to the dual methodological approach:

1. the Web content analysis of 58 Italian MGSR; and
2. the case study based on an in-depth interview with the head chef of Casa Format.

4.1 Results of the Web content analysis

Before examining specific sustainability practices, it is useful to contextualise the distribution of Michelin distinctions within the sample. As shown in Table 1, the composition of MGSR is heterogeneous, with a predominance of one-star restaurants and a limited number of higher-star establishments. This heterogeneity is reflected in differentiated patterns of sustainability communication.

One relevant insight concerns the uneven distribution of sustainability communication across restaurant categories. One-star restaurants appear to be the most active in communicating sustainability practices, particularly in relation to sustainable menus and local sourcing. This suggests a stronger reliance on sustainability as a narrative and differentiation tool. Two- and three-star restaurants, on the other hand, display consistently low levels of communication across all dimensions, often below 10%, indicating that sustainability – although potentially implemented – may not be central to their explicit communication strategies or may be conveyed through less formalised channels.

Table 1 Distribution of sustainability practices by restaurant type (N = 58)

Type of restaurant	n	Local food (%)	Organic food (%)	Energy use (%)	Food waste (%)	Sustainable menu (%)	Community outreach (%)
1 star	30	29	13	27	19	50	10
2 stars	9	3	0	1	1	5	3
3 stars	5	7	1	1	7	7	3
Big gourmand	7	13	12	7	5	13	4
Others	7	17	14	13	7	19	8
Total	58	69	40	49	39	94	28

Source(s): Authors' elaboration

The results reveal a clear imbalance in how sustainability is communicated. Rather than providing a comprehensive representation, communication appears to be selective, privileging certain dimensions over others. In particular, practices that are more visible and easily embedded in the customer experience tend to dominate, while more technical, infrastructural or less tangible dimensions remain underrepresented.

As summarised in Table 2, the most frequently communicated dimension is the sustainable menu (94%), followed by local food sourcing (69%). These findings suggest that sustainability is primarily framed through elements that are directly accessible to customers and integrated into the dining experience. In this sense, communication strategies appear to prioritise practices that can be immediately perceived and interpreted by consumers.

Other dimensions show significantly lower levels of visibility. Organic sourcing is mentioned by 40% of restaurants, indicating a moderate level of attention but still limited compared to more visible practices. Even more striking is the relatively low communication of energy-related practices (39%) and community outreach initiatives (28%). These results indicate that sustainability aspects requiring technical explanation or extending beyond the immediate service encounter are systematically under-communicated.

Food waste management occupies an intermediate position (49%), suggesting a growing awareness of resource efficiency. However, the analysis indicates that references to waste reduction are often generic and lack detailed explanation, limiting their effectiveness as communication tools. This reinforces the idea that sustainability communication tends to rely on simplified narratives rather than comprehensive disclosure.

Taken together, these findings highlight a structural bias in sustainability communication within high-end restaurants. Practices that are experiential, visible and easily narratable – such as menus and local sourcing – are emphasised, whereas less visible but potentially more impactful dimensions – for example energy systems or community engagement – remain marginal. This selective visibility raises important questions regarding the completeness, consistency and transparency of sustainability narratives in the fine dining sector.

The binary coding scheme was adopted to ensure consistency, comparability and replicability across the full population of Italian MGSR. This approach is appropriate for identifying whether specific sustainability dimensions are present or absent in online communication. However, it does not measure the depth, quality, credibility or narrative richness of the information disclosed. For this reason, the binary analysis was complemented by the case study, which provides qualitative insight into the meaning and operational substance of sustainability practices.

Table 2 The sustainable practices of Italian Michelin Green Star restaurants (*n* = 58)

<i>Sustainable practice</i>	<i>Definition</i>	<i>n</i>	<i>%</i>
Local food	Sourcing local food from local producers and in the restaurant's farms or gardens	41	69
Organic food	Mentions the word "organic" for food and seafood and considerations on animal welfare when sourcing food ingredients	25	40
Energy use	Energy and water conservation practices or efficient/environment-friendly building	24	39
Food waste	Reducing waste from harvesting to consumption	30	49
Sustainable menu	Mentions specific menus or dishes designed for vegetarian or vegan diet and displays sustainable labels on the menu	55	94
Community outreach	Mentions the practice of supporting the community	18	28

Source(s): Authors' elaboration

4.2 Results of the interview with Casa Format – case study

The in-depth interview with the head chef at Casa Format reveals a comprehensive and systemic approach to sustainability, deeply embedded in the restaurant's operational model. The findings are organised according to the same six dimensions used in the Web content analysis, allowing for direct comparison and analytical triangulation.

