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Supply Chain Transparency in the Cosmetics/Beauty Industry and Its Influence on Consumer Trust and Perception

Asrita Yelisetti

ABSTRACT

The cosmetics and beauty industry is rapidly evolving, and with it, marketing practices are evolving too. This industry has transformed in recent years, with sustainability becoming a widespread concern for consumers and corporations alike. This same concern has been utilized as a marketing technique by brands across the industry. Current research has examined the effects and accuracy of this new form of marketing, but a gap remains regarding its use in sustainable supply chain claims. Brands often claim to follow sustainable sourcing, transportation, packaging, or distribution practices, all of which are supply chain functions. Yet, little research has examined the effects of these claims on consumer and brand perception, particularly in the U.S. market. This paper examines how brands communicate their sustainable supply chain practices and how consumers report trusting and interpreting sustainability claims. The study was conducted with a literature review, content analysis of brand communications, and consumer survey of 102 respondents. The survey measured general attitudes toward sustainability claims rather than responses to the specific communications analyzed. Results showed that the importance of sustainability was positively associated with trust damage from misleading claims ($\rho = 0.50$, $p < 0.001$), and that both claim discernment ($\rho = 0.50$, $p < 0.001$) and greenwashing exposure ($\rho = 0.47$, $p < 0.001$) were positively associated with trust in independent sources over brand marketing. All three associations remained significant after correction for multiple testing, although they rest on limited variation in responses and should be interpreted with caution. Claim discernment was not significantly associated with trust in clear communication, although 98.8% of respondents reported trusting brands more when they clearly explain their supply-chain practices. Certification credibility was not significantly associated with its outcome measure, and greenwashing exposure showed only a weak, non-significant negative association with perceived alignment between brand's claims and practices. The findings also suggest that consumers interpret "ethical sourcing" unevenly: most it associated it with environmental protection, animal welfare, fair wages and natural ingredients, and nearly half with certifications, but very few associated it with supply-chain traceability, community benefit, or child labor practices, although this result is treated exploratory.

Keywords: *Supply Chain, Sustainable Beauty, Brand Perception, Sustainability Marketing*

INTRODUCTION

As the cosmetics/beauty industry expands rapidly, sustainability-oriented products are growing with it. Environmental concerns have become widespread among consumers worldwide (Dwivedi et al. 2025; Mamta & Prakash 2025). Yet, this growth has led consumers to view sustainability claims with skepticism and distrust rather than trust (Suphasomboon & Vassanadumrongdee 2025; Persakis et al. 2025). Greenwashing is a marketing practice in which companies spend more time promoting their eco-friendliness than on actually minimizing their environmental impact (Suphasomboon & Vassanadumrongdee 2025; Peraskis et al. 2025). Perceived greenwashing is a consumer's perception that a brand's environmental claims are exaggerated or misleading (Nyilasy et al. 2014).

When consumers believe that a company is partaking in greenwashing, it directly shapes their behavior (Nguyen et al. 2019; Utami et al. 2022). It becomes a barrier to the credibility of sustainability marketing, and as brands increasingly rely on sustainability to stand out, understanding its impact on consumer trust is essential (Peyton & Purwanegara 2023; Oe & Yamaoka 2022). Much of consumer skepticism centers on the lack of communication in regards to the supply chains of these products, which is at the root of a brand's sustainability practices (Peyton & Purwanegara 2023; Holloway 2024). Some supply chain functions include sourcing, transportation, manufacturing, and waste management (Salsabila et al. 2025; Leskinen 2020; Bom et al. 2019). Yet, existing research on consumer trust in sustainable cosmetic/beauty brands is extremely broad, rather than isolating supply-chain processes as an area of study (Suphasomboon & Vassanadumrongdee 2025; Hameed & Waris 2018; Oe & Yamaoka 2022).

