

RESEARCH ARTICLE OPEN ACCESS

Highlighting That Green Products Derive From Waste: Which Is the Effect on Consumer Behavioral Intention?

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Received: 19 September 2025 | **Revised:** 22 January 2026 | **Accepted:** 15 February 2026

Keywords: circular economy | circular products | consumer behavior | industrial symbiosis | sustainability | sustainable marketing

ABSTRACT

In the current market landscape, many innovative eco-friendly materials are being developed. Plant-based leather is being used recently in the production of fashion accessories. Based on the rational perspective in explaining sustainable consumer behavior, this study investigates the effect of green perceived utility, perceived performance, and general risks on the purchase intention and the willingness to pay more for fashion accessories made of plant-based leather, exploring whether emphasizing the origin of the materials as waste has a negative or positive effect on consumers' behavioral intentions. Results show that the positive effect of green perceived utility overcomes the negative ones of perceived risks. When consumers are informed that the materials are industrial waste, their perception of the product's environmental benefits significantly increases, although there is not a significant increase in perceived risks. Accordingly, providing such information indirectly increases the purchase intention and the willingness to pay more for these products.

1 | Introduction

Today, companies are increasingly confronted with mounting pressures from both regulatory authorities and consumers to mitigate their environmental impact. On the one hand, policymakers encourage companies to adopt production practices that are increasingly sustainable (Christensen et al. 2021; Xiao et al. 2025). On the other hand, a significant portion of consumers expects the products they purchase to exhibit strong environmental performance¹ (OECD 2025), and there is growing evidence that many consumers are willing to buy environmentally friendly or “green” products, as well as to pay a premium price for them (e.g., Gomes et al. 2023). These dual forces are compelling an increasing number of firms to embed the principles of the circular economy (CE) within their business models (Bandeira et al. 2025; Sgambaro et al. 2025; von Kolpinski et al. 2023).

One of the CE strategies that firms can implement is industrial symbiosis (IS), that is, replacing primary inputs with wastes generated by other production processes (Chertow 2000; Saavedra et al. 2018). In addition to generating environmental benefits, this practice also yields economic advantages for the participating firms, which can reduce their waste disposal and input purchase costs if they implement IS (Chertow and Lombardi 2005).

Motivated by the potential benefits, an increasing number of firms are currently inclined to adopt the IS approach to develop new products made from waste materials and production scraps derived from industrial processes (Fraccascia et al. 2023). Illustrative examples include toilet paper manufactured from sugar production residues (Zhu et al. 2008), discarded conveyor belts repurposed to create bags and accessories,² and insulating panels produced from waste fibers originating in textile manufacturing processes.³ By introducing these products, companies

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can reduce the volume of waste directed to landfills, thereby mitigating their environmental impact.

One of the sectors with significant potential for the application of CE practices, and specifically IS, is the fashion industry (Acerbi et al. 2025; Goel et al. 2025). Increasing attention is being directed toward this sector from a sustainability standpoint, owing to its substantial environmental footprint—both in terms of product manufacturing and end-of-life disposal (Schiavoli et al. 2024). In this context, a promising application of IS involves the use of plant-based leather⁴—produced utilizing by-products or waste materials derived from production processes (Acerbi et al. 2025; Schiros et al. 2022) of other industries, such as the agricultural and food and beverage ones—as input for the fashion industry. This material, derived from natural, plant-based raw ingredients—including oranges, apples, grapes, and pineapple leaves—offers a sustainable alternative to conventional animal leather and is being increasingly employed in the production of several types of accessories, such as bags and shoes. Life cycle assessment indicate that the environmental impact of plant-based leather is substantially lower than that of animal leather (e.g., Muthu and Ramchandani 2024).

However, from a marketing standpoint, products derived from IS (henceforth IS products) pose a challenge for companies. Although consumers may acknowledge the environmental benefits these products offer compared to conventional alternatives, they may nevertheless exhibit lower willingness toward purchasing them. In this regard, the literature highlights that consumers' willingness to buy products made from recycled materials may be strongly influenced by their perceptions of these products' quality and performance relative to non-recycled alternatives (e.g., Polyportis et al. 2022). Specifically, the use of recycled materials in manufacturing may negatively affect consumers' perceived quality of the product (Abbey et al. 2017; Kuah and Wang 2020; Magnier et al. 2019; Sun et al. 2018). Beyond performance-related concerns, consumers may also perceive financial risks, particularly through diminished perceptions of the product's value for money (Hamzaoui Essoussi and Linton 2010; Park and Lin 2020). Similar concerns may emerge for products realized with alternative materials (Dangelico et al. 2022).

Transparency in sustainability marketing is essential for contrasting green washing and building consumer trust, as open disclosure of sustainability efforts—such as supply-chain information, verified performance data, and third-party certifications—enables more informed consumers' decision-making and enhances brand credibility (Agarwal et al. 2025; Ezech and Dube 2025).

In the context of products made through IS, firms are then faced with a strategic decision: whether or not to highlight to consumers that the product contains materials derived from industrial wastes. This decision is linked to two phenomena, recently discussed in the scientific literature, known as green blushing (e.g., Falchi et al. 2022; Guercini et al. 2025) and greenhushing (e.g., Font et al. 2017; Hilton 2025; Wren Montgomery et al. 2026). Specifically, whereas firms are often incentivized to communicate their green achievements—sometimes even resorting to

greenwashing tactics—because they believe such communication can generate competitive advantages, others deliberately choose to under-report or refrain from reporting altogether their environmental efforts. The reasons behind this choice are diverse. From a consumer perspective, companies may fear that providing information about their sustainability initiatives could negatively affect perceived product quality (e.g., Guercini et al. 2025). Moreover, companies may opt to conceal their green efforts if they believe market demand is not yet ready. In this regard, when marketing environmentally friendly products, firms may refrain from explicitly positioning them as “green,” assuming that their target segments do not value environmental attributes (Belz and Peattie 2012; Belz and Schmidt-Riediger 2010).

