

CONSUMER PERCEPTION OF SUSTAINABILITY COMMUNICATION ON FERMENTED PROBIOTIC MILK PACKAGING: A FOCUS GROUP STUDY

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Purpose: This paper examines how consumers perceive and interpret sustainability-related communication on fermented probiotic milk (FPM) packaging, addressing a recognised gap in qualitative evidence specific to fermented dairy products.

Design/methodology/approach: Two focus group interviews (FGI) were conducted with FPM consumers in Poland (N = 16), diversified by age, lifestyle, and environmental engagement. Products were selected through purposive sampling to capture a range of packaging materials and communicative attributes. Data were analysed using structuring qualitative content analysis (Kuckartz, 2018) with ATLAS.ti 25, following the Gioia methodology.

Findings: Five overarching interpretive dimensions were identified: (1) health-framed sustainability, whereby "sustainable" is equated with "natural" and "minimally processed" rather than with systemic environmental performance; (2) symbolic sustainability indicators, marked by scepticism towards general eco-claims and greater trust in externally verified certifications; (3) a packaging material hierarchy in which glass serves as a dominant but conditional ecological heuristic; (4) informational transparency as a prerequisite for considering

a purchase; and (5) conditional consumer engagement, where pro-environmental choices depend on price, availability, and minimal effort. A conceptual framework integrating these dimensions is proposed.

Research limitations/implications: The study is exploratory, based on a small sample within a single country and product category. Future research should test the proposed framework through quantitative or experimental designs across broader contexts.

Practical implications: Sustainability communication on FPM packaging should align with the consumer health frame, prioritise legibility as a precondition for environmental message reception, and rely on institutionally grounded certifications rather than multiplying general eco-claims.

Social implications: The findings highlight a persistent attitude-behaviour gap and underscore the need for systemic solutions - producer-led recycling infrastructure and clearer labelling regulation - that reduce the organisational burden on individual consumers.

Originality/value: The paper offers the first qualitative exploration of sustainability packaging communication in the FPM segment, identifying health-frame dominance as a novel theoretical contribution and providing a five-dimension interpretive framework for both academic investigation and packaging design practice.

Keywords: sustainable packaging, fermented dairy products, consumer perception, packaging communication, heuristics.

Category of the paper: research paper.

1. Introduction

In today's competitive food market, it is increasingly clear that product packaging is far more than a physical barrier or a means of transport. Packaging serves a communicative function, acting as the product's "first impression" in the consumer encounter - conveying signals about quality, functionality, safety, and brand values (Kukreja, Patil, 2025; Patel, 2023; Jain, Hudnurkar, 2022). From a marketing perspective, packaging becomes a carrier of meaning that can shape product perception, build trust, and influence purchase decisions.

The fermented probiotic milk (FPM) segment - which includes products such as drinking yoghurts and kefir - stands out within food categories for several reasons. First, it carries a strong health emphasis, owing to the presence of probiotic cultures, a shorter shelf life, and the requirement for refrigerated storage. Second, consumers expect information about both the product's composition and its microbiological quality and storage conditions. Third, the context of sustainability has become increasingly prominent in recent years, spanning raw material sourcing (e.g. milk from organic farms), the production process (emission reduction, locality), and packaging (renewable materials, recyclability, compostability). In this setting, FPM packaging - as the first point of contact between product and consumer - may serve a pivotal communicative function, from the in-store decision through to the at-home user experience (Ankiel et al., 2025; Francis et al., 2024; Taşkoparan et al., 2025).

At the same time, the packaging sector is increasingly entangled with global challenges around resource management, waste reduction, and the transition towards a circular economy model. Consumers are declaring growing expectations of brands and products regarding their environmental impact, a trend reflected in numerous market reports and academic studies (Despoudi et al., 2025; Du Rietz Dahlström et al., 2024; Maciejewski 2020; Wojciechowska, Wiszumirska, 2022). The number of studies that examine in detail how consumers interpret environmental information on packaging - particularly in the context of fermented food products - remains, however, severely limited.

Despite the growing body of research on packaging and sustainability, several research gaps remain (Ankiel et al., 2025; Klein et al., 2025; Sokolova, 2023):

1. A lack of qualitative studies exploring how consumers interpret sustainability-related packaging information in FPM.
2. A tendency in the literature to focus on broad food product categories, with no studies specific to FPM.
3. The problem lies not in the absence of information but in its comprehensibility and practical usefulness for consumers.

The primary aim of this paper is therefore to examine consumer perceptions of the communicative value of FPM packaging, with particular attention to sustainability. The study will:

1. Identify key packaging elements (visual and textual).
2. Describe the interpretive and associative processes consumers apply to environmental messages.
3. Identify communicative barriers - both cognitive and symbolic.

1.1. Packaging as a communication tool and its informational functions

In the literature, packaging is described as a multidimensional element encompassing physical characteristics (material, construction, barrier properties), visual attributes (colour, shape, graphics), and informational components (labels, symbols). Researchers (Kukreja, Patil, 2025; Li, Li, 2024) argue that packaging is a significant marketing communication tool that affects consumer purchasing behaviour. Two main dimensions of packaging's informational value are typically distinguished:

1. Visual value - graphic elements, symbols, and packaging structure that operate heuristically, enabling rapid inferences ("this product looks natural/ecological").
2. Textual/informational value - labels, health claims, environmental declarations, and post-consumption instructions.

These elements form an important component of the consumer perception process, determining not only whether a product is noticed and understood, but also how its value is interpreted (Patel, 2023; Jain, Hudnurkar, 2022).

Research shows that consumers frequently rely on simplified signals (heuristics) embedded in packaging - for instance, the colour green, a natural paper texture, or a leaf symbol - which can lead to the inference of a higher level of product sustainability, regardless of the actual environmental performance (Sokolova et al., 2023; Li, Li, 2024). The “Paper Meets Plastic” study, for example, found that consumers tend to rate packaging with a higher paper component (even when the plastic content remains constant) as more environmentally friendly - a phenomenon termed the PEF (perceived environmental friendliness) bias - despite life cycle assessment (LCA) evidence pointing in a different direction (Sokolova, Krishna, Döring, 2023; Steiner, Florack, 2023). These findings underscore the need to examine how consumers interpret packaging elements and what meaning they personally attach to packaging information.

1.2. Sustainable packaging and the consumer perspective

The literature on sustainable packaging increasingly acknowledges that environmental claim alone is insufficient to elicit an appropriate consumer response. What matters is the quality and credibility of the message (Lombardi et al., 2023; Sun, Moon, 2024; Wojciechowska, Wiszumirska, 2022).

A study by Orzan, Cruceru, Bălăceanu and Chivu (Orzan et al., 2018) showed that while consumers state a preference for paper, glass, or carton packaging (due to easier recyclability), actual purchases of “ecological” packaging were considerably less frequent - pointing to a gap between declared preferences and actual behaviour.

Similarly, Wojciechowska and Wiszumirska (Wojciechowska, Wiszumirska, 2022) demonstrated that consumer knowledge of sorting rules and recycling labels is insufficient, which limits the effectiveness of packaging communication. Consumers may also assess environmental claims critically, particularly when they sense that a company uses eco-claims as a marketing instrument rather than an expression of genuine change (Sokolova, Krishna, Döring, 2023, Nguyen, Barretta, 2024).