A first key insight concerns the depth and integration of sustainability practices. Unlike the fragmented and selective communication observed across MGSR, Casa Format adopts a holistic approach in which sustainability is inserted across all operational dimensions.

With regard to local sourcing, approximately 80% of raw materials originate from the restaurant's own garden or from selected local producers. This reflects not only a logistical choice but a broader commitment to ecological responsibility, supply chain transparency and the preservation of local economies. Similarly, the approach to organic sourcing is based on a pragmatic and trust-oriented philosophy, privileging substantive sustainability over formal certification. This highlights a nuanced understanding of sustainability that goes beyond standardised labels.

Energy management represents one of the most advanced dimensions. Casa Format achieves full energy self-sufficiency through the integration of photovoltaic and geothermal systems, combined with passive architectural solutions. This systemic approach contrasts sharply with the limited visibility of energy practices observed in the Web analysis, suggesting that highly impactful sustainability investments are often not translated into communication.

Food waste management is equally comprehensive, combining composting, reuse of ingredients, portion control and standardised preparation processes. This reflects a circular approach to resource management, extending sustainability beyond environmental concerns to include operational efficiency and organisational practices.

The restaurant's menu further illustrates this integrated approach. While not strictly vegetarian, it is increasingly oriented towards plant-based ingredients, seasonal availability and reduced reliance on animal products. Importantly, sustainability is not directly embedded in the menu as a communication tool, but rather conveyed through complementary channels such as information cards and direct interaction with customers.

Finally, community engagement emerges as a relational and practice-based dimension. Rather than formalised outreach initiatives, Casa Format promotes sustainability through everyday practices, staff training and close collaboration with local producers. This reflects a model of "embedded sustainability", where values are transmitted through experience rather than explicit communication.

Generally, the case study highlights a clear discrepancy between implementation and communication. Casa Format demonstrates that sustainability practices can be highly developed, integrated and impactful, yet remain only partially visible in formal communication channels. This reinforces the evidence emerging from the Web content analysis and provides a deeper understanding of the structural nature of the implementation–communication gap.

5. Discussion

The combined findings from the Web content analysis and the Casa Format case study provide a comprehensive understanding of sustainability practices within the Italian MGSR context. While many restaurants demonstrate a strong operational commitment to sustainability, the results reveal a clear and systematic gap between implementation and communication. In several cases, sustainability practices appear significantly more advanced than the official websites show.

This finding aligns with previous research showing that sustainability in hospitality often remains “behind the scenes” and is insufficiently communicated to customers (Testa *et al.*, 2015; Tölkes, 2018; Sung *et al.*, 2021). As highlighted by Ko *et al.* (2019), the lack of clear communication reduces customer awareness and limits the perceived value of sustainability efforts, even when these are substantively implemented.

The analysis further reveals that communication is uneven across sustainability dimensions. Customer-facing elements – such as sustainable menus and local sourcing – are widely disclosed, whereas more complex – e.g. including energy efficiency and community engagement – remain under-communicated. This pattern suggests that sustainability narratives are shaped by their communicability rather than by their actual relevance or impact. In this respect, the case of Casa Format illustrates how deeply embedded sustainability practices – such as energy self-sufficiency, circular waste management and relational sourcing – are only partially translated into online communication.

These findings highlight a structural misalignment between experiential value creation and its communication, particularly in luxury services, where symbolic and narrative dimensions are central (Dion and Arnould, 2011; Batat, 2021a, 2021b). The intangible and co-created nature of luxury dining further complicates the translation of operational practices into effective communication (Lovelock and Gummesson, 2004; Wirtz and Lovelock, 2016).

Importantly, the identified communication gap does not appear to be primarily driven by opportunistic behaviour or greenwashing. Rather, the evidence suggests the presence of a form of “embedded sustainability”, in which practices are rooted in organisational values but are not strategically communicated. This interpretation challenges dominant assumptions in the literature that equate limited communication with opportunistic disclosure (Majeed and Kim, 2022), offering instead a more nuanced understanding of sustainability in values-driven luxury contexts.