This study seeks to examine how cosmetic and beauty companies communicate their supply chain sustainability practices to consumers and how this influences the credibility of their sustainability claims and consumer trust in the brand. Specifically, this study examines three connected questions: how brands communicate supply-chain sustainability practices, how consumers interpret those communications, and how those interpretations relate to consumer trust. This question is framed to understand how communication and sustainability messaging regarding sourcing, traceability, and other supply chain practices ultimately shape consumer perception and trust. To address this, the study tests six hypotheses examining trust in clear communication, certification credibility, greenwashing exposure, sustainability importance, claim discernment, and trust in independent sources. H1 and H2 examine whether claim specificity relates to trust in brands that communicate clearly, and whether trust in independent sources relate to the perceived credibility of third-party certifications. H3 examines whether greenwashing exposure relates to perceived alignment between brands' claims and practices. H4 examines whether sustainability importance relates to trust damage from misleading claims. H5 and H6 examine whether claim discernment and greenwashing exposure relate to trust in independent sources over brand marketing.

This study uses a mixed-methods approach combining a literature review, a content analysis of brand websites and social media posts, and a survey of 102 consumers, each described in detail in the Research Methodology section.

This study contributes to existing academic knowledge by examining how cosmetic/beauty companies specifically communicate supply chain sustainability practices to consumers and by examining how consumers perceive the credibility of sustainability claims and their trust in brands (Oe & Yamaoka 2022; Suphasomboon & Vassanadumrongdee 2025). The study examines current marketing practices and content produced by companies in this sector and considers this data alongside customer data that measures consumer perceptions of these practices, products, and brands. Existing research in this area tends to isolate either the company's operations or the consumer side of sustainability communication, instead of considering the relationship between the two (Leskinen 2020; Peyton & Purwanegara 2023). Research in this space is also frequently conducted outside of the U.S. market, with a heavy concentration in Europe, Indonesia, Thailand, and Brazil (Martins et al. 2025; Costa et al. 2026; Leskinen 2020; Salsabila et al. 2025; Oe & Yamaoka 2022; Barbosa et al. 2026). This study directly addresses these gaps by examining the sustainability communication of brands in the U.S. market, using a consumer sample recruited through a U.S.-based personal network.

The findings of this study will be significant for multiple groups. For brands and marketing executives, the study offers insight into which perceptions of supply-chain sustainability communication are associated with credibility and trust. For consumers, the findings may help them recognize credible sustainability communication looks like, and they'll be able to distinguish it from general marketing language primarily designed to influence purchasing behavior. For policymakers, the findings will support ongoing discussions on sustainability labeling. Beyond industry-specific impacts, this study also addresses the broader issue of greenwashing's impact on environmental progress. If a company's sustainability communication doesn't build genuine credibility, it may be less incentivized to pursue more expensive sustainable practices (Sajeev 2024).

LITERATURE REVIEW

This literature review integrates research on sustainable cosmetics, greenwashing, sustainability certifications, supply-chain operations, and consumer trust (Table 1). The search procedure is described in the Research Methodology section. Throughout this literature review, several persistent themes emerged, structuring the review. The following sections will examine these themes thoroughly.

Table 1: Summary of Selected Literature Reviews

Study	Methods	Country / Global	Factors	Findings
Martins et al. (2025)	Qualitative	Europe	● Sustainability ● Upcycling ● Cosmetics ● Circular economy	● The cosmetic industry is shifting towards sustainability ● Upcycling and sustainable ingredient sourcing play a key role in this ● Sustainable cosmetics are expected to reach $ 326 billion, reflecting shifting customer values. The upcycling circular model reduces waste by reusing, repairing, refurbishing, and recycling materials ● Companies are reducing emissions through energy-efficient processes, conserving water through recycling systems, optimizing resources, and implementing circular approaches ● Packaging and distribution play a key role in sustainability, and brands are also using recycling and refill programs ● High cost of natural ingredients is a barrier due to constrained supply chains and packaging
Costa et al. (2026)	Qualitative	Europe	● Certifications ● Circular Economy ● Cosmetics ● Sustainability	● Sustainability certifications & tools became useful, but widespread use is causing concerns about greenwashing ● Companies face a lot of scrutiny due to resource depletion, pollution, biodiversity loss, and ethical supply chain violations for materials like mica and palm oil; thus, certifications are used, and sustainability must be embedded in