In the FPM context, sustainability messaging may encompass packaging materials, refrigerated transport, the locality of dairy sourcing, and product function (e.g. natural cultures, minimal processing). Consumers, however, may interpret these messages through the lens of their own heuristics and prior knowledge, which can become a bottleneck for effective communication (Ankiel et al., 2025; Francis et al., 2024).

1.3. Mechanisms of perception and interpretation of packaging information

Research on consumer perception of packaging suggests that the information interpretation process typically proceeds in several steps (Kukreja, Patil, 2025;): attention - comprehension - attribution of meaning - decision (use/involvement in decision).

In the context of sustainable packaging, specific challenges emerge: information overload, unclear symbols, scepticism towards claims, and differences in environmental knowledge.

Studies distinguish between consumer groups, such as “engaged in green”, “indolent adopters”, and “ecological objectors”, and these groupings influence how messages are received (Cao et al., 2021; Mladenović et al., 2024; Wojciechowska, Wiszumirska, 2022).

Information overload and conflicting signals on packaging (e.g. paper combined with plastic) can further limit communication effectiveness (Ankiel et al., 2025; Francis et al., 2024; Lang, Heiman, 2024). In the FPM context, health-oriented claims may additionally overshadow sustainability information - raising the question of how consumers weigh different messages and interpret the relationships between them.

1.4. The specific character of fermented milk products (FPM)

FPM such as yoghurts and kefir are characterised by a traditional production process, health-promoting properties, and wide availability (Ankiel et al., 2025; Francis et al., 2024; Tamime, Robinson, 2007; Raats, Shepherd, Sparkes, 1993; Pieniak et al., 2009). The FPM market is marked by strong competition, a diversity of flavour variants and packaging formats, and consumer sensitivity to marketing signals (Ankiel et al., 2025; Euromonitor, 2023, Euromonitor, 2024; Wang et al., 2024; Riswanto et al., 2025). Packaging transitions - for example from plastic to carton - must account for consumer perceptions of product quality and safety (Orzan et al., 2018), which reinforces the importance of packaging’s communicative function in the FPM context (Wang, Wang, Cho, 2022).

2. Methods

2.1. Focus group research

The study was conducted in the form of two focus group interviews (FGI) with FPM consumers in Poland (N = 16, in groups of 8), diversified by age (18-60), lifestyle, and level of environmental engagement, with an equal split between women and men. Given the exploratory nature of the study, the sample size was appropriate: the focus group literature indicates that two to four groups of six to ten participants typically suffice to achieve thematic saturation in qualitative research (Krueger, Casey, 2015). Recruitment was carried out by a research agency based on selection criteria (regular buyers of yoghurts and kefir), and the agency conducted the interviews according to a scenario developed by the research team. Each session lasted approximately 90 minutes and included both exploratory questions and projective elements (association mapping, packaging preference segmentation). The fermented dairy products were selected using a purposive sampling strategy (Table 1), designed to capture the diversity of packaging materials, formats, and functional roles observed in the retail market. The sample included products packaged in single-use plastics, multi-layer cartons, flexible composite

packaging, glass, and reusable ceramic containers, representing both conventional and alternative packaging solutions. This selection was designed to ensure sufficient variability for subsequent analysis of on-pack information and communicative attributes, without restricting the study to a single material or product category.

Table 1.

Characteristics of the studied dairy products and packaging solutions

Product type	ID	Packaging material & structure	Certification & eco-labelling	Key producer messages & visual narrative
Natural yoghurt	A	PP plastic cup, aluminium lid; potentially recyclable depending on local infrastructure	BIO; EU organic farming logo	Organic milk from certified farms; natural taste; live bacterial cultures; simple ingredient list; plain graphics with green accents, naturalness narrative
BIO yoghurt with blueberries	B	PP plastic cup, aluminium lid; single-use, no packaging sustainability declarations	BIO; EU organic farming	BIO ingredients; no artificial colours or flavours; blueberry motif; prominent BIO/organic labelling
Bio Kefir naturalny Klimeko	C	HDPE plastic bottle, PE cap; potentially recyclable; lower environmental performance vs. glass	BIO; EU organic farming logo	Natural; no additives; traditional fermentation; organic milk; green accents, tradition and nature narrative
Flavoured kefir (raspberry)	D	Multi-layer Tetra Pak laminate carton, PP cap; multi-material - technically difficult to recycle	No BIO/ECO certification	Communication limited to flavour and product type; raspberry motif; flavour-product aesthetics
Kefir	E	PET plastic bottle, PP cap; recyclable plastic (material code 5); no declared eco properties or packaging certification	No BIO/ECO certification	"Natural kefir with L. Casei 431® and vitamins"; immune and digestive support; vitamins B6, B12, D3; white label with blue accents; probiotic bacteria and vitamin icons; functional "Janaturalnie" narrative
Natural yoghurt 3%	F	Glass jar, metal lid; paper label; fully recyclable; no plastic components	EU Organic certification (or national equivalent); glass recycling markings	Organic milk from certified farms; simple additive-free composition; natural taste; glass jar as a pro-environmental choice; minimalist green-white label with nature motifs; locality and eco narrative
Natural BIO kefir	G	PP cup, aluminium lid, additional paper sleeve; single-use plastic — potentially recyclable; standard dairy packaging with BIO certification	BIO certificate; EU organic farming logo; no-GMO declaration	"Natural BIO kefir"; organic milk; traditional fermentation; minimalist green-white label; prominent BIO lettering; simplicity and naturalness, no decorative elements
Kefir	H	Multi-layer Tetra Pak laminate, PP cap; recycling possible only in specialised facilities	No BIO/ECO certification	Natural kefir with live bacterial cultures; classic Milko brand aesthetics; communication limited to product type and culture content

Soured milk 4.0%	I	Glazed ceramic jar, aluminium closure, paper label; reusable packaging; highest environmental potential in the sample; entirely plastic-free	BIO; EU organic farming logo	"Matures in the jar"; recommendation to reuse packaging; rustic aesthetics; circularity and tradition narrative
Icelandic-style skyr (strawberry)	J	Doypack-type flexible packaging; multi-layer laminate, PP cap; composite packaging - low recyclability in current waste systems	No BIO/ECO certification	High protein content; "simple ingredients"; on-the-go convenience; bold colours; fruit graphics; modernity narrative

Source: Own elaboration.

2.2. Data Analysis

The research onion framework developed by Saunders et al. (2023) provided the methodological foundation, with the study grounded in critical realism and an abductive approach to theory development. Drawing on Yin's (2018) qualitative case study framework, the study aimed to identify key themes and challenges related to the perception, communication, and assessment of sustainability in fermented dairy products, with particular attention to packaging as a carrier of environmental values.

Participant responses were analysed using qualitative content analysis following Kuckartz (2018), with the support of ATLAS.ti 25 (version 25.0.1.32924). The data analysis procedure was based on the approach described by Kaiser et al. (2024).

In the first stage, one author coded 20% of the material and developed a preliminary coding system. The main coding categories were derived deductively - directly from the questions included in the interview guide (Table 2). Once the coding system had been established, all authors met to discuss and apply it to the full data corpus, reaching interpretive consensus according to agreed criteria. A codebook was also prepared, containing code definitions and anchoring examples, which facilitated interpretive consistency throughout the subsequent coding and discussion phases. The approach followed the logic of Gioia, Corley, and Hamilton (2013), enabling the transition from first-order concepts expressed in participants' own language to second-order themes and theoretically aggregated dimensions.