With regard to products derived from IS, the issue of quality represents a critical factor. Indeed, the recent study by Dangelico and Fraccascia (2025) highlights that consumers exhibit limited willingness to tolerate any deterioration in performance of IS products compared with traditional products. Furthermore, an additional potential risk emerges alongside performance concerns: The fact that these products are made from waste materials derived from industrial processes may lead consumers to perceive potential hazards linked to inadequate product safety⁵ (Fraccascia et al. 2023).

The production and diffusion of IS products would contribute to the reach of the UN Sustainable Development Goal (SDG) 12: “Ensure sustainable consumption and production patterns.” To support the production and adoption of these products, it is essential to identify consumers' perceptions about them and how these influence consumers' willingness to purchase them and pay for them. All in all, in the case of products derived from IS, the information that the products contain materials derived from wastes might be able to affect the behavior of consumers. On the one hand, emphasizing this piece of information may enhance the product's perceived environmental sustainability, potentially increasing consumers' willingness to buy and pay for the product. On the other hand, such disclosure could elevate consumers' perceived risks, thereby diminishing their willingness to purchase and pay for it.

This study is situated within the broader literature on sustainable consumer behavior, which explores the factors influencing purchase intention and willingness to pay a premium for environmentally friendly products (e.g., Dangelico, Fraccascia, and Strazzullo 2024; Kamboj and Matharu 2021; White et al. 2025), as well as the drivers of green behaviors enacted by consumers (e.g., Aizhong and Ayong 2025; Testa et al. 2025). Within this context, research on consumer behavior for products deriving from IS is still at its infancy (Dangelico et al. 2025; Dangelico and Fraccascia 2025; Fraccascia et al. 2023). These studies investigate consumers' perceptions and the determinants of purchase intention for IS products, without explicitly considering the specific effect of consumers' knowledge that the product is an IS product rather than “just” a green product. Understanding this differential effect would be key to understanding consumer behavior for IS products.

This study focuses on fashion accessories made of plant-based leather as green products derived from IS. Specifically, the following research questions are addressed in this study:

RQ1. Which are the determinants of the consumer's behavioral intentions toward fashion accessories made of plant-based leather?

RQ2. Which is the effect of informing consumers that a fashion accessory made of plant-based leather derives from industrial waste?

To address these research questions, a study was conducted involving 1259 Italian consumers, who completed a questionnaire designed to identify the factors influencing the purchase of accessories (such as backpacks, handbags, and wallets) made from plant-based leather. The decision to focus on accessories is motivated by several reasons. *First*, accessories are frequently manufactured using resource-intensive processes and materials—particularly leather and synthetic polymers—which can be responsible for significant water and energy consumption and contribute to chemical pollution and waste generation (e.g., Cheah et al. 2013; Hildebrandt et al. 2021). Consequently, enhancing sustainability within this segment of the fashion industry is imperative. *Second*, because accessories often function as high-visibility, long-lasting items that express consumers' identity and style, examining consumer behavior in this product category offers important insights into how individuals respond to sustainable innovations and how firms can effectively encourage more responsible consumption patterns. *Third*, existing research on consumer behavior in sustainable fashion has predominantly focused on clothing (Schiarioli et al. 2024), leaving accessories as a relatively underexplored domain within the academic literature.

Specifically, three factors were examined for their potential impact on purchase intention. The first, *perceived green utility*, captured consumers' perceptions of the environmental benefits the product provides. The other two, *perceived performance risks* and *perceived general risks*, were used to assess the extent of risk perceived by consumers in relation to the product. Two versions of the questionnaire were administered; specifically, in both versions, consumers were informed that the product is made of plant-based leather (deriving from oranges, apples, grapes, or pineapple leaves), whereas only in one version it was specified that the products derived from industrial waste of the food industry. Data collected were validated through CFA and subsequently analyzed using a structural equation modeling (SEM) approach.

With reference to [RQ1](#), results indicate that perceived green utility is the most significant driver of purchase intention, whereas the other two factors act as barriers. With reference to [RQ2](#), notably, informing consumers that the product is made from industrial waste enhances their green perceived utility but has no statistically significant effect on their perception of product-related risks. Therefore, providing this information to consumers has exclusively positive effects on their willingness to purchase the product and to pay a premium price for it.

The reminder of the paper is as follows. In Section 2, the theoretical background is presented and hypotheses are developed. In Section 3, methodological details are reported. In Section 4, results from this study are described, whereas in Section 5, these are discussed. Finally, in Section 6, implications and conclusions are reported.

2 | Theoretical Background and Hypothesis Development

Sustainable consumer behavior refers to actions that aim to satisfy present needs while simultaneously benefiting the natural environment or limiting environmental impacts (Trudel 2019). Research on this topic has rapidly grown during the past few years (Dangelico et al. 2022; Schiaroli et al. 2025, 2024; Testa et al. 2025; White et al. 2019), with numerous studies examining the determinants of consumers' purchase intention and willingness to pay more for green products (Dangelico et al. 2022; Schiaroli et al. 2024; Testa et al. 2021). A subset of this research focused on circular products, including products made from recycled materials, reused, remanufactured or refurbished (Harms and Linton 2016; Magnier et al. 2019; Michaud and Llerena 2011; Pretner et al. 2021). Marketing such products presents specific challenges, as consumers' acceptance of circular products depends on several factors—such as environmental benefits, perceived quality, safety, risks, emotions, and individual differences (Magnier et al. 2019; Polyporis et al. 2022)—whereas the willingness to pay for these products often remains is low (Harms and Linton 2016; Michaud and Llerena 2011; Pretner et al. 2021).