				operations ● Major shortcoming of certification is selective emphasis and not enough consideration of packaging recyclability, pollution during product use, or post-consumer waste + fair wages, indigenous people's rights, and gender equity ● COSMOS, NATRUE, RSPO, Fair for Life, C2C, USDA, B.Corp, Carbon Trust, EU Ecolabel, Leaping Bunny, EWG, Fairtrade, ISO 16128 and ISO 22715, PETA and more are some sustainability certifications ● Labels cover a limited dimension of sustainability ● Sustainability instruments in the cosmetics industry are fragmented ● Companies should shift towards integrated and evidence-based sustainability approaches
Salsabila et al. (2025)	Quantitative	Indonesia	● Cosmetics & Beauty ● Environment ● NRBV ● Sustainable supply chain (SSC)	● Sustainable supply chain practices are measured through the extent of sustainable procurement, warehousing, product design, energy, transportation, reverse logistics, and sustainable waste management ● Sustainable product design has the opportunity to increase customer confidence in the company and boost corporate image ● Hypothesized that the effectiveness of green SCM can be increased by conducting sustainable procurement, green production, being concerned w/ environment by optimizing energy, and conducting waste recovery and treatment activities to

				reduce pollution ● Sustainable transportation and logistics also play a major role ● Major finding: sustainable waste management plays a big role in corporate image
Leskinen (2020)	Qualitative	Finland	● Sustainability ● Value chain ● Circular economy ● Cosmetics	Sustainability & circular economy are steadily growing in the cosmetics industry ● Companies must evaluate sustainability across the whole value chain (economic, environmental, social dimensions), not in isolation ● Circular economy in cosmetics is centered around sourcing, carbon-neutral and water-smart production, and recyclable packaging
Peyton & Purwanegara (2023)	Qualitative	Global	● Sustainable beauty ● Product purchase ● Barrier to buy ● Supply Chain Transparency	● There are six barriers to buying sustainable products: product suitability, high price, brand trust, product quality, supply chain, and product hygiene ● Low brand trust is tied to greenwashing skepticism ● Customers expect higher performance for higher prices, but higher performance isn't always there ● Untraceable supply chains heighten skepticism ● Firms could build credibility through green alliances
Oe & Yamaoka (2022)	Quantitative	Thailand	● Product quality ● Ethical sourcing	● High quality, communicating sustainability, and ethical behavior of products are all interrelated, and all lead to results in brand loyalty

			● Ethical behavior of producers ● Brand loyalty	● CSR has a direct impact on brand perception, but CSR without transparency isn't as effective
Barbosa et al. (2026)	Literature Review	Brazillian	● Sustainability/green cosmetics ● Biodiversity-based sourcing ● Certification ● Circular economy	● Brazilian sustainability model built on three pillars: traceability/certification, community partnerships, and biotechnology-driven innovation ● Brazil's cosmetic exports surpassed U.S. $300 million, which positioned sustainability as a competitiveness driver

SUMMARY OF LITERATURE REVIEW

Theme 1 - Sustainable Supply-Chain Practices & Circular Economy

Several studies in the literature review establish that sustainability in the cosmetics industry centers on supply-chain practices rather than just isolated product features (Martins et al. 2025; Salsabila et al. 2025; Leskinen 2020). Upcycling and sustainable ingredient sourcing are central to the industry's shift toward circularity, as brands reduce waste through reuse and recycling (Martins et al. 2025; Bom et al. 2019). Water and energy are also optimized with recycling systems (Martins et al. 2025). Some studies argue that sustainability should be evaluated across the entire value chain rather than in isolation for individual practices (Leskinen 2020; Acerbi et al. 2023). This is backed by quantitative evidence showing that sustainable supply-chain practices strengthen a company's image (Salsabila et al. 2025; Shekari & Ghatari 2013). Together, these studies establish that sustainability in cosmetics is rooted in supply-chain practices. However, they focus on how these practices are built and implemented, rather than how they are communicated to consumers and how that communication is perceived.