3. Results

The structuring qualitative content analysis, supplemented by category aggregation in the Gioia logic, yielded five overarching dimensions through which consumers interpret sustainability and the communicative value of FPM packaging: (1) health-framed interpretation

of sustainability, (2) symbolic sustainability indicators, (3) packaging material hierarchy, (4) informational transparency, and (5) conditional consumer engagement (Table 2).

Table 2.

Five overarching dimensions of consumer interpretation of sustainability and communicative value of FPM packaging

Overarching dimension	Analytical category (2nd-order)	1st-order code (in vivo)	Anchoring quote (abbreviated)	Counter-position (abbreviated)
Sustainability interpreted through a health lens	Naturalness as product "cleanliness"	"periodic table" — I put it back	"When I see... a periodic table... I put it... back on the shelf."	
	Functional-nutritional orientation	I need "high-protein"	"...quite a few... yoghurts... high-protein... because... I need protein."	"...production doesn't involve environmental degradation... we're not cutting down forests..." (non-health definition).
	Ingredient list as "OK/not OK" criterion	protein and bacteria "must be there"	"I check whether there's... protein... bacteria... if something else is in there... already not OK."	
Symbolic sustainability indicators	Scepticism towards general eco-claims	"empty slogans" - take with a pinch of salt	"...slogans... are just empty slogans... keep your distance... soon everything will be bio..."	
	Certification as a credibility signal	the certificate obliges, someone monitors it	"...the certificate obliges... someone monitors it... governed by regulations... meets the norms..."	"...commercially... profit-driven." (suspicion of greenwashing/marketing).
	Minimalism as a credibility signal	"too much going on" - I won't take it	"...if the graphic design... has too much going on... I won't choose it."	
	Visual heuristics (colour/nature)	doesn't have to be green to tempt me	"...it doesn't necessarily have to be green... can be colourful... I'll pick it up... start studying it..."	Tension: "green/leaves" appear as an "eco" shortcut but are not a universal indicator.
Packaging material hierarchy	Glass superiority heuristic	I prefer glass over plastic	"...I prefer the product in glass over plastic."	"...glass recycles worse than most plastics..." (heuristic reversal).
	Utility and safety	thicker plastic - won't fall apart	"...plastic is thicker... I wouldn't worry about it falling apart... in my backpack."	
	Format convenience (on-the-go)	plastic, because more convenient	"...most people will probably go for... plastic, because it's more convenient."	Glass preferred "in principle", but loses out to convenience/price.

Informational transparency	Legibility as a prerequisite for consideration	illegible — I put it back	"If something is illegible, I just put it back."	"I don't really read ingredient lists... I buy the ones I already know." ("label-free" decisions).
	Compensating for small print	people read the ingredients on their phones	"...people... use their phones to read those ingredients."	
	Digital solutions on the label	I scan the QR, not through a magnifying glass	"...I scan the QR code... to read the ingredients on my phone... not through a magnifying glass."	Technology helps but does not replace basic on-pack legibility.
Conditional consumer engagement	Price premium: declarations vs. practice	"pay more?" - nobody	"...who would be willing to pay more? ... so nobody."	"I think yes." (single declaration does not carry into group decision).
	Acceptance of systemic solutions	if you could return it — I'd take glass	"That packaging could be returned..."; "I would choose glass."	
	Producer responsibility (EPR in plain terms)	recycling is the producer's problem	"...so that the recycling problem is more the producer's than mine... clear labelling..."	"...it could highlight my choice, but I wouldn't go out of my way to look for it." (low effort propensity).
	Trust deficit in "circularity"	I don't believe it's from recycled material	"I don't believe that... it's from recycled material..."	Counter-point: credibility reinforced by "monitored certificate" (dimension 2).

Source: Own study.

In both groups, the concept of sustainability was frequently interpreted not as a systemic category (e.g. product life cycle, environmental performance) but as an attribute of a “good” product from a health perspective: naturalness, a simple ingredient list, the absence of “chemicals”, and - particularly in group 2 - nutritional functionality (e.g. protein content). This semantic shift meant that “sustainability” was often treated as a synonym for “cleanliness” and “healthiness”, and packaging along with environmental messages was evaluated through the filter of nutritional quality.

Short ingredient lists and the avoidance of “chemicals” emerged as the dominant evaluation logic. In G1, participants described the practice of reading labels as a tool for selecting “clean” products. Characteristic evaluative metaphors appeared: the more extensive the ingredient list, the greater the reluctance to purchase (the “periodic table” metaphor - putting the product back on the shelf). At the same time, a “short ingredient list” was highlighted as simple, transparent, and conducive to a sense of control over one’s choice. In G2, flavoured products were similarly viewed with scepticism as potentially “artificial”; preferences for natural versions were justified by the suspicion that “fruity” means additives rather than real fruit (“more like chemicals than

actual fruit”). The same passages also reflected an expectation of “fewer chemicals” and fewer preservatives, consistent with the health-based interpretation of sustainability as a “cleaner” product.

In G1, a short use-by date functioned as a quality heuristic and was interpreted as a signal of less processing and greater “naturalness” (“the shorter the date... the healthier”). This motif also recurred in projective exercises as a component of the “ideal sustainable product” (alongside a simple ingredient list and legibility). In G2, a comparable heuristic appears in the form of a recurring preference for a “shorter best-before date” as one of the characteristics of a sustainable product, reinforcing the interpretation that “sustainable” means “less processed / fresher”.

In G2, the health dimension also took the form of nutritional functionality: skyr and high-protein products were described as practical “protein supplements” and even cited explicitly as justifications for more frequent purchases. Notably, in the exercise asking participants to define a “sustainable product”, “appropriate protein content” appeared among the first spontaneous associations - illustrating just how deep this semantic shift runs.

While the health-and-ingredients perspective dominated, voices closer to a systemic understanding of sustainability also emerged in both groups. In G2, one participant described sustainability as a characteristic “at every stage of the value chain” (e.g. technologies and energy used in production) - a clear counterpoint to “clean ingredient list” heuristics. Similarly, in G1, a definition referencing the absence of environmental degradation (“we’re not cutting down forests... we’re not draining reservoirs”) was offered, though it remained an exception rather than the dominant interpretive frame.

3.1. Symbolic sustainability indicators

In both groups, participants described sustainability in terms of symbolic signals - brief messages and visual elements that allow a particular meaning to be rapidly assigned to a product (e.g. “eco”, “bio”, “natural”, “local”, “traditional”). At the same time, these very signals were subject to negotiation: some participants treated them as useful cognitive shortcuts, others as marketing devices requiring verification. In G1, the devaluation of general slogans was a particularly strong theme. Participants stressed that messages such as “eco/bio/natural” can be “empty” and overused, demanding interpretive caution (“you have to keep your distance... because soon everything will be bio”). There was also a direct conviction that such claims lose their “power to act” because they are ubiquitous and no longer differentiate products. At the same time, some remarks indicated that such slogans can still catch attention as an initial impulse, but their meaning is “conditional” and requires verification (“worth checking, because the word alone might only be partially backed up”). As a result, these signals function more as an “invitation to investigate” than as a standalone basis for decisions. In G2, similar selectivity was visible: some participants declared that “natural - yes”, but “eco and bio - no”, suggesting different trust thresholds for different labels and semantic categories.