From a theoretical perspective, these findings can be interpreted through the lens of signalling theory. The observed gap represents a form of signal failure, whereby sustainability practices – although implemented – remain largely unobservable to external stakeholders. Consequently, the potential benefits associated with signalling, including legitimacy, reputational enhancement and competitive differentiation, are only partially realised (Connelly *et al.*, 2011).

In the most recent literature, sustainability communication in haute cuisine often focuses on topics such as sustainable technologies, culinary offerings, community initiatives, supply chains, corporate values and certifications (Olivieri *et al.*, 2025). It also states that ESG messages in the food and beverage sector are most effective when strategically framed and delivered via digital platforms, such as mobile apps (Kim *et al.*, 2025). Building on this literature, the present study distinguishes four modes of sustainability communication – explicit, selective, embedded and under-communicated – to explain how the gap.

The framework conceptualises sustainability communication as a signalling mechanism mediating the relationship between operational sustainability practices and stakeholder value creation. As shown in Figure 1, the proposed model strengthens the theoretical generalisability of the findings by demonstrating that the communication gap is not a single or homogeneous phenomenon. Rather, it may arise from different communication configurations. In some cases, restaurants communicate sustainability explicitly and strategically; in others, they disclose only the most visible practices; in still others, sustainability remains embedded in the experience but weakly formalised in digital communication. This distinction allows the implementation–communication gap to be interpreted not only as a lack of disclosure, but also as the outcome of different organisational approaches to sustainability communication.

From a stakeholder perspective, this signal failure has important relational consequences. When sustainability practices remain under-communicated, stakeholders are less able to

Figure 1 The implementation–communication gap in sustainability practices among Michelin Green Star restaurants



recognise, assess and reward them. Customers may fail to perceive the sustainability value embedded in the dining experience; local communities and suppliers may remain only partially visible in the restaurant's sustainability narrative; and certifying bodies may lack comparable information to evaluate communication quality. Thus, the communication gap does not merely concern disclosure, but affects the broader process through which sustainability creates stakeholder value.

At the same time, the results extend stakeholder theory by showing that value creation through sustainability depends not only on implementation but also on the ability to make such practices visible and interpretable. In the absence of effective communication, the relational and trust-building potential of sustainability remains limited.

From a practical perspective, this misalignment reduces the transformative potential of best practices within the sector. Enhancing transparency and traceability – through standardised disclosure frameworks, integration of sustainability criteria into institutional mechanisms such as the Michelin Guide and capacity building in ESG communication – could significantly strengthen the visibility and impact of sustainability initiatives in high-end gastronomy. This is consistent with recent research on ESG reporting in hospitality and

tourism, which highlights the need to align sector-specific sustainability indicators with stakeholder expectations and operational challenges (Bernard *et al.*, 2025).

More specifically, sustainability communication could be improved through a set of minimum disclosure indicators aligned with the six dimensions analysed in this study. For local sourcing, restaurants could disclose the percentage of ingredients sourced from local producers, the geographical radius of procurement and the stability of supplier relationships. For organic food, communication could include the share of certified organic ingredients, animal welfare criteria and information on trusted non-certified producers. For energy use, relevant indicators may include renewable energy adoption, energy self-sufficiency, water-saving systems and efficiency measures in kitchen operations. For food waste, restaurants could report waste prevention practices, reuse strategies, composting, donation initiatives and monitoring systems. For sustainable menus, indicators may include the availability of plant-based dishes, seasonal menus, low-impact ingredients and information provided to customers through menus or information cards. Finally, for community outreach, restaurants could disclose collaborations with local communities, educational initiatives, staff training, charitable activities and support for local food systems.

These indicators would not require restaurants to adopt complex corporate reporting systems, but could provide a practical and comparable disclosure framework suitable for small and medium-sized hospitality organisations.

6. Conclusions

This study investigated how sustainability is implemented and communicated by Italian MGSR. The mixed-method approach combined a comprehensive Web content analysis of all 58 Italian MGSR with an in-depth case study of Casa Format. The analysis was guided by three research questions focusing on (1) the extent and nature of online sustainability communication, (2) the existence of a gap between implementation and communication and (3) qualitative insights to better understand the drivers of this gap.