Theme 2 - Certification, Labeling, and the Limits of Credibility Signals

Current research also explores the impact of sustainability certifications and eco-labeling on consumer-perceived credibility. Certification schemes have been widespread tools for signalling sustainability, but their proliferation has led to fragmentation, selective emphasis, and inconsistent coverage of key issues such as packaging and labor practices (Costa et al. 2026). Research shows that eco-labels directly increase eco-conscious consumer behavior, but this effect is mediated by green trust and environmental concern (Hameed & Waris 2018). One of these studies criticizes certification, arguing that its fragmentation renders it useless (Costa et al. 2026), while others view it as driving market competition (Barbosa et al. 2026). Collectively, this research suggests that certifications are an

inconsistent credibility signal whose effect depends on trust consumers already hold. It doesn't examine if consumers who rely more on independent sources also find certifications more credible.

Theme 3 - Greenwashing Perception & Consumer Trust

A third theme examines how consumers respond to sustainability claims that raise skepticism. Supply-chain transparency and brand trust were identified as two major barriers to purchasing sustainable beauty products, highlighting how untraceable supply chains heighten consumer skepticism and how low brand trust is closely tied to perceptions of greenwashing (Peyton & Purwanegara 2023; Nguyen et al. 2019). Product quality, communicated sustainability, and producers' ethical behaviors are interrelated and can predict brand loyalty, but marketing sustainability without transparency does not produce the same effect (Oe & Yamaoka 2022; Sajeev 2024). Greenwashing research also treats vagueness as a deliberate marketing strategy, as vague claims allow brands to imply sustainability without offering anything consumers can verify (Suphasomboon & Vassanadumrongdee 2025). However, current studies tend to treat consumers as a homogeneous group, rather than examining whether greenwashing affects some consumers more than others, or whether it changes where consumers turn for trustworthy information.

This study broadens research on consumer trust by examining how brands present supply-chain claims through visual and numerical marketing. It extends the focus on sustainable supply-chain practices by examining not only how they're built but also how they're communicated. It addresses the credibility limitations caused by certifications by examining the alignment between claims and practice and whether consumers' trust in independent sources shapes how credible they find third-party certification. It broadens research on consumer trust by specifically examining company-side communication decisions that benefit the company. It also examines whether the impact of greenwashing on trust depends on how much a consumer values sustainability, and whether claim discernment and exposure to greenwashing are associated with consumer trust toward independent sources. Given that sustainability claims are becoming commonplace in the cosmetics industry but are met with skepticism (Suphasomboon & Vassanadumrongdee 2025; Martins et al. 2025; Phan & Nguyen 2026), understanding how supply chain communication shapes credibility and trust is essential for both brands seeking to build genuine consumer trust and consumers seeking to evaluate sustainability claims accurately.

Despite extensive research on sustainable supply-chain practices, sustainability certifications, and consumer trust, few studies have yet examined the relationship among these three factors (Holloway 2024; Charalampidis et al. 2023). This study examines not only how companies communicate their sustainability practices but also how that communication shapes consumer perception. Future research should examine how these dynamics vary across brand size.

HYPOTHESIS DEVELOPMENT

Two established theories organize the six hypotheses tested. The first is signaling theory, which explains how one party conveys information about qualities that another cannot directly observe (Spence 1973;

Connelly et al. 2011). Consumers cannot see a brand's supply chain, so sustainability claims act as signals of hidden practices. A signal is credible when it is costly or if it's difficult to fake and can be verifies. Vague claims are cheap to make, and thus are weak signals, while specific details and independent third-party certifications can be stronger ones (Connelly et al. 2011). Signaling theory thus bears on H1, which examines whether consumers who can differentiate vague claims from specific ones place more trust in brands that communicate clearly, and H2 which examines if trust in independent sources is associated with perceived credibility of third-party certifications.

The second is the Persuasion Knowledge Model (Friestad & