

GENEROSO BRANCA
QIAONI SHI
SARA VALENTINI

GREEN MESSAGING IN ITALIAN GROCERY COMMUNICATING SUSTAINABILITY THROUGH PACKAGING

In the Italian grocery sector, how is sustainability communicated through food packaging? To find an answer, this study identifies and tracks the textual and visual sustainability-related elements on thousands of packaging items over time. The results, based on a large dataset of images of products marketed in Italy between 2016 and 2024, reveal the prevalence of material-related claims and distinct sustainability narratives depending on product category, consumer expectations, and regulatory changes. These findings provide valuable insights into how companies adapt their packaging communication strategies in response to changing market demands and institutional pressure.

MARKETING//PACKAGING//GROCERY SUPPLY CHAIN//MADE IN ITALY//SUSTAINABILITY



GENEROSO BRANCA

is a Postdoctoral Researcher in the Department of Marketing at Bocconi University. At the SDA Bocconi School of Management, he is a marketing management fellow and a member of the Channel & Retail Lab.

QIAONI SHI

is an Assistant Professor of Marketing at Bocconi University. She holds a PhD in marketing from the University of Pittsburgh.

SARA VALENTINI

is an Associate Professor of Marketing at Bocconi University. She has a PhD in Management and a Statistics degree with honors from the University of Bologna in Italy.

Packaging, as a key marketing tool, is more than a protective container. It is a strategic element of the marketing mix that directly influences consumer behavior at the point of sale (e.g., Herédia-Colaço, 2023; Briand Decré and Cloonan, 2019; Park and Ma, 2019). Beyond its functional utility, packaging communicates product information, shapes perceptions, and guides purchasing decisions. It acts as a silent salesperson, often being the first touchpoint between consumers and brands on the shelf. Packaging characteristics attract attention, convey brand values, and enhance perceived product quality. Consumers can also use packaging cues in place of direct product evaluation, making it a critical factor as far as in-store choices. Effective packaging stimulates desire, supports product differentiation, and reinforces brand positioning.

What's more, by combining aesthetic appeal and informational clarity, packaging serves as a competitive advantage and a key driver of market success.

Previous literature (e.g., Herédia-Colaço, 2023; Festila and Chrysochou, 2018; Magnier and Crié, 2015) has proposed frameworks for classifying the different aspects of packaging design, typically distinguishing among structural features (such as size, shape, and materials), graphical elements (colors, images, and logos), and informational cues (labels and claims).

Moving on to sustainability, this issue has become a central concern in the current debate, fueled by mounting consumer awareness, regulatory pressures, and stakeholder expectations. And at the center of conversation on sustainability is product packaging (Branca et al., 2024). Indeed, while it serves essential functions in protecting, preserving, and presenting products, packaging is also a significant contributor to environmental waste, especially in the food sector, where it accounts for a large part of total pollution. As a result, more and more often companies are adopting sustainable packaging solutions as part of broader eco-friendly strategies. However, defining what makes packaging "sustainable" is far from straightforward. Multiple stakeholders are involved (such as designers, marketers, regulatory bodies, and consumers), each with different expectations and aims. Further complicating the situation, regulatory frameworks are evolving unevenly across countries, and while consumers are expressing ever greater interest in sustainable solutions, they often struggle to recognize or interpret eco-friendly packaging cues correctly (Nguyen et al., 2020; Ertz et al., 2017). The result of all this is a complex landscape for brands, where marketing teams must forge a path between authenticity, compliance, and effective communication.

Sustainable packaging can be conceptualized from two complementary perspectives (Zeng and Durif, 2020): one based on engineering criteria, such as life cycle assessment (LCA), and another grounded in consumer perception, where visual or textual

cues evoke environmental friendliness (Magnier et al., 2016). In this sense, companies can convey sustainability in various ways, combining different cues and attributes.

Given the centrality of packaging in consumers' evaluation processes and the growing consequence of environmental claims, strategic questions emerge at the intersection of marketing and sustainability communication.

How prevalent is sustainability messaging across different food categories? Which types of sustainability signals have become more prominent over time? Are firms moving from generic environmental language toward more specific, verifiable, structured forms of communication?

To explore these questions, we analyze packaging text and visual elements from thousands of food and beverage products over multiple years in the Italian market. Then, by focusing on a selection of representative categories (in our case, mozzarella cheese, pasta, and wine), we examine how sustainability-centric cues have evolved and how firms are adapting their packaging strategies to category dynamics, consumer expectations, and communicative trends. This article presents selected insights from our ongoing research, offering a practitioner-oriented reflection on the state of sustainable packaging communication.