Firstly, the Web content analysis revealed a high degree of variability in sustainability communication. While some practices, such as sustainable menus (94%) and local sourcing (69%), are widely disclosed, others, including energy efficiency (14%) and community outreach (28%), remain significantly under-communicated. This selective visibility suggests that sustainability communication tends to privilege customer-facing and easily narratable practices, while more structural and less visible dimensions are marginalised.

Secondly, the Casa Format case study provides strong evidence of a substantial implementation–communication gap. Despite adopting advanced and embedded sustainability practices – including energy self-sufficiency, circular waste management, responsible sourcing and staff engagement – many of these initiatives are not fully communicated through official digital channels. This pattern, which is consistent with the broader sample, points to a systemic limitation in how sustainability is articulated within the high-end dining sector.

Thirdly, the qualitative analyses emerging from the case study suggest that this gap is not primarily due to opportunistic behaviour or greenwashing, but rather to organisational and strategic constraints. In particular, the absence of formalised reporting frameworks, limited communication capabilities and a cultural preference for authenticity over promotion contribute to the limited dissemination of sustainability-related practices. Although this approach reflects a values-driven orientation, it simultaneously limits their potential impact in terms of stakeholder awareness, market differentiation and wider sectoral dissemination.

Drawing on signalling and stakeholder theory, these findings can be interpreted as a form of signalling failure, whereby sustainability practices – although effectively implemented – remain

largely unobservable to stakeholders due to insufficient or inconsistent communication. Consequently, the potential benefits associated with sustainability, including legitimacy, trust and competitive differentiation, are only partially realised.

From a practical perspective, the study highlights the need for more structured and standardised approaches to sustainability communication in the luxury dining sector. The development of minimum disclosure guidelines, the integration of ESG criteria into institutional frameworks such as the Michelin classification system and targeted training initiatives for restaurateurs could improve transparency and promote a more consistent culture of communication.

In conclusion, while Italian MGSR demonstrate a strong commitment to operational sustainability, their transformative potential depends on their ability to effectively communicate these efforts. Bridging the implementation–communication gap is therefore critical not only for improving the visibility and credibility of individual restaurants, but also for enabling high-end gastronomy to play a more active role in the broader transition towards sustainable and regenerative food systems.

The conceptual model proposed in this study provides a transferable framework for analysing sustainability communication beyond the Italian context, offering a basis for future comparative studies on luxury hospitality, fine dining and other experiential service sectors.

7. Limitations and future research

This study is not without limitations. While the case study approach provides in-depth insights, the generalisability of the findings remains limited across different types of restaurants and geographical contexts. Furthermore, the reliance on a single interview may introduce potential bias and limits the breadth of perspectives captured.

A further limitation concerns the use of a binary coding scheme. While this method allows for a systematic and replicable assessment of the presence or absence of sustainability-related content, it does not capture differences in communication quality, specificity, credibility or stakeholder orientation. Future studies could address this limitation by developing graded disclosure indicators or weighted scoring systems capable of assessing not only whether sustainability practices are communicated, but also how extensively, transparently and credibly they are disclosed.

Future research could address these limitations by adopting broader empirical designs, such as semi-structured interviews or surveys involving chefs, managers and staff, to capture more nuanced insights into the organisational drivers and barriers underlying sustainability communication. Comparative studies including non-luxury segments (e.g. casual dining, fast food or street food) could further extend the scope of analysis and reveal sector-specific dynamics. In addition, cross-national investigations would enable a more comprehensive understanding of how sustainability is implemented and communicated across different institutional and cultural settings.

Future research should also explore the effectiveness of different communication formats – such as sustainability dashboards, certification labels and storytelling strategies – in shaping consumer perceptions and behavioural responses. In particular, extending the analysis beyond official websites represents a promising avenue. Sustainability communication in luxury dining is inherently experiential and may be conveyed more effectively through alternative channels, including social media, on-site materials (e.g. menus or information cards) and direct interactions between staff and customers during the service experience.

Investigating these channels would provide a more comprehensive understanding of how sustainability is perceived, interpreted and experienced by customers, thereby contributing

to both theoretical and practical advancements in sustainable hospitality. Enhancing the visibility and effectiveness of sustainability communication is essential to enable MGSR to move beyond symbolic recognition and fully realise their potential as agents of change within the global food system.

Ethics statement

The study does not involve human subjects beyond the voluntary interview with a restaurant owner, conducted with informed consent.

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