Against the backdrop of general-slogan inflation, a clear shift towards certificates as more credible signals was visible in both groups. In G2, certification is presented as a tool that “commits” the producer, since it implies oversight and standards (“the certificate obliges... someone monitors it... it meets the norms”). Participants did not accept certification uncritically, however. In G1, the motif of “home-made certificates” or ones that are easy to obtain and that do not build trust appeared (“many brands use certificates you can just make up and sign yourself...”). Similarly, in G2, a distinction was drawn between recognised certificates (e.g. international ones) and “badges introduced by companies that really don’t mean anything”. This indicates that a certificate functions as a signal only when participants perceive it as institutionally grounded and difficult to “manufacture” by the brand itself.

In the area of graphics and colour, some participants described classic associations: green and an aesthetic “close to nature” can suggest ecological credentials. In G2, the direct intuition that “green” strengthens identification of a product as bio/eco was articulated. Counterpositions were visible in both groups, however. In G1, some participants declared that “green and natural” graphics do not attract them, and that visual appeal derives more from distinctiveness, novelty, and “colourfulness” than from nature references. In G2, the topic of “rural/pastoral” graphics was raised by the moderator, but responses pointed rather to a limited, situational role for such stimuli (“it has a bit of it...”), without any clear dominance of that particular heuristic.

An important symbolic element was also the assessment of packaging aesthetics as “calm” versus “loud”. In G2, a clear preference for packaging that does not “shout” or demand attention through an excess of stimuli was expressed; yet the discussion also showed that boldness is accepted, provided it does not disorient or impede reception. This minimalism can be interpreted as a credibility heuristic: less graphic “superstructure” means less suspicion of communicative manipulation.

The theme of locality functions as a potential indicator of “non-commerciality” and authenticity (G1), but it is selective in character: some participants associate it with the practice of occasional purchases “from the farmer” or at a market (costly but perceived as high-quality), and in such situations the need for labelling drops (“you go to a specific farmer, you don’t need all the information written out”). In G2, a counter-case appeared: locality and “traditional method” do not necessarily influence the decisions of people who do not feel competent to assess the production process.

3.2. Packaging material hierarchy

In both groups, packaging material served as a quick interpretive “filter”, enabling inferences about product quality and sustainability without recourse to systemic information (e.g. life cycle data). The discussion was dominated by comparisons of material solutions in terms of “better–worse”, though this hierarchy proved conditional and negotiated over the course of the discussion.

In G1, some participants expressed a direct preference for glass over plastic, linking it both to health-related considerations (microplastics) and to the subjective experience of consumption (“it just tastes better to me”). Such remarks arose spontaneously when participants were asked about packaging characteristics, suggesting that glass functions as the cognitively most accessible signal of quality/safety - and, for some, of sustainability. Notably, the same discussion also contained remarks indicating that glass becomes attractive when price is not a barrier (“if price weren’t a factor, then glass”), showing that this preference is embedded in economic conditions rather than purely in declared pro-environmental attitudes.

In parallel, both G1 and G2 featured a strong functional thread: plastic was regarded as a practical solution (durability, resistance to damage, transport convenience). In G1, this argument took the form of a very concrete use context (“in a bag, in a backpack”) and related to material quality and thickness. In G2, the emphasis on functionality was even more pronounced: rather than declaring a material preference as such, participants stressed that in the market “most products will still be plastic anyway, because they’re more convenient”. Some remarks also shifted the focus from the type of material per se (glass vs. plastic) to packaging “quality” parameters (thickness, rigidity, lack of deformation), suggesting a pragmatic approach to assessing packaging that is independent of declared eco-friendliness.

A counter-argument also appeared in the data, undermining the simplified material hierarchy: glass was described as problematic from a recycling perspective (one participant noted that “glass recycles worse than most plastics”), directly challenging the intuitive equation of glass with a pro-environmental choice. This counter-voice serves as a “negative case” for the dominant heuristic and shows that different models of understanding sustainability coexist within a single group. The same discussion sequence also revealed the conditional nature of glass preference: its acceptance increases when a systemic solution is in view (e.g. the possibility of returning the packaging). Participants indicated that “if you could return it”, glass becomes the preferred choice, while without such a mechanism, some remain with plastic “all the same”.

3.3. Informational transparency

In both groups, the legibility and clarity of on-pack information was treated as a necessary prerequisite for even considering a purchase. Participants described transparency primarily in practical terms: “can I quickly find what I need” (e.g. the best-before date, ingredient list, an unambiguous product name) - only secondarily as something that affects brand image or credibility. In G1, when asked about information they “couldn’t imagine buying without”, participants immediately pointed to the best-before date and basic product identification (“so you can tell at a glance whether it’s a kefir...”). The same passage also contained the demand that the product name and type be prominently displayed and written unambiguously (“clearly written, in large type, what the product is”). An analogous emphasis was visible in G2, where participants stressed the importance of whether the best-before date is legible and

easy to locate. In practice, transparency was thus understood as the packaging's "informational efficiency" - its ability to quickly deliver operationally critical content.

In G1, the moderator explicitly noted that participants "had to squint" at some of the labels, and asked about the importance of appropriate font size and legibility. This theme also arose in G2, where legibility was connected to typography and information layout, with participants drawing attention to whether the table of contents and information are "readable" and whether the layout forces "peering" at the text. An important addition to transparency is semantic consistency of the product name: in G2, formulations such as "strawberry yoghurt of the skyr type" were mentioned as capable of triggering suspicions of "playing games" and acting as a "red flag", even though the information is formally present. This shows that transparency does not reduce to the quantity of information but also encompasses its unambiguity.

When legibility is compromised (e.g. small print), participants describe compensatory strategies based on digital tools. In G2, the explicit demand to scan a QR code "to read the ingredients on my phone... not through a magnifying glass" appeared; in G1, participants mentioned apps for scanning and quickly assessing ingredient composition, while stressing the conditional nature of that strategy (it only works if the packaging has the right code).

It is worth noting, however, that the data also contain an opposing standpoint: some participants declared that they do not regularly read labels and base their choice on experience ("the ones I've already drunk... I buy routinely"). This counter-case is methodologically important, showing that even high label legibility does not guarantee that every consumer will use the information in the selection process; transparency then functions more as a "safety net" available when needed than as a constant decision-making tool.

3.4. Conditional consumer engagement

In both groups, engagement with the choice and consumption of FPM within a circular economy logic was conditional: participants declared that pro-environmental solutions are desirable, but their acceptance depends on cost, availability, and whether the cognitive and organisational effort will be shifted onto the consumer. In G2, the question of paying a premium was directly "tested" through a vote. Despite one participant declaring "I think yes", the final result was unambiguous: the group as a whole did not declare willingness to pay a higher price even with the guarantee of 100% packaging recovery by the producer. In G1, more nuanced responses appeared, but pragmatic logic still prevailed: a surcharge - if any - would need to be small ("a few pennies at most"), justified by the need to count costs over the year and by household budget constraints. Some remarks also linked reluctance to pay more with suspicion of producer opportunism ("producers play games too... I'd be paying tens of groszy and they get it for a couple"), indicating that price and trust are intertwined. A counter-position also appeared in G1, with one participant declaring a higher acceptance of a surcharge (of the order of a few to several dozen percent), though it was formulated hypothetically and premised on

the assumption that the products are not “first necessities”, again underlining the conditional character of the decision.

Beyond price, availability was a very strong condition for more frequent FPM purchases. In G2, participants indicated that a purchase becomes more likely if the product does not require “going out of your way” and is available in popular retail channels (e.g. discount stores). This thread suggests that even a positive attitude towards sustainability may not translate into behaviour if it is accompanied by increased time or organisational cost.

An important element of conditional engagement was the need for “sustainability” not to mean additional work at the disposal stage. In G1, participants articulated an expectation that packaging should be designed so that the consumer does not have to separate components or wonder about waste classification (“I don’t want to have to deal with it... the recycling problem is more the producer’s than mine... clear labelling so I know where to throw it”). In this logic, “responsibility” is accepted only when it is operationally simple and does not generate uncertainty.

G1 also raised an important systemic condition: material preferences (e.g. glass) become genuinely acceptable when the infrastructure for packaging return exists (“if you could return it... then glass”). This mechanism shows that some “pro-ecological” choices are hampered not so much by a lack of values as by a lack of solutions that make it easy for the consumer to close the loop.

3.5. Cross-group comparison as a check on pattern stability

The comparative analysis of the two focus group interviews indicates a high degree of consistency in key interpretive patterns across both groups: G1 and G2 participants consistently interpreted sustainability through the lens of health and symbolic heuristics rather than systemic categories, with pro-environmental engagement taking a consistently conditional character constrained by price, availability, and effort.

Differences between the groups were mainly a matter of emphasis and discussion dynamics. G1 produced more counter-positions and corrections of positions (e.g. the thread challenging the automatic equation of glass with a more ecological solution), pointing to a more negotiated character of material hierarchy and ecological criteria. G2 showed stronger pragmatic logic (packaging convenience, purchasing routine, impact of dietary constraints) and a more decisive moment of consensus on the unwillingness to pay more for pro-environmental solutions even given the assumption of full packaging recovery. Taken together, the cross-group comparison suggests that the identified dimensions provide a stable account of the dominant modes of interpreting FPM communicative value in the studied sample, alongside differences in the degree of critical engagement and the conditions under which pro-environmental declarations translate into purchase intentions.

3.6. Proposed conceptual framework

Based on the identified dimensions, an interpretive framework is proposed (Fig. 1) in which communicative stimuli related to the product and its packaging - materiality, symbolism, information, and product attributes (block A) - are processed through interpretive mechanisms (block B): health and material heuristics, uncertainty reduction through certification, a trust filter, and effort cost. The declarative outcomes (block C) are: perceived sustainability, trust, conditional willingness to pay a premium, and choice intention. The transition from B to C is modulated by boundary conditions - price, availability, and systemic solutions. The model does not assume simple causal relationships but rather organises the findings as a set of mechanisms and boundary conditions that can be tested in subsequent research stages (e.g. quantitative or experimental studies). These patterns confirm that the health frame and conditional engagement operate as shared interpretive defaults across both groups, with differences in their specific expression - functional-nutritional in G2, ingredient-cleanliness-based in G1- reflecting group-level variation in lifestyle orientation rather than fundamentally distinct modes of sustainability reasoning.

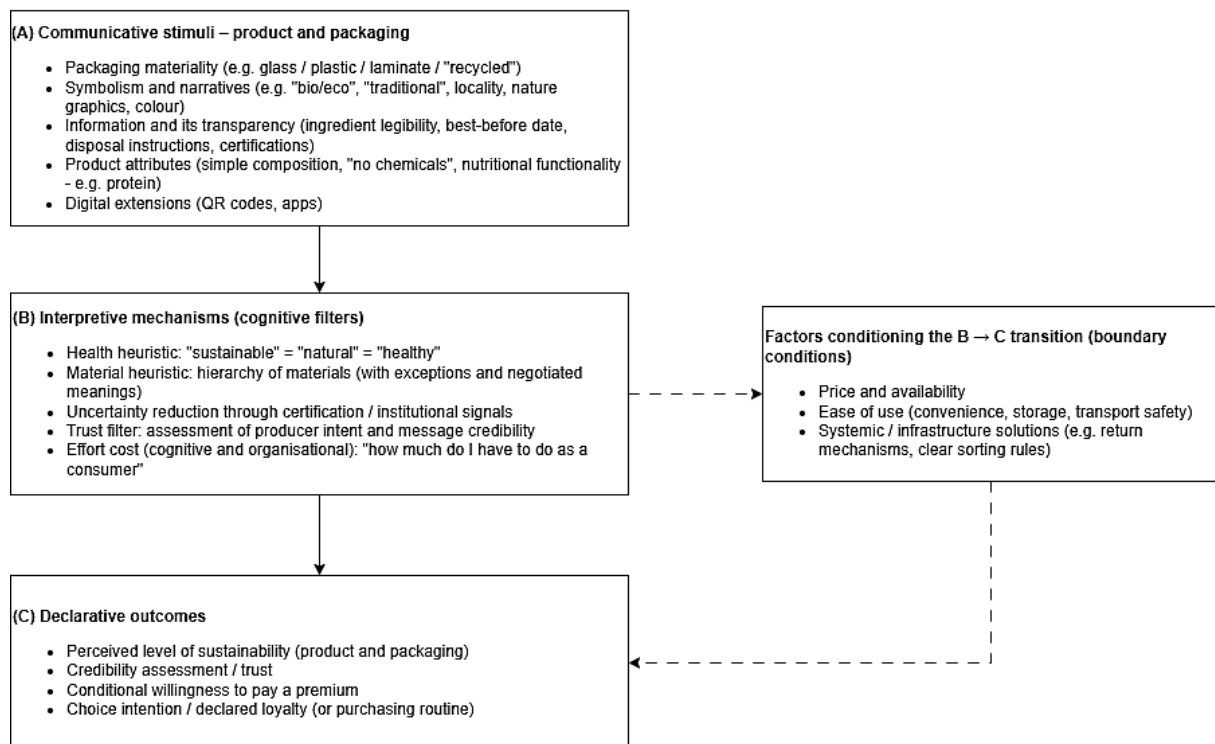


Figure 1. Interpretive framework of FPM sustainability perception based on the communicative value of packaging.

Source: Own elaboration.

4. Discussion

The findings from the two focus group interviews show that in the studied sample, perceptions of FPM sustainability are constructed primarily on the basis of cognitive-symbolic and practical signals (packaging material, legibility, certifications, “ingredient cleanliness”) rather than through systemic categories relating to actual environmental performance (e.g. a life cycle perspective). A common thread across both groups is the tendency to interpret messages via shortcuts - heuristics - and the conditional nature of pro-ecological declarations, constrained by price, availability, and effort on the consumer’s part.

4.1. Sustainability as a health frame: semantic shift and its consequences

One of the key intellectual contributions of this study is the identification of a shift in the meaning of sustainability towards healthiness and naturalness. For a proportion of participants, “sustainable” means primarily “less processed”, “shorter ingredient list”, and “fewer chemicals” - and even “shorter best-before date” - which functions as a practical quality heuristic. In G2, a strong functional component (e.g. protein, skyr) also emerged, suggesting that sustainability communication in the FPM segment competes for attention with health and dietary messaging. The consequence is that environmental messages may be interpreted - or overlooked - through the lens of “health”, and the effectiveness of pro-environmental communication depends on whether it is consistent with expectations regarding nutritional quality.

This observation is not unique in the literature, though it represents a specific and hitherto rarely documented phenomenon in the context of fermented dairy products. Research on perceptions of organic and sustainable food shows that consumers frequently fail to separate the category “healthy” from “environmentally friendly”, treating the two as co-occurring or even synonymous (Schleenbecker, Hamm, 2013; Aschemann-Witzel, Zielke, 2017). This phenomenon is described in the literature as the health halo effect: a positive assessment of one product attribute - here, healthiness - automatically transfers to the assessment of other dimensions, including the environmental one (Schuldt, Hannahan, 2013). As a result, a product perceived as “natural” or “minimally processed” also acquires the attribute of “ecological”, even when the packaging contains no environmental claim at all.

In the present study, this mechanism manifested itself in a particularly clear way. In G1, participants spontaneously described the practice of reading labels as a tool for selecting “clean” products - the more extensive the ingredient list, the greater the reluctance to purchase (the “periodic table” metaphor as a reason to put the product back on the shelf). Equally, a “short ingredient list” was cited as a signal of simplicity, transparency, and a sense of control over one’s choice - cognitive categories that are originally health-related but also interpreted as sustainability indicators. In G2, the same mechanism took a functional form: high-protein products (skyr) were described as “balanced” and “supplementary” - “sustainable” meaning here dietary equilibrium rather than environmental sustainability. Tellingly, in the exercise

asking participants to define a “sustainable product”, “appropriate protein content” appeared among the very first spontaneous associations, illustrating the depth of this semantic shift.

It is worth emphasising that this shift is not only cognitive in character but also communicative. Research on organic food labelling shows that consumers are reluctant to engage with environmental information when it competes with expectations about food quality and safety (Sirieix et al., 2013). In the FPM segment, this tension is particularly strong: the product is by nature defined by health attributes (bacterial cultures, probiotic properties, short shelf life as a freshness indicator), which means the health frame dominates as the primary interpretive filter, and environmental messages are relegated to “second in the queue” for consumer attention. Further confirmation of this dynamic comes from the counter-voices that appeared in both groups: isolated remarks invoking a systemic understanding of sustainability (e.g. “we’re not cutting down forests”, “technologies and energy at every stage of the value chain”) were clear exceptions rather than the dominant interpretive frame - suggesting that systemic sustainability comprehension requires active knowledge and motivation, whereas the health frame is activated automatically. The health frame operated consistently across both groups; its functional variant (protein/dietary balance logic) was more pronounced in G2, while counter-voices invoking systemic sustainability remained isolated in both - confirming the health frame as a cross-group rather than subgroup-specific pattern (as mentioned in the Section 3.6).

The implication for FPM packaging communication design is significant: effective environmental communication should not compete with the health frame but seek to align with it or attach to it. This means that messages such as “natural ingredients”, “minimal processing”, or “no additives” may serve a dual function - health and environmental - acting as “semantic bridges” between the two frames. Purely systemic messages (e.g. carbon footprint, packaging life cycle), by contrast, may prove less effective unless anchored in a nutritional or quality logic that is close to everyday consumer expectations.

4.2. Material heuristic

It has repeatedly been demonstrated that packaging material serves consumers as one of the most important interpretive signals when assessing a product’s degree of sustainability (Boesen et al., 2019; Otto et al., 2021; Thomas et al., 2025). As in the present study and in others, particular significance was attributed to glass, which was intuitively associated with a more ecological, more natural, and higher-quality solution than plastic (Thomas et al., 2025; Kozik-Kołodziej, 2026). Such associations fit well within the mechanism of heuristic consumer inference - a set of simplified evaluation rules in which the packaging material itself becomes the carrier of environmental meaning (Ischen et al., 2022; Otto et al., 2021). Rather than analysing the full product life cycle, a quick assessment is triggered by the belief that a given material is, “in and of itself”, more environmentally friendly (De Feo et al., 2022; Boesen et al., 2019).

This perception can be interpreted in terms of the material heuristic, understood as a special case of the heuristic based on physical product characteristics (Product Sustainability Directory, 2025; Otto et al., 2021). Its essence is that a material property of the packaging is transformed into a cognitive shortcut that organises the assessment of the entire product (van Loo et al., 2022). In this sense, glass is treated not solely as a technical material but also as a symbol of durability, neutrality, cleanliness, and greater alignment with the idea of responsible consumption (Thomas et al., 2025; Groth et al., 2023). Glass thus functions as a salient “green” signal (environmentally friendly packaging cue), influencing not only the assessment of the packaging itself but also the way the entire product is perceived (Ischen et al., 2022; Otto et al., 2021). In consumer studies, glass is simultaneously rated as more premium, safer, and more environmentally friendly than plastic, even when that rating does not derive from an in-depth knowledge of the actual environmental parameters of the solution (Thomas et al., 2025; Kozik-Kołodziej, 2026; De Feo et al., 2022).

This heuristic is conditional, however: within the same empirical material, voices appeared that challenged the automatic equation of glass with a pro-ecological choice, noting that the assessment changes when recycling, weight, and transport are taken into account. The material signal does not disappear, but it ceases to be sufficient in itself. This is confirmed by life cycle assessment (LCA) research, which shows that no universal hierarchy of packaging materials exists in which glass automatically outperforms plastic across all environmental impact categories: the ultimate balance depends on packaging weight, transport distance, energy source, and end-of-life scenario (Boesen et al., 2019; De Feo et al., 2022). Consumers tend to significantly overestimate the ecological credentials of glass relative to LCA findings, while overestimating the environmental impact of plastic (Otto et al., 2021). Glass’s advantage is thus symbolically strong but environmentally ambiguous.

It was also clear that the strength of the material heuristic is tempered by the costs of use. Participants’ remarks showed that the assessment of a packaging’s ecological credentials is not detached from everyday consumption practices. Ease of use, convenience, risk of breakage, ease of carrying, and suitability for travel were factors that weakened the preference for glass. In this sense, plastic was not defended as a more ecological material, but as a more functional one in specific use contexts. This tension between axiological preference and everyday practice is well described in the more recent literature on sustainable packaging, which stresses that positive attitudes towards more ecological solutions frequently collide with the demands of convenience, safety, and ease of use (Miao et al., 2023; Otto et al., 2021).

In participants’ remarks, glass gained in attractiveness only when coupled with a return system or a reuse model - consistent with literature showing that acceptance of return solutions depends on price, convenience, and ease of participation in the cycle (Miao et al., 2023; Theobald et al., 2024). Material thus does not act as a standalone determinant of sustainability, but as an element of a broader system of meanings and institutional conditions (Otto et al., 2021; Groth et al., 2023).

4.3. Informational transparency and uncertainty reduction

Informational transparency is one of the foundational conditions for effective communication between product and consumer. The packaging design literature underlines that packaging serves not only a protective or marketing function but also an informational one - it constitutes the primary communicative interface between producer and user. Information such as product name, ingredient list, nutritional value, allergens, and best-before date is critical for informed consumer decision-making. Its presence and legibility are especially important from the perspective of health safety and producer trust (Thota et al., 2020). The findings of the present study directly confirm this mechanism: in both focus groups, legibility and clarity of information were treated as a necessary prerequisite for considering a purchase at all. In G1, when asked about information they “couldn’t imagine buying without”, participants immediately pointed to the best-before date and unambiguous product identification. In G2, participants stressed the importance of whether the best-before date is legible and easy to find - before they would even reach for additional environmental messages.

Research shows, however, that the mere presence of information on packaging does not guarantee that it will be effectively processed by the consumer. The manner in which content is presented matters greatly - including font size, visual hierarchy, placement of elements, and information density. Packaging communication reviews in the food domain indicate that the way messages are formulated, and their visual layer, can significantly affect product interpretation. Even subtle typographic, stylistic, or graphic elements can shape expectations regarding quality, healthiness, or product character (Schifferstein, de Boer, Lemke, 2021).

At the same time, packaging communication is designed under conditions of limited consumer attention. The packaging design literature notes that consumers frequently use visual elements as rapid interpretive cues about a product. Colour, typography, and graphic symbols can signal product attributes such as naturalness, healthiness, or degree of processing (Underwood, Klein, 2002). In practice, this means that visual packaging communication serves a heuristic function - enabling rapid inference about product properties without the need to read textual information in detail. Legibility and simplicity of the message thus become a key factor in communicative effectiveness. Eye-tracking studies show that consumer attention is strongly determined by visual factors such as element size, position, and colour, while high information density can hinder processing and lead to the omission of part of the messages (Chrysochou, Krystallis, Giraud, 2012). This can be interpreted through cognitive load theory. According to this approach, the human capacity to process information is limited by working memory capacity. When a message contains too many elements or is too detailed, recipients may have difficulty processing it, resulting in simplified handling of information or complete omission. Research on food label design has shown that more aggregated and simplified information formats may be more effective for people with lower working memory capacity, since they reduce cognitive load during decision-making (Avalos, 2025). This mechanism found direct

reflection in participants' remarks. One participant in G1 put it plainly: "If something is illegible, I just put it back" - a response that illustrates how crossing the cognitive threshold results in immediate product rejection, before any assessment of its environmental characteristics can take place. Similarly, in G2, participants drew attention to whether the nutritional table and ingredient information are "readable" and do not require "squinting" - corresponding to the model of cognitive processing cost as a decision-making filter.

The phenomenon of processing fluency - the ease with which an individual can process visual and semantic information - is also relevant here. Research on packaging design shows that simpler and more transparent visual compositions are cognitively easier to process and are typically assessed more positively by consumers than designs with a high level of visual complexity (Xia et al., 2023). When basic on-pack information is difficult to read or incomplete, consumers may resort to compensatory strategies to supplement missing data. Increasingly, this involves digital tools - scanning QR codes, checking information in mobile apps, or searching for product data online. This can be interpreted as a transfer of part of the cognitive effort from the physical packaging to external information sources - a kind of "outsourcing" of the cognitive process beyond the product's communicative artefact. The development of smart and interactive packaging suggests that digital extension of product communication can support consumer decision-making by providing additional information about composition, freshness, or storage (Kamboj et al., 2025). This observation is confirmed by the empirical data: in G2, there was an explicit call for scanning a QR code "to read the ingredients on the phone... not through a magnifying glass", while in G1, participants mentioned apps for scanning and quickly assessing product composition, treating them as a substitute for poorly legible labels. It is worth noting, however, that the data also contain a significant counter-case: some participants stated that they do not regularly read labels and base their choice on experience and routine ("the ones I've already drunk... I buy routinely"). This behavioural pattern shows that even high label legibility does not guarantee its use - transparency then functions as a "safety net available when needed" rather than as a constant decision-making tool. For environmental communication, this is significant: ecological signals on packaging primarily reach those consumers who actively engage with labels, while habitual buyers remain outside the reach of this communicative layer. QR codes and scanning apps emerged in the data as compensatory strategies activated when physical legibility failed rather than as proactively sought channels — positioning digital tools as a second-tier communicative layer that extends packaging information beyond its physical constraints. This suggests that Block A of the conceptual framework should be understood as encompassing not only physical packaging attributes but also their digital extensions, with the boundary between packaging and the broader product communication ecosystem becoming increasingly permeable (Mishra et al., 2025).

In the context of sustainability communication, the problem of basic legibility and informational ergonomics takes on particular significance. Information about a product's environmental impact, the sourcing of raw materials, or the recyclability of packaging often

constitutes an additional communicative layer that must compete for consumer attention with mandatory information and marketing messages. Research on packaging perception shows that ecological signals are frequently difficult for consumers to recognise or interpret, particularly when they appear against a backdrop of many other visual messages (Brance, 2025).

It can accordingly be argued that basic communicative legibility on packaging constitutes a kind of “entry condition” for more complex messages, including environmental communication. If basic information is difficult to locate or process, the consumer may not devote sufficient attention to additional sustainability messages. Under conditions of cognitive overload, environmental signals become just one of many competing visual stimuli, which significantly limits their communicative effectiveness.

4.4. Trust and the credibility of signals

Assessment of environmental messages on packaging is not based solely on their presence, but above all on their credibility (Ischen et al., 2022; Otto et al., 2021). In both groups (G1 and G2), clear ambivalence towards symbolic signals was visible. General slogans such as “eco”, “bio”, “natural”, or “traditional” were, on the one hand, recognised as useful cognitive shortcuts facilitating initial orientation in the range; on the other, they were frequently treated as overused and too general to serve as a standalone basis for trust - a finding consistent with earlier observations (Lombardi et al., 2023; Kozik-Kołodziej, 2026). The data reveal a clear motif of “devaluation” of such terms: the more frequently they are used, the less they differentiate products, and the more often they trigger interpretive distance rather than automatic acceptance. Consequently, general environmental claims function more as a prompt for further product scrutiny than as a signal that closes the evaluation process - consistent with observations about growing scepticism towards “green” marketing language (Mladenović et al., 2024; Young et al., 2010).

These observations fit into a broader debate about what has been called eco-claim inflation (OECD, 2024; European Commission, 2024). As the volume of environmental declarations in the market increases, the risk grows that some will be perceived as formulaic, overly general, or poorly documented (OECD, 2024). Institutional documents stress that the spread of products and services bearing environmental claims has intensified concerns about greenwashing - false, misleading, or unverified environmental statements - which undermines consumers’ ability to distinguish credible messages from superficial ones (Persakis et al., 2025; OECD, 2024). From this perspective, what matters is not the existence of a claim per se, but the possibility of its verification, comparison, and grounding in a credible reference system (European Commission, 2024; Ischen et al., 2022).

Against the backdrop of general-slogan inflation, certification takes on particular importance. The data make clear that certificates are perceived as more credible than general producer declarations, but only when they are external, recognisable, and embedded in a system of oversight. In participants’ remarks, a certificate functions as a signal that “someone checks

it” - as a tool for uncertainty reduction; at the same time, not every mark works in the same way. Both groups drew a distinction between recognised certificates, associated with standards and external control, and “badges” created by companies themselves, which do not build trust. This finding corresponds well with literature showing that traditional labels based on clearly defined criteria (e.g. organic) are more likely to be treated as credible than general, unspecified claims of the “green” or “environmentally friendly” type (Lombardi et al., 2023; Ischen et al., 2022). The importance of this mechanism is also confirmed by more recent empirical research on eco-label trust. Yang et al. show that trust in environmental labels is strongly associated with both label knowledge and institutional trust in the certifying bodies (Yang et al., 2024). Both factors have a significant positive effect on eco-label trust, with transparency and information accessibility strengthening trust through enhanced knowledge and confidence in the certification system (Yang et al., 2024).