BACKGROUND AND CURRENT SCENARIO

A substantial body of research has explored specific packaging attributes and cues relating to sustainability and how they shape consumer perceptions and behaviors. Building on recent contributions (e.g., Branca et al., 2024; Herbes et al., 2020; Magnier and Crié, 2015), three macro-categories can be identified. First, structural cues refer to the physical characteristics of the packaging, including reductions in packaging volume (e.g., less or no overpackaging), materials used (e.g., recycled, recyclable, or derived from

renewable sources), reusability, size, and shape. Next come graphical cues, encompassing visual features such as colors, logos, images, symbols, and photographs. Last, informational cues refer to both verbal and numerical data on environmental performance, which encompass environmental labels, certifications, claims, and scientific statements.

Although these categories provide a useful framework for analyzing how sustainability is conveyed through packaging, we still need to understand how they are actually applied in the market. To explore this, we turn to recent evidence from the Italian Fast-Moving Consumer Goods (FMCG) sector. The *Osservatorio Immagino* of GS_I Italy highlights that more and more FMCG companies, both manufacturers and retailers, are committing to explicit ethical, social, and environmental goals. In fact, according to the most recent data, 83.8% of products monitored in 2024 and 83.1% in 2025 featured at least one sustainability-related cue on their packaging (GS_I Italy, 2024; 2025). Among these, the most prevalent are environmental cues, represented by mandatory information (such as packaging disposal instructions) and voluntary claims that guide consumers toward greener behaviors. In June 2024, similar cues appeared on 83.6% of products; that figure in 2025 is 83.0%.

However, sustainability communication patterns vary significantly across product categories. For instance, on milk products the emphasis tends to lie on animal welfare and packaging material, while for mozzarella the accent is on environmental responsibility and a connection with region of origin. For pasta products, producers are increasingly adopting FSC certifications, compostable packaging, and claims related to supply chain and agricultural sustainability. Yogurt stands out as a highly dynamic category, with the growing use of environmental certifications and innovations in packaging materials. In the beverage sector, instead, bottled water producers are increasing sustainable packaging practices, investing in lighter bottles, R-PET materials, and lower emissions. By contrast, wine

shows slower but steady progress, primarily through the adoption of lighter bottles, FSC-certified labels, and compostable closures.

HOW SUSTAINABILITY IS COMMUNICATED ON PACKAGING

To investigate how sustainability is communicated through food packaging, we analyzed a rich dataset of packaging images collected in collaboration with *Osservatorio Immagino* of GS_I Italy. This dataset, covering the period from 2016 to 2024, includes front, back, and side images of thousands of food and beverage products across major supermarket chains in Italy. For each product, we tracked packaging updates over time, so we were able to monitor not only the presence of sustainability claims but also how these claims evolved through the years. In this way, we investigated how firms strategically position their products and packaging as sustainable through packaging communication. This meant analyzing the types of claims, the use of logos and certifications, and the specific wording chosen to convey environmental or ethical responsibility. In doing so, we capture the sustainability positioning as intended and constructed by the firm – that is, how companies seek to frame their environmental and social credentials in the competitive context of the grocery aisle.

To operationalize our analysis, we systematically coded a wide range of sustainability-related elements found on product packaging (such as claims, phrases, certifications, and logos) across both textual and visual components. This allowed us to construct a longitudinal dataset tracking the presence of sustainability cues at the SKU level over time. In addition, each time a product's packaging was updated, a new observation was recorded, enabling us to capture how firms adapt their sustainability communication strategies across years and product categories.

To this end, we defined a comprehensive list of sustainability-related keywords and grouped them into categories representing different dimensions

of sustainability. These keywords consist of both common Italian and English expressions that are related to specific aspects of sustainability (e.g. recyclable (*riciclabile*), biodegradable (*biodegradabile*)), as well as the names of logos, associations, certifications, etc., we find in the Italian market that certify a product’s degree of sustainability (e.g. ISO 14001, Forest Stewardship Council). We enriched the keyword list further by exploring the textual data using fuzzy matching and embedding similarities to ensure a more data-driven approach.

We identified eight labels; for the full list, see Table 1. We assigned one or more categories to a product if there is a match between the keywords and the textual data presented on the product packaging. The categories span ingredient-related information to environmental impact disclosures and social or ethical responsibility messages. Notably, sustainable/sustainability appear frequently, but since the term is generic and vague, it’s essential to understand the intended meaning from different perspectives as it applies to a product.

Figure 1 shows the time trends in the percentage of products for each label. The first two years are omitted due to the low number of observations.

A CLOSER LOOK AT SOME PRODUCT CATEGORIES

Table 2 reports the distribution of sustainability-labels across mozzarella, pasta and wine.

Figures 2, 3, and 4 show the time trends for labels and claims respectively for mozzarella, pasta, and wine.

DISCUSSIONS AND CONCLUSIONS

The preliminary findings underscore the centrality of packaging materials as a sustainability communication lever across all categories, particularly for pasta (77%) and mozzarella (56%). The wide use of packaging in this way reflects the fact that both firms and consumers are paying attention to recyclability and material-related sustainability cues in environmental messaging on food items. This is consistent with the literature that shows a tendency to emphasize the structural attributes of packaging (e.g., Herbes et al., 2020; Nguyen et al., 2020).

Category-specific patterns reveal distinct sustainability narratives. With mozzarella, the prominence of ingredient statements and nutritional

TABLE 1. SUSTAINABILITY-RELATED LABELS AND CLAIMS

Labels and claims	Description	Examples of wording on packaging
Ingredients and Nutritional Quality*	Specific features of ingredients or nutrients are listed.	no preservatives, high in protein, gluten-free, low fat
Sustainable Lifestyle Positioning	Sustainable or natural consumption choices are referenced	vegan, vegetarian, natural ingredients
Practical Sustainability Guidance	Instructions for proper disposal, use, or conservation are provided	
Sustainable Packaging Materials	The environmental sustainability of the packaging is highlighted	recycled, biodegradable, plastic-free, Mobius loop, bio-based
Sustainable Sourcing and Production	Certifications or claims about ethical/fair production are referenced	FSC, traceability, renewable source, organic farming guidelines
Environmental Footprint Claims	Data or certifications on its environmental impact (LCA) are reported	carbon footprint, CO2 offset, EPD, carbon neutral, LifeGate®
Generic Environmental Claims	Broad or vague terms are used connoting environmental sustainability	eco-friendly, green, sustainable, circular
Social and Ethical Responsibility	Social impact, ethics, or animal welfare are cited	Fair Trade, B Corp, animal welfare, ICEA certification

* While not strictly sustainability-related in an environmental sense, these claims often serve to position the product as healthier, cleaner, or more natural – attributes that increasingly overlap with consumers’ broader understanding of sustainable lifestyles.

FIGURA 1. LABELS AND CLAIMS DISTRIBUTION OVER TIME (IN %)

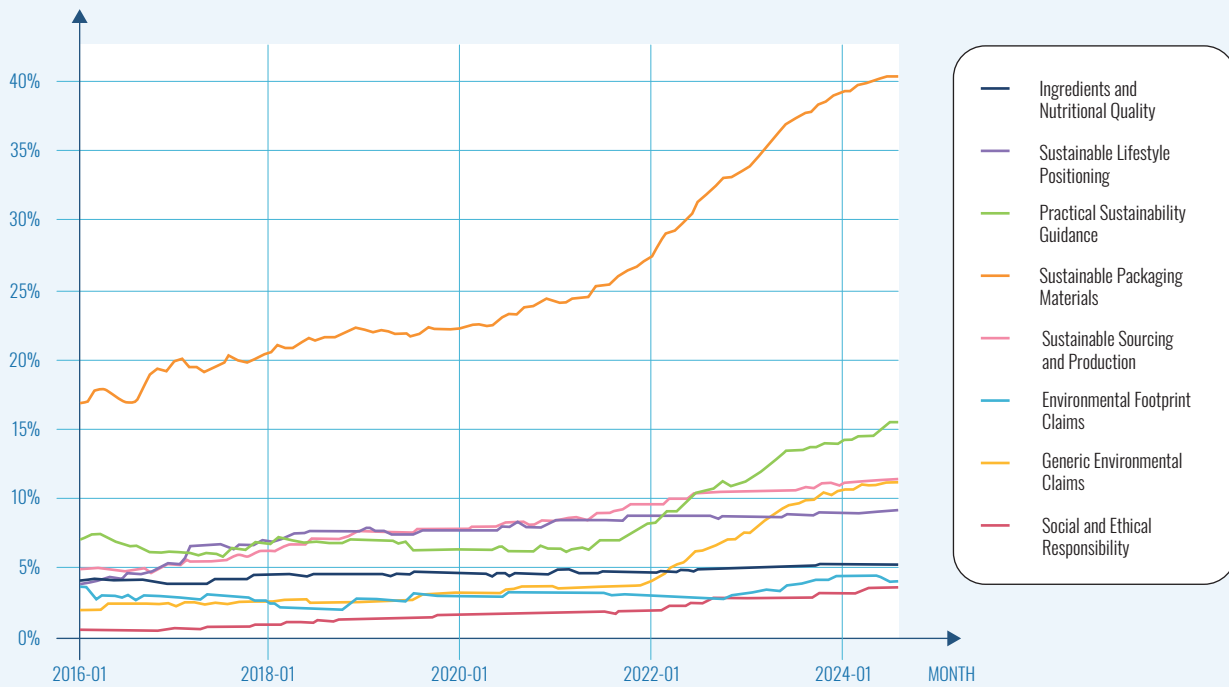


TABLE 2. REPORTS THE DISTRIBUTION OF SUSTAINABILITY-LABELS ACROSS MOZZARELLA, PASTA AND WINE

Labels and claims	Mozzarella		Pasta		Wine	
	#	%	#	%	#	%
Ingredients and Nutritional Quality	736	41.05	244	4.06	26	0.28
Sustainable Lifestyle Positioning	165	9.20	935	15.56	483	5.19
Practical Sustainability Guidance	359	20.02	847	14.10	891	9.58
Sustainable Packaging Materials	1001	55.83	4622	76.92	1203	12.93
Sustainable Sourcing and Production	105	5.86	690	11.48	982	10.56
Environmental Footprint Claims	4	0.22	871	14.49	76	0.82
Generic Environmental Claims	31	1.73	205	3.41	1137	12.22
Social and Ethical Responsibility	75	4.18	56	0.93	352	3.78
Total Product Numbers	1793	100.00	6009	100.00	9302	100.00

FIGURE 2. LABELS DISTRIBUTION OVER TIME (MOZZARELLA, IN %)

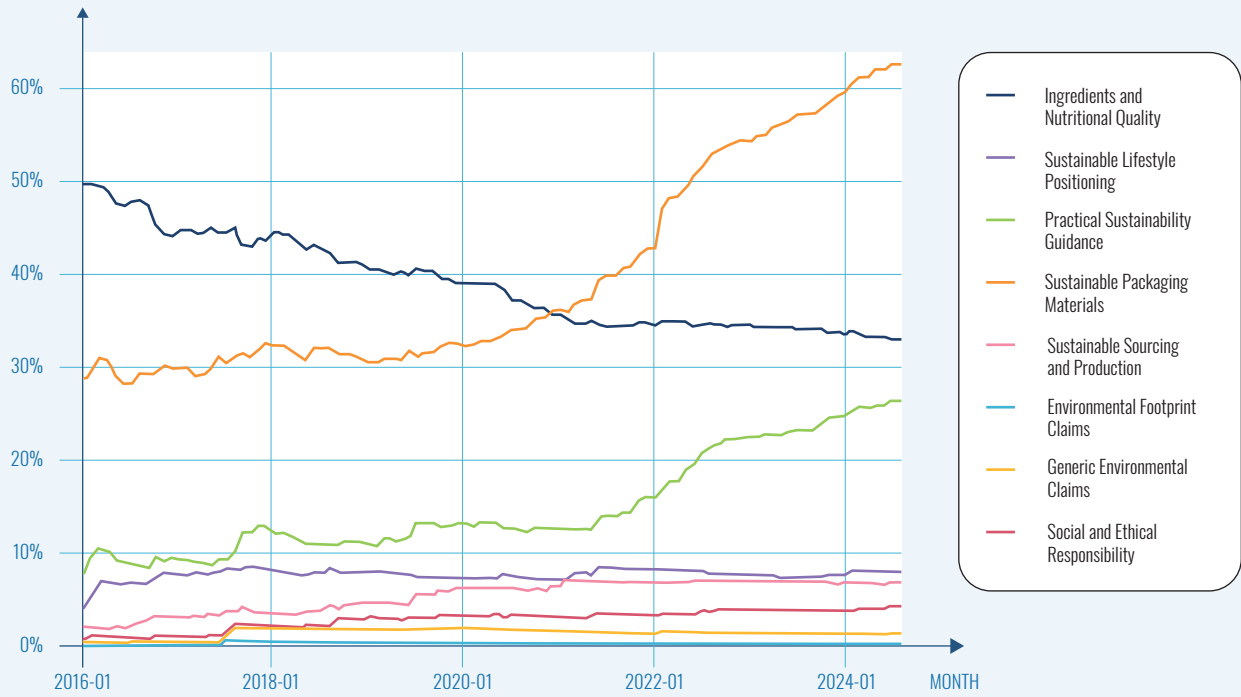


FIGURE 3. LABELS DISTRIBUTION OVER TIME (PASTA, IN %)

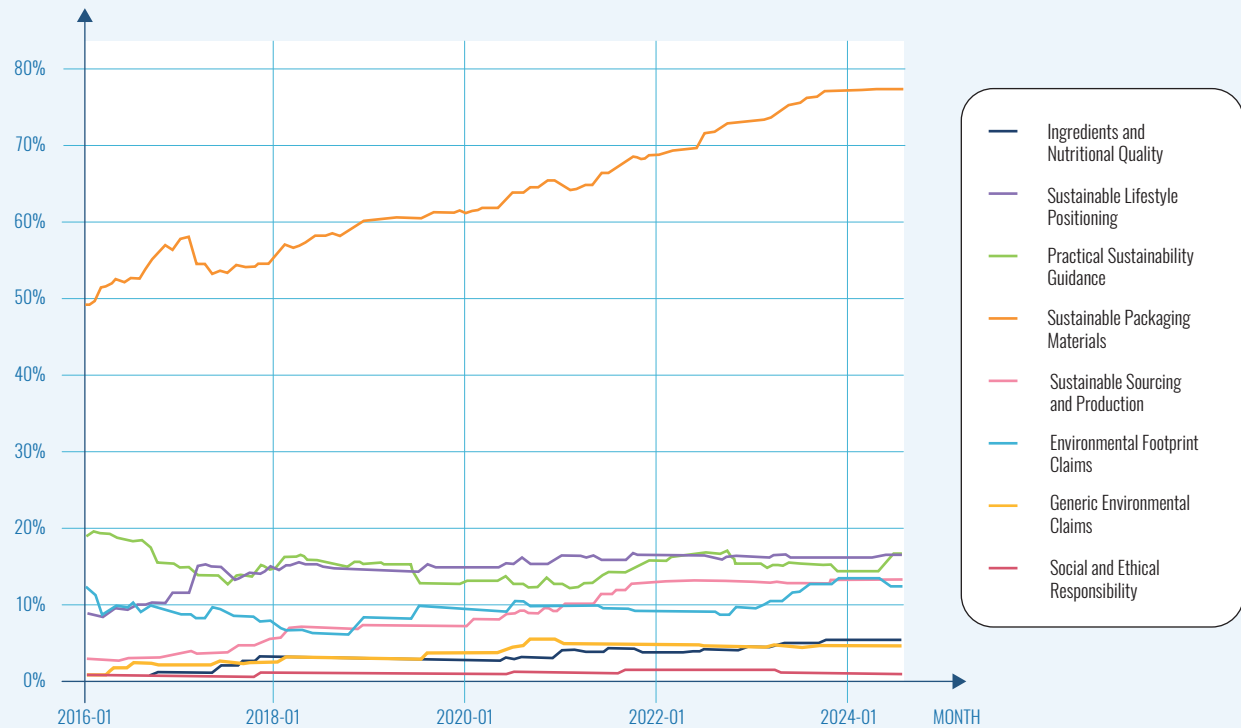
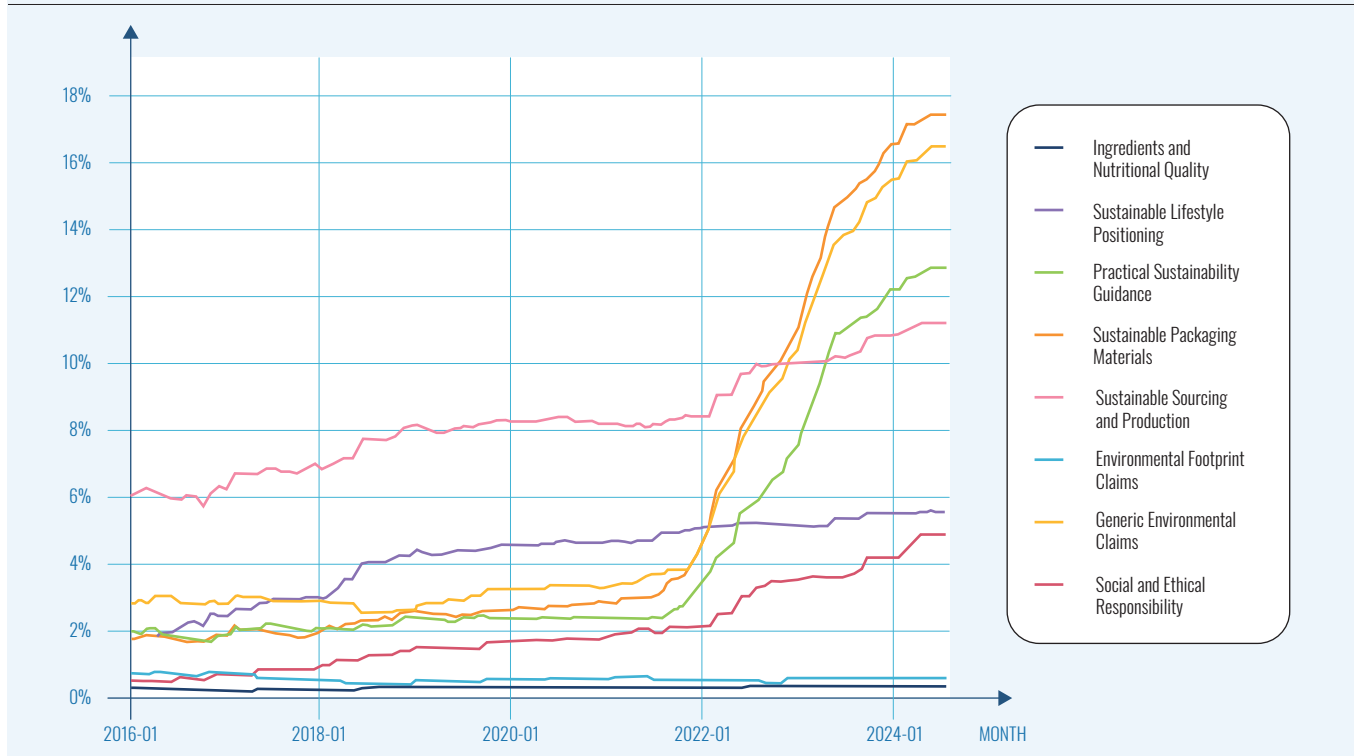


FIGURE 4. LABELS DISTRIBUTION OVER TIME (WINE, IN %)



claims (41%) suggests a hybrid positioning strategy, where environmental responsibility is closely tied to perceptions of freshness, naturalness, and health. These attributes are culturally salient in Italian dairy consumption and may offset more technical sustainability indicators. In short-shelf-life categories, perceived product quality and safety tend to take precedence over metrics such as carbon footprint or production certifications. Firms appear to respond accordingly, highlighting cues that match consumer priorities in fresh food contexts.

Pasta emerges as a responsive category, with the uptake of multiple sustainability signals, especially those related to packaging material and environmental impact. The incidence of certifications and environmental claims may point to a more structured, multi-dimensional communication approach.

Wine lags in sustainability signaling, with low uptake of sustainability cues across the board. However, recent regulatory shifts, such as the 2023

EU mandate for environmental labeling, may be prompting a gradual change. The predominance of generic environmental and social claims in this category suggests a cautious foray into sustainability discourse. Structural and perceptual constraints may explain this delay: wine communication is deeply rooted in tradition, provenance, and craftsmanship, leaving limited space for sustainability narratives unless they are carefully integrated. Moreover, wine labels are already dense with credence attributes, creating competition for attention and limiting the communicative bandwidth available for environmental messaging.

Taken together, these results suggest that sustainability communication via packaging is not uniform but contingent on product category dynamics, consumer expectations, and regulatory developments. While some categories pursue comprehensive, multifaceted strategies, others prioritize cues that are more aligned with perceived product quality or cultural conventions. In light of

this, firms appear to be calibrating their packaging communication based on both the nature of the product and the maturity of the sustainability discourse in the category.

However, in addition to this evidence, future research is needed to understand whether these packaging elements actually translate into individual preferences and purchasing behaviors, which would account for the transactional dimension.



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