This study focuses on rational explanations of sustainable consumer behavior, as based on a comparison of perceived benefits and costs related to the purchase of green products (Belz and Peattie 2012), consistently with the theory of consumers' decision-making process (Engel et al. 1986) and the expected utility theory (Mongin 1997). These theories suggest that, when evaluating a purchase—such as deciding whether to buy a product and determining how much he/she is willing to pay—a consumer evaluates costs/risks and benefits deriving from the purchase and the likelihood of the purchase increases when benefits overcome costs/risks (Blythe 2013; Mitchell 1992; Polyporis et al. 2022). In the context of green products, these two theories are particularly relevant because purchasing decisions often occur under conditions of uncertainty. In this regard, consumers may lack complete information regarding the actual quality of a green product—both in absolute terms and relative to conventional alternatives—raising questions about whether its quality is superior, equivalent, or inferior to that of traditional products. Consequently, consumers perceive a mix of potential benefits and risks associated with the purchase decision.

2.1 | Perceived Benefits

A type of benefit consumers can find in green products is related to the environmental benefits that the product provides. Green perceived utility refers to how effective green products are perceived in protecting the natural environment (Chang 2011). Several studies have demonstrated that consumer awareness of a product's environmental benefits positively influences purchase intention across various product categories, such as electric vehicles (Zhao et al. 2024), green cosmetics and personal care products (Suphasomboon and Vassanadumrongdee 2022), and sustainable beer (Dangelico, Fraccascia, and Strazzullo 2024). Nevertheless, Dangelico, Ceccarelli, and Fraccascia (2024) found that perceived green

utility does not influence the intention to purchase sustainable biscuits, underscoring that the effect of perceived environmental benefits may be dependent on the product category. With specific regard to green products deriving from IS, Fraccascia et al. (2023) found that perceived green utility increases consumers' purchase intention of electronic products, and Dangelico and Fraccascia (2025) found that perceived green utility positively affects the intention to purchase a sofa made with waste deriving from IS.

Thus, we hypothesize that:

Hypothesis 1. *Perceived green utility positively influences consumer intention to purchase fashion accessories made of plant-based leather.*

Fraccascia et al. (2023) found that green perceived utility does not affect consumers' willingness to pay a premium price for electronic products deriving from IS. In a similar vein, Gomes et al. (2023) reported that green perceived benefits exert a negative effect on the willingness to pay more for green products of Generation Z consumers.

However, other studies indicate that providing consumers with information about the environmental benefits of circular products can increase their willingness to pay. In general, the willingness to pay more for recycled, reused, or remanufactured products tends to be lower than for products made of virgin materials (Michaud and Llerena 2011; Pretner et al. 2021). Nevertheless, when consumers are informed of the environmental benefits of circular products, especially when the information is third party verified (Pretner et al. 2021), their willingness to pay rises. Similarly, when consumers are informed about the environmental impact of conventional products, the willingness to pay for them decreases (Michaud and Llerena 2011).

Based on the above considerations, we hypothesize that:

Hypothesis 2. *Perceived green utility positively influences consumer willingness to pay a premium price for fashion accessories made of plant-based leather.*

2.2 | Perceived Risks

Several risks can be associated with green products made from recycled materials. For instance, Magnier et al. (2019) identify several types of risks related to the purchase of products made of ocean plastic, such as general risks—that is, those associated with the psychological discomfort that consumers might experience during the purchase decision-making process, particularly stemming from the fear of making an incorrect choice (e.g., Laroche et al. 2005; Stone and Grønhaug 1993)—and risks related to product contamination, safety, quality, and performance.

Perceived risks play a critical role in shaping consumers' purchase intention and willingness to pay for recycled products (Magnier et al. 2019). Empirical evidence demonstrates that perceived risks have exerted a negative effect on purchase intention

of recycled products (Hein 2022) and remanufactured products (Wang and Hazen 2016). With specific regard to recycled fashion accessories, Thi et al. (2024) found that perceived financial risks and quality risks negatively and directly affect consumers' purchase intention, whereas risks related to hygiene and aesthetics have a negative and indirect effect, mediated by attitude.

Based on the above considerations, we hypothesize that:

Hypothesis 3. *Perceived performance risks negatively influence consumer intention to purchase fashion accessories made of plant-based leather.*

Hypothesis 4. *Perceived general risks negatively influence consumer intention to purchase fashion accessories made of plant-based leather.*

With regard to the willingness to pay, existing evidence indicates that perceived risks reduce consumers' willingness to pay for recycled products. Specifically, the price that consumers are willing to pay for products containing recycled or reused materials is negatively influenced by perceived functional risks (Akkucuk 2011; Hamzaoui Essoussi and Linton 2010) and health risks (Akkucuk 2011). Thus, we hypothesize that:

Hypothesis 5. *Perceived performance risks negatively influence consumer willingness to pay a premium price for fashion accessories made of plant-based leather.*

Hypothesis 6. *Perceived general risks negatively influence consumer willingness to pay a premium price for fashion accessories made of plant-based leather.*

2.3 | Consumer Knowledge

When dealing with sustainability, transparency is a key issue for companies (Baldassarre and Campo 2016; Ezech and Dube 2025; Mol 2015; Schäfer 2023). Companies characterized by a high commitment toward sustainability can adopt a high-profile (transparent companies) or a low-profile (translucent companies) communication strategy (Baldassarre and Campo 2016). However, even for transparent companies, communication on sustainability characteristics of products may be characterized by different nuances. For instance, companies using vegetable leather, instead of animal leather, while explicitly declaring the type of material, may or may not emphasize that it is a pre-consumption waste, deriving from IS. Providing this piece of information may influence consumers' perceptions. Indeed, knowledge on the specific characteristics of green products, such as materials used and production processes, may influence consumers' perceptions related to product value and associated risks (e.g., Khan et al. 2022). Wang and Hazen (2016) find that green knowledge on remanufactured products positively influences perceived value, but its effect on perceived risks is not significant.

The reuse of waste as production inputs is recognized to generate substantial environmental benefits (Zhu and Chertow 2016). In the case of IS products, awareness that the product derives from waste can be expected to enhance consumers' perceived green utility.