The findings indicate that the key problem is not the volume of environmental communication but its credibility. An excess of general and repetitive messages leads to scepticism, and the greenwashing literature confirms that imprecise or hard-to-verify environmental declarations undermine consumer trust in both specific brands and the entire category of environmental communication (Persakis et al., 2025; OECD, 2024).

Consumer trust in environmental signals is not, moreover, purely cognitive in character. It is also assessed through the lens of a general evaluation of producer intent: consumers ask not only whether a given claim formally exists, but also whether it seems honest, whether it is backed by something beyond packaging aesthetics, and whether the brand gives the impression of genuinely wanting to communicate responsibility rather than merely exploiting “green” marketing language (Young et al., 2010; Lombardi et al., 2023). In this sense, the credibility of a claim is relational - it derives not only from the content of the message but from the relationship between content, source, form of verification, and sender reputation (Carrington et al., 2010; Yang et al., 2024).

From a theoretical perspective, a transition can thus be observed from simple semantic signals to institutionally grounded ones (Ischen et al., 2022; Otto et al., 2021). General terms such as “eco”, “bio”, or “natural” remain important as elements of first contact with a product, but increasingly they are not sufficient for building trust (Lombardi et al., 2023). The function of uncertainty reduction is assumed instead by marks that are recognisable, externally verifiable, and embedded in a broader system of control (Yang et al., 2024; OECD, 2024). In practice, this means that the credibility of an environmental signal depends not on its intensity but on whether the consumer regards it as verifiable, independent, and institutionally grounded (European Commission, 2024; Persakis et al., 2025).

Against the backdrop of general-slogan inflation, certification emerged as a more credible signal, but only when perceived as externally governed. The data reveal a consistent two-tier distinction: internationally recognised, third-party-verified certifications (“the certificate obliges... someone monitors it”) versus company-created marks perceived as easy to self-issue

and therefore trust-deflating ("badges introduced by companies that really don't mean anything"). This aligns with evidence that eco-label credibility depends on the perceived independence of the certifying body rather than visual salience (Yang et al., 2024; Lombardi et al., 2023).

4.5. Conditional engagement

Declared pro-environmental attitudes were conditional: even where sustainability was assessed positively, willingness to pay more was limited or absent, and in G2 a clear moment of consensus on this issue emerged. Consumers also articulated an expectation that packaging and the broader system should "take off" the organisational cost (sorting, separating components, unclear rules), shifting responsibility towards producers and infrastructure. This indicates that in the studied sample, pro-environmental choices are more likely when they are "easy by default" and compatible with everyday purchasing practices (price/availability).

The attitude-behaviour gap in sustainable consumption is well-established in the literature. Consumers consistently declare strong support for environmental protection, but these declarations do not always translate into actual purchasing decisions. Research shows that factors such as price, convenience, and product availability often prove stronger determinants of consumer choices than environmental values (Carrington, Neville, Whitwell, 2010; Young et al., 2009). In practice, even those who declare pro-ecological attitudes may forgo more sustainable products if they entail additional financial or organisational costs. The perception of responsibility for pro-environmental action also plays an important role: participants expressed a clear expectation that the production and distribution system should minimise the effort required of the consumer - pointing to difficulties with sorting multi-material packaging, separating components, and unclear recycling rules. Responsibility for resolving these problems was frequently transferred in their remarks to producers, packaging designers, and systemic infrastructure.

This can be interpreted through the concept of system-enabled sustainable behaviour. According to this approach, pro-environmental consumer behaviours are more likely in situations where they are supported by appropriately designed institutional and infrastructural structures. Rather than relying solely on individual consumer motivation, it may be more effective to design systems that make pro-environmental behaviours the easiest or default option (Thøgersen, 2005).

Similar conclusions emerge from behavioural economics research, which stresses that consumer decisions are strongly shaped by the choice context. According to choice architecture and the default options mechanism, people tend to select solutions that require the least cognitive or organisational effort (Thaler, Sunstein, 2008). Price and availability are key enabling conditions for translating pro-environmental intentions into actual consumer choices (Vermeir, Verbeke, 2006).

The analysis suggests, therefore, that in the sample studied, pro-environmental consumer choices take the form of conditional engagement - becoming more likely when specific structural conditions are met: above all, a competitive product price, easy availability, and minimisation of the additional organisational effort required of the consumer. When these conditions are not met, declared environmental values may give way to more pragmatic selection criteria.

4.6. Limitations

The study is exploratory in nature and draws on two focus group interviews (N = 16), so the conclusions should be treated as a description of interpretive mechanisms and boundary conditions within the studied sample rather than as population-level generalisations. First, FGIs are sensitive to group dynamics (dominance of some participants, conformism, social desirability of responses), which can amplify certain themes and suppress others. Second, the analysis concerns declarative statements made in a moderated discussion setting and does not include observation of actual purchasing behaviour, precluding inference about the actual influence of individual signals on real-world in-store choices. Third, the study is embedded in the context of a single country and a specific product category (FPM), which limits the transferability of conclusions to other markets and categories without additional comparative research. The use of a selected set of packaging stimuli also captured diverse interpretive strategies but does not exhaust the full range of packaging formats and communicative practices present in the market. Then, participants did not consistently name specific certification schemes, which limits conclusions regarding recognition differentials between individual labels; future research using named certification stimuli would allow more precise mapping. And finally, digital tool usage was captured only as self-reported behaviour; future research using interaction logging or in-store observation would allow fuller mapping of the phygital packaging communication experience.

4.7. Practical implications

For the design of FPM packaging communication, the findings point to three directions: (1) environmental communication should align with the health frame, as this often organises interpretation; (2) legibility and informational ergonomics are a prerequisite for “unlocking” the reception of environmental messages; and (3) credibility is built through recognisable certifications and by limiting the “inflation” of general claims, not through their multiplication.

5. Conclusions

The findings indicate that consumers interpret FPM sustainability primarily through a set of cognitively accessible signals rather than systemic categories. Symbolic sustainability indicators function as rapid interpretive shortcuts, but their effectiveness is undermined by the inflation of meanings and scepticism towards general eco-claims. Consequently, trust shifts from verbal declarations towards more institutional signals - certificates in particular - and towards communicative elements that reduce “information noise” (minimalism and high legibility). At the same time, “eco” graphics (e.g. green colours, nature motifs) and narratives of locality and tradition operate selectively and do not constitute universal decision determinants.

Packaging material proved to be an important but ambiguous sustainability signal. Glass frequently functions as an intuitive indicator of a “better” choice, but its advantage is constrained by utility criteria (convenience, durability, ease of transport) and by counter-arguments relating to the realities of recycling. As a result, sustainability assessment in the materials domain is conditional and negotiated in the course of discussion.

Informational transparency operates as an uncertainty reduction mechanism and a basic prerequisite for considering a purchase: consumers expect to be able to quickly locate key information (best-before date, unambiguous product identification, ingredient list). Ambiguous naming and low legibility undermine communicative credibility, and some participants compensate for these limitations through digital solutions (QR codes, apps), while others limit label reading and base their decisions on routine and prior experience.

Consumer engagement with sustainable FPM consumption takes the form of conditional readiness. Declarations of support for pro-environmental solutions coexist with low acceptance of price premiums, high sensitivity to availability, and an expectation that the burden of recycling organisation and clarity of rules will largely be assumed by producers or systemic solutions. Taken together, the findings suggest that effective sustainability communication in FPM should balance environmental signals with expectations regarding healthiness, legibility, and ease of use.

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