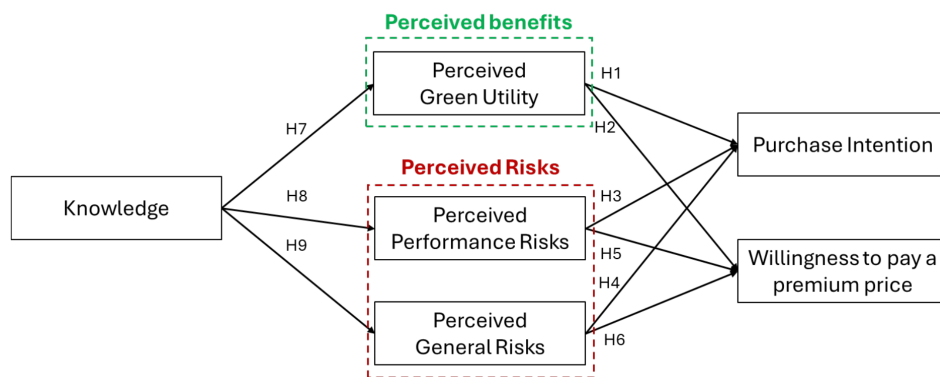


FIGURE 1 | Theoretical model of consumer behavioral intention toward fashion accessories made of plant-based leather.

However, this same awareness may also heighten perceived risks associated with the use of recycled materials. Prior research highlighted that recycled content in products can negatively influence consumers' perceptions of product quality (Abbey et al. 2017; Kuah and Wang 2020; Magnier et al. 2019; Sun et al. 2018), thereby increasing concern about performance-related risks. Further, consumers may also perceive other types of risks related to products made from waste: financial risks deriving from diminished perceptions of the product's value for money (Hamzaoui Essoussi and Linton 2010; Park and Lin 2020) as well as risks related to contamination and unsafety (Fraccascia et al. 2023; Magnier et al. 2019).

Hence, we hypothesize that:

Hypothesis 7. *Consumer knowledge that fashion accessories made of plant-based leather derive from IS increases perceived green utility.*

Hypothesis 8. *Consumer knowledge that fashion accessories made of plant-based leather derive from IS increases perceived performance risks.*

Hypothesis 9. *Consumer knowledge that fashion accessories made of plant-based leather derive from IS increases perceived general risks.*

Figure 1 displays the theoretical model of the consumer behavioral intention (in terms of purchase intention and willingness to pay a premium price) for fashion accessories made of plant-based leather as well as research hypotheses.

3 | Methods

3.1 | Study Design and Execution

Primary data were gathered via a survey conducted among Italian consumers from August to November 2024. To this end, a structured questionnaire (see Section 3.2) was developed and initially tested on a small group of consumers to verify the clarity of the items and estimate the time required for completion. The pretest resulted in minor revisions to the wording of several questions.

Specifically, two versions of the questionnaire were distributed, differing solely in the product description provided. For both

versions, consumers were provided with the following definition: "By fashion accessories made with plant-based leather, we mean accessories (e.g., bags, backpacks, wallets) that use, instead of traditional animal leathers, leathers obtained from plant-based raw materials, such as oranges, apples, grapes, and pineapple leaves." In the first version, there was just the above-mentioned definition, whereas in the second one, the following sentence was added to the definition: "These raw materials derive from industrial wastes of the food industry, such as production of fruit juice or wine."

The two versions of the questionnaire were then disseminated online using social media platforms and instant messaging applications, following approaches commonly employed in related research (e.g., Pivetti et al. 2020; Wei et al. 2021). Although this sampling method may introduce biases due to its non-probabilistic nature and limit generalizability, the considerable number of responses received helps to reduce such concerns (Atkinson and Flint 2001). To ensure data quality, an attention check item was embedded within the questionnaire, to verify the participants' attention during survey completion (Abbey and Meloy 2017). After excluding responses in which the attention check item was answered incorrectly, the final dataset consisted of 1259 completed questionnaires. As all items in the survey were mandatory, the dataset contained no missing values.

Regarding sample composition, males accounted for 32% of participants, whereas females represented 68%. The age distribution showed that 56% of respondents were under 35 years old, 9% were between 35 and 44 years, 13% ranged from 45 to 54 years, 17% were aged 55 to 65, and 4% were older than 65. Approximately 65% of the sample held at least a bachelor's degree. In terms of household net income, nearly 60% reported family income below 3000 euros monthly. Detailed socio-demographic characteristics of the sample are presented in Table 1.

3.2 | Questionnaire Structure

The questionnaire comprised multiple items designed to measure the following constructs: green perceived utility, perceived performance risks, general risks, purchase intention, and willingness to pay. Each construct was assessed using a multi-item 5-point Likert scale, ranging from 1 (*strongly disagree*) to 5

TABLE 1 | Sociodemographic characteristics of the sample.

	Frequency	Percentage
Gender		
Male	403	32.06%
Female	854	67.94%
Age		
18–24	344	27.37%
25–34	361	28.72%
35–44	116	9.23%
45–54	169	13.44%
55–65	212	16.87%
Over 65	55	4.38%
Education		
Middle school or lower	43	3.42%
High school	417	33.17%
Bachelor's degree	332	26.41%
Master's degree	432	34.37%
Doctorate	33	2.63%
Monthly household net income		
Less than €1500	199	15.83%
€1501–€3000	563	44.79%
€3001–€4500	285	22.67%
Over €4500	210	16.71%

(strongly agree). Specifically, *perceived green utility* was measured with six items (two out of six from Magnier et al. 2019 and Dangelico et al. 2024 and four out of six self-developed). *Perceived performance risks* was measured with five items (new scale, adapted from Dangelico et al. 2024 and integrated with Magnier et al. 2019); *perceived general risks* was measured with four items (adapted from Magnier et al. 2019); *purchase intention* was measured with three items (adapted from Alzubaidi et al. 2021). *Willingness to pay* a premium price was measured with three items (adapted from Khan et al. 2024). The survey ended with some questions about sociodemographic characteristics of respondents, as common in this kind of studies (Dangelico et al. 2022, 2021): gender (a dummy variable coded as 0 for male and 1 for female), age (from 1 = 18–24 to 6 = over 65), education (from 1 = middle school or lower to 5 = doctorate), and monthly household net income (from 1 = less than €1500 to 4 = over €4500).

Finally, the *knowledge* variable—reflecting whether consumers were knowledgeable that the raw materials used in the accessories derived from industrial wastes of the food industry—was modeled as dichotomous, coded with 0 for respondents who received the first version of the questionnaire and 1 for respondents who did receive the second version.

3.3 | Analytic Technique

To test our hypotheses, we employed a two-step procedure using AMOS 27.0. In the first step, the measurement model was evaluated and validated through confirmatory factor analysis (CFA). Subsequently, SEM was applied to test the hypotheses outlined in Section 2. Given the large sample size and the known sensitivity of the chi-square (χ^2) statistic to sample size, multiple additional fit indices were used to assess the overall model fit, including the comparative fit index (CFI), adjusted goodness-of-fit index (AGFI), normed fit index (NFI), Tucker–Lewis index (TLI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR) (e.g., Bagozzi 2010; Byrne 2016).

4 | Results

4.1 | The Measurement Model

A CFA was performed to test the measurement model. The model is made of five factors: green perceived utility, perceived performance risks, general risks, purchase intention, and willingness to pay. The fit indices show a good model fit: $\chi^2 = 472.63$ [df = 168] [$p = 0.000$], CFI = 0.982, AGFI = 0.953, TLI = 0.977, RMSEA = 0.038, SRMR = 0.031 (Byrne 2001; Hair et al. 2006). To assess the constructs' convergent validity and reliability, we employed several indicators: average variance extracted (AVE), Cronbach's alpha, and composite reliability (CR). Table 2 displays the results. All item loadings were above 0.50, and each construct demonstrated satisfactory reliability, with Cronbach's alpha coefficients surpassing 0.70. Similarly, both CR and AVE values exceeded the commonly accepted thresholds of 0.70 and 0.50, respectively. These results collectively indicate that all constructs meet the criteria for acceptable convergent validity and internal consistency (Hair et al. 2006; Nunnally and Bernstein 1994).

To evaluate discriminant validity, the criterion established by Fornell and Larcker (1981) was applied. Table 3 reports both the square root of the AVE for each construct and the corresponding inter-construct correlation matrix. Discriminant validity is supported, as the square root of the AVE for each construct exceeds the squared correlations with all other constructs, consistent with the guidelines proposed by Hair et al. (2006).

4.2 | The Structural Model

To test the structural model, the knowledge variable and the control variables (sociodemographic variables) were added to the measurement model; the hypothesized paths were included as well. Model fit indices indicated a good model fit ($\chi^2 = 933.860$ [df = 272] [$p = 0.000$], CFI = 0.961, AGFI = 0.928, NFI = 0.946, TLI = 0.954, RMSEA = 0.044, SRMR = 0.045) (Byrne 2001; Hair et al. 2006).

Table 4 displays the results of the structural model. Regarding the factors influencing PI, PGU is found to exert a positive effect on this variable, thereby supporting Hypothesis 1. Conversely,

TABLE 2 | Factor loadings, Cronbach's alpha, AVE, and CR for each factor.

Construct	Item	Standardized factor loading	Cronbach's alpha	AVE	CR
Perceived green utility (PGU)	I think that fashion accessories made with plant-based leather protect the environment	0.796	0.886	0.6382	0.9135
	I think that fashion accessories made with plant-based leather can effectively reduce pollution	0.849			
	I think that fashion accessories made with plant-based leather can contribute to protecting animal welfare	0.734			
	I think that fashion accessories made with plant-based leather can effectively reduce water consumption	0.786			
	I think that fashion accessories made with plant-based leather can effectively reduce the use of numerous chemicals	0.835			
Perceived performance risks (PPR)	I think that fashion accessories made with plant-based leather are healthy for those who use them (hypoallergenic and free from harmful chemicals)	0.788			
	I think that fashion accessories made with plant-based leather are less durable than those made with animal leather	0.736	0.861	0.6441	0.9000
	I think that fashion accessories made with plant-based leather require more frequent maintenance than those made with animal leather	0.727			
	I think that fashion accessories made with plant-based leather have a worse aesthetic appearance compared to those made with animal leather	0.856			
	I think that fashion accessories made with plant-based leather are less beautiful than those made with animal leather	0.844			
Perceived general risks (PGR)	I think that fashion accessories made with plant-based leather have a lower quality than those made with animal leather	0.840			
	There is a good chance I will make a mistake if I purchase fashion accessories made from plant-based leather	0.673	0.851	0.6844	0.8956
	I have a feeling that purchasing fashion accessories made from plant-based leather will really cause me lots of trouble	0.894			
	I will incur some risk if I buy fashion accessories made from plant-based leather in the next 12 months	0.837			
	The fashion accessories made with plant-based leather are a very risky purchase	0.886			

(Continues)

TABLE 2 | (Continued)

Construct	Item	Standardized factor loading	Cronbach's alpha	AVE	CR
Purchase intention (PI)	I intend to buy fashion accessories made with plant-based leather in the next future	0.918	0.928	0.8744	0.9543
	I will try to buy fashion accessories made with plant-based leather in the next future	0.945			
	I plan to buy fashion accessories made with plant-based leather in the next future	0.942			
Willingness to pay (WTP)	I am willing to pay more for fashion accessories made with plant-based leather rather than purchasing the same products at a lower price but made with animal leather	0.916	0.898	0.8305	0.9363
	I would like to buy fashion accessories made with plant-based leather, even if competing products made with animal leather had priced lower	0.910			
	I would be willing to pay a higher price for fashion accessories made with plant-based leather due to the environmental benefits of these leathers	0.908			

TABLE 3 | Correlation matrix. The main diagonal displays the squared root of the AVE, in bold.

	PGU	PPR	PGR	PI	WTP
PGU	0.941				
PPR	−0.211	0.928			
PGR	−0.237	0.434	0.922		
PI	0.455	−0.260	−0.262*	0.963	
WTP	0.460	−0.272**	−0.234	0.558	0.948

* $p < 0.05$.** $p < 0.01$.*** $p < 0.001$.

TABLE 4 | Results of the structural model.

Paths	Standardized coefficients	Outcome
KNOWLEDGE → PGU	0.079**	Hypothesis 7 supported
KNOWLEDGE → PPR	0.090	Hypothesis 8 not supported
KNOWLEDGE → GR	0.067	Hypothesis 9 not supported
PGU → PI	0.577***	Hypothesis 1 supported
PPR → PI	−0.142***	Hypothesis 3 supported
GR → PI	−0.088**	Hypothesis 4 supported
AGE → PI	0.066***	
GENDER → PI	0.243***	
EDUCATION → PI	0.071***	
INCOME → PI	−0.006	
PGU → WTP	0.732***	Hypothesis 2 supported
PPR → WTP	−0.206***	Hypothesis 5 supported
GR → WTP	−0.027	Hypothesis 6 not supported
AGE → WTP	0.025	
GENDER → WTP	0.201***	
EDUCATION → WTP	0.087***	
INCOME → WTP	0.028	

** $p < 0.01$.*** $p < 0.001$.

PI is negatively affected by PPR and GR; hence, Hypotheses 3 and 4 are supported. With respect to the determinants of WTP, PGU is found to have a positive effect on this variable, thus supporting Hypothesis 2, whereas PPR exhibits a negative effect,

thus supporting Hypothesis 5. GR is not found to be significant; thus, Hypothesis 5 is not supported. Regarding the role of knowledge, it is found to positively influence PGU, whereas its effect on both PPR and GR is not significant; accordingly, Hypothesis 7 is supported, whereas Hypotheses 8 and 9 are not supported. Turning to the sociodemographic variables, PI is positively affected by gender—being females more willing to purchase the product—age, and education. WTP is positively affected by gender—with females being more willing to pay a premium price—and education.

5 | Discussion

With reference to RQ1 (*Which are the determinants of the consumer's behavioral intentions toward fashion accessories made of plant-based leather?*), our study highlights that the perception of the product's green utility is the main determinant of purchase intention and willingness to pay for fashion accessories made of plant-based leather, whereas perceived risks have a negative but weaker effect—specifically both performance and general risks on purchase intention and performance risks on the willingness to pay.

Regarding the perceived benefits, these findings align with prior research demonstrating that consumer awareness of a product's environmental benefits positively influences purchase intention across various product categories, such as electric vehicles (Zhao et al. 2024), green cosmetics and personal care products (Suphasomboon and Vassanadumrongdee 2022), sustainable beer (Dangelico, Fraccascia, and Strazzullo 2024), and products derived from IS (Dangelico et al. 2025). These results also align with prior research showing that when consumers are informed about the environmental benefits of circular products—especially when the information is third party verified—the willingness to pay tends to increase (Pretner et al. 2021). With regard to perceived risks, the findings are consistent with previous studies showing that such risks negatively affect both consumers' purchase intentions and willingness to pay a premium price for recycled and remanufactured products (Akkucuk 2011; Hamzaoui Essoussi and Linton 2010; Hein 2022; Wang and Hazen 2016). With specific regard to the fashion industry, this study results indirectly support previous evidence that perceived value positively influences purchase intention of green apparel (Pandey and Yadav 2023).

With respect to sociodemographic characteristics, the present study indicates that age, gender, and educational attainment can exert a significant effect on purchase intention. Notably, the positive association between age and purchase intention observed in this study contrasts with several prior studies, which generally suggest that older individuals may exhibit lower intentions to purchase sustainable products (e.g., Dangelico, Ceccarelli, and Fraccascia 2024)—with specific studies conducted on sustainable fashion products (e.g., Schiaroli et al. 2025; Teerakapibal and Schlegelmilch 2024)—as well as a reduced propensity to engage in sustainable behaviors more broadly (e.g., Sogari et al. 2025). However, the literature is not unanimous on this point and presents rather mixed findings. Indeed, other studies indicate that age may not be a relevant factor in shaping

consumers' purchase intention. The impact of age on purchase intention may depend on several factors, such as the specific product/material under investigation (e.g., Dangelico et al. 2022 for sustainable fashion products made of different materials) and the country of origin of the respondents (e.g., Schiaroli and Fraccascia 2026). In contrast, the observed positive effect of gender aligns with a substantial body of literature indicating that female consumers tend to demonstrate significantly higher purchase intention for sustainable products compared to their male counterparts (e.g., Baier et al. 2020; Fraccascia et al. 2023; Liobikienė et al. 2017; Schiaroli et al. 2025). However, a different viewpoint is provided by Dangelico et al. (2022), who highlights that the effect of gender on purchase intention for sustainable garments depends on the type of sustainable materials. Finally, the positive relationship between education level and purchase intention is consistent with previous findings, particularly those focused on sustainable fashion consumption (Dangelico et al. 2022; Park and Lin 2020). For instance, Dangelico et al. (2022) found that education positively affects purchase intention of sustainable garments, regardless of the type of material used (recycled, organic, or alternative vegetable matter). With respect to the impact of sociodemographic characteristics on the willingness to pay, female respondents demonstrated a greater willingness to pay a premium price than men. This result is consistent with prior research suggesting that women are generally more inclined than men to pay extra for products with environmentally friendly attributes (Dangelico et al. 2022; De Medeiros et al. 2016; Fraccascia et al. 2023; Vecchio and Annunziata 2015). With specific regard to sustainable clothing, Nguyen et al. (2025) found that the effect of gender on the willingness to pay a premium for bio-based clothing is ambiguous, whereas Dangelico et al. (2022) highlighted that female consumers display a higher willingness to pay for clothing made of organic materials or alternative vegetable matter, whereas gender does not affect the willingness to pay more for clothing made of recycled materials.

The positive effect of educational attainment on the willingness to pay more aligns with prior research, which has identified a correlation between higher education levels and increased willingness to pay for sustainable products (Li et al. 2017). In the fashion domain, Nguyen et al. (2025) highlighted that consumers with higher income and education levels are more willing to pay premiums for bio-based clothing, whereas Dangelico et al. (2022) found that consumers' education level does not affect the willingness to pay for sustainable clothing, regardless of the material type.

With reference to RQ2 (*Which is the effect of informing consumers that a fashion accessory made of plant-based leather derives from industrial waste?*), results indicate that providing information about the use of industrial waste in the production of fashion accessories enhances the consumers' perception of the product's environmental benefits, without significantly increasing the perceived risks. Consequently, this information indirectly boosts both purchase intention and willingness to pay a premium for these products.

The increase in the perceived environmental benefits means that consumers value a product made from eco-friendly materials more useful for the environment when these natural materials derive from waste. Indeed, the benefits of IS practices

are twofold: On the one hand, IS contributes to a reduction in the consumption of virgin raw materials; on the other hand, it leads to a decrease in the volume of waste requiring disposal (Domenech et al. 2019; Martin et al. 2015). The nonsignificant effect of knowledge on perceived risks contrasts with previous studies that have found products made with waste materials to be associated with a higher consumers' perception of risks. Specifically, previous research indicates that such products often evoke greater concerns related to quality risks (e.g., Abbey et al. 2017; Kuah and Wang 2020; Magnier et al. 2019; Sun et al. 2018), financial risks related to a reduced perception of the product's value for money (e.g., Hamzaoui Essoussi and Linton 2010; Park and Lin 2020), and safety and contamination risks (Fraccascia et al. 2023; Magnier et al. 2019). This counterintuitive result suggests that consumer behavior toward IS products may have distinctive features compared to other circular products and that the type of materials and the origin of the waste may affect consumers' perceptions and their behavioral intention toward green products deriving from waste. In this study, waste was natural and derived from the agricultural industry (leather obtained from plant-based raw materials, such as oranges, apples, grapes, and pineapple leaves), which may have reduced the negative effect of the information on the consumer's risk perceptions. Different effects may be found for other types of waste, particularly those without a natural origin such as plastics, metals, or textile and/or that come from the post-consumption phase, such as in the case of ocean plastics (e.g., Magnier et al. 2019). These products may be perceived as having higher safety and contamination risks. Also, the type of product may explain the counterintuitive result. Indeed, this study focused on fashion accessories, which may be associated with lower performance risks compared to other categories of products, such as technological ones (for instance, Fraccascia et al. 2023 focused on electronic products). Another potential explanation for this finding is that, as CE concepts and sustainable manufacturing practices gain wider acceptance, consumers might be more likely to see these products as innovative instead of risky.

6 | Conclusions

6.1 | Implications

This study is highly innovative in the landscape of sustainable consumer behavior research and has several implications for scholars and practitioners.

As to the **theoretical implications**, this study contributes to the literature on the determinants of consumer behavior for sustainable products in general (e.g., Ogiemwonyi 2024; Syed et al. 2024; Testa et al. 2021), with specific regard to sustainable fashion (Khan et al. 2023; Schiaroli et al. 2024) and to IS products (stream of literature that is still at its infancy) (Dangelico et al. 2025; Dangelico and Fraccascia 2025; Fraccascia et al. 2023). Furthermore, this study advances the theoretical understanding of sustainable fashion consumption by shifting the analytical focus from clothing—traditionally the central object of investigation (e.g., Schiaroli et al. 2024)—to fashion accessories, a category that has received markedly less scholarly attention.

To the best of our knowledge, this is the first study to investigate whether explicitly informing consumers that a green product is derived from industrial wastes affects purchasing behavior, with a particular focus on how such information influences the determinants of purchase intention. Indeed, the few existing studies focusing on green products derived from IS (Dangelico et al. 2025; Dangelico and Fraccascia 2025; Fraccascia et al. 2023) are limited to investigating consumers' perceptions and the determinants of purchase intention for these products, without explicitly considering the role of information disclosure. On the contrary, through its experimental design, this study allows us to understand the differential effect on consumer behavioral intention of providing the information that a green product is not “just” a sustainable product but that it is a specific type of green product, deriving from IS. Thus, the results of this study have important implications for scholars investigating sustainable consumer behavior.

First, this research contributes to a deeper understanding of the rational explanations of sustainable consumer behavior—which posits that consumers evaluate benefits and risks linked to the product purchase (Belz and Peattie 2012)—highlighting that the positive effect of the perceived green utility overcomes the negative effect of perceived risks, on both purchase intention and willingness to pay for sustainable fashion accessories. *Second*, our results highlight that, in sustainable consumer behavior studies, green products derived from IS should be treated separately from other types of circular products (recycled, reused, remanufactured, or refurbished). *Third*, this study findings, along with comparisons to prior research, indicate that the product category, the type of materials (even within the same industry, i.e., fashion), and the origin of the waste should be carefully taken into account in the research design and theoretical considerations. *Fourth*, although our findings largely corroborate those of previous studies, they also reveal a distinct effect of age on the purchase intention of sustainable fashion accessories made of vegetable leather, thereby highlighting the nuanced role of sociodemographic variables. This may suggest that also the influence of sociodemographic variables on sustainable consumer behavior may be dependent upon the specific category and characteristics of the considered sustainable products. *Finally*, this study contributes to the literature on transparency in sustainability marketing and to the emerging body of literature on the phenomena of green blushing and greenhushing (e.g., Falchi et al. 2022; Font et al. 2017; Guercini et al. 2025; Hilton 2025; Wren Montgomery et al. 2026). This stream of research remains relatively underdeveloped. The article offers an original contribution by examining a concrete case in which a firm may choose not to emphasize some characteristics of its sustainable products. Specifically, it investigates the potential effects of additional information disclosure (i.e., emphasizing that a green material derives from industrial waste) and reflects on the effectiveness of such a policy. Results suggest that full transparency is a better strategy than green hushing or greenblushing.

In terms of **managerial implications**, this study's results are useful to give directions for managers of companies developing and marketing sustainable accessories made with plant-based leather.

The significant role of perceived green utility in enhancing both purchase intention and willingness to pay a premium

price underscores the importance for companies to highlight the environmental benefits of their products in marketing and communication strategies. These efforts should encompass all aspects of communication, including advertising, point of sale, and packaging (Nadeem et al. 2025). Third-party verified ecolabels, as well as collaborations with partners having a good reputation and environmental expertise—such as universities, research centers, and NGOs—would increase consumers' trust in products' environmental benefits.

The negative effect of risks on consumers' behavioral intentions highlights that companies should actively reassure consumers about the quality and the performance of sustainable accessories made of plant-based leather. This can be achieved by designing and positioning such products as offering performance that is at least equivalent to that of conventional alternatives. To this end, companies may reduce the perceived risk by providing detailed information regarding the origin and processing of plant-based materials. Moreover, leveraging social media platforms to educate consumers about the production processes of plant-based leather and its viability as an alternative to conventional materials may further alleviate perceived risks. Finally, companies could reduce such risks by offering satisfaction guarantees or flexible return policies, thereby enhancing consumer confidence in sustainable fashion accessories.

The positive effect of knowing that a product derives from waste on the perceived green utility (and, thus, on the purchase intention and the willingness to pay) for sustainable accessories made of plant-based leather suggests that companies using waste deriving from IS practices should emphasize that in their communication, adopting a completely transparent approach on the full range of sustainability characteristics of their products.

The significant effects of sociodemographic characteristics on purchase intention and on the willingness to pay a premium price suggest adopting a differentiated targeting approach, characterized by a specific marketing mix for each segment. Because women emerged to have a greater purchase intention and willingness to pay more, they should be the primary target of companies developing fashion accessories with plant-based leather. At the same time, companies should look for ways to make male consumers more interested and involved in such a type of product.

6.2 | Limitations and Future Research Directions

This research has some limitations. First, because consumers' perceptions may vary based on the type of material, its origin, and the category of product, the generalizability of this study's results is limited. Companies belonging to other sectors and/or using other types of waste are encouraged to rely on (if already available) or conduct market research on consumer perceptions referring to specific combinations of material type, material origin, and product category.

Second, the sample characteristics also limit the generalizability of results. Our study indeed involved a non-probabilistic convenience sample of Italian consumers. Nevertheless, the large sample size increases the precision of the estimates by

reducing random error (Atkinson and Flint 2001). The sample presents a high proportion of young, educated women. This category of consumers is likely to place greater emphasis on sustainability in their fashion consumption choices compared to other groups (e.g., Schiaroli et al. 2024). Specifically, the composition of the sample may have amplified the positive impact of perceived green utility on purchase intention and willingness to pay for plant-based leather products. Moreover, because the study was conducted among Italian consumers, their perceptions of fashion and sustainability may have influenced the responses. Indeed, Italy possesses a deeply rooted fashion tradition (Cappelli et al. 2019) and ranks among the leading European nations in terms of expenditure on fashion products.⁶ Consequently, the findings could vary in other cultural contexts where fashion holds different meanings or levels of significance. Further research is required to replicate this study using a more representative sample of the population and to conduct cross-country replications in order to examine the influence of cultural factors on the observed relationships.

As discussed above, the effect of proving to consumers the information about the waste nature of the eco-friendly materials may be dependent upon the type of materials and the type of industry that produced them as well as upon the product category. Thus, an interesting research avenue would be testing the developed model, with an experimental design, for different combinations of materials, industries, and product categories. This would allow researchers to understand the effect of each of these factors on consumers' perceptions of green utility and risks related to the product, so as to determine specific combinations of them for which it is convenient to emphasize in the communication activities that the product derives from waste.

Further, longitudinal studies are encouraged to analyze how consumers' perceptions, intentions, and their determinants change while sustainable products made of innovative materials deriving from industrial waste progressively become increasingly widespread in the market and known by consumers.

Finally, this study focuses on the rational perspective to explain sustainable consumer behavior. Future research could be devoted to investigating whether and how the answers to this study's research questions change when taking into account other perspectives of sustainable consumer behavior.

We hope that this study, by contributing to more deeply understanding consumer behavior toward products made from waste and IS practices, will help to move toward more circular production and consumption patterns, contributing to the UN SDG 12.

Acknowledgments

We acknowledge the financial support provided by the National Recovery and Resilience Plan (NRRP), Mission 4 Component 2 Investment 1.3 – Call for tender No. 341 of 15/03/2022 of the Italian Ministry for Universities and Research funded by the European Union – NextGenerationEU, Award Number: PE00000004, Concession Decree No. 1551 of 11/10/2022 adopted by the Italian Ministry for Universities and Research, CUP D93C22000920001, MICS (Made in Italy – Circular and Sustainable).

Funding

This work was supported by the Italian Ministry for Universities and Research (PE00000004 and D93C22000920001).

Endnotes

¹ <https://www.deloitte.com/us/en/insights/industry/retail-distribution/consumer-behavior-trends-state-of-the-consumer-tracker/sustainable-products-customer-expectations.html>.

² <https://www.kazmok.com/>.

³ <https://isolanti.maiano.it/recycletherm-km0/>.

⁴ The terms “vegetable leather” and “biobased leather” are also commonly used as synonyms for “plant-based leather.”

⁵ The notion of perceived safety refers to the extent to which individuals regard a product as non-threatening or risk-free (e.g., Wang and Tsai 2019).

⁶ <https://fashionunited.it/statistics/statistiche-moda-italia>.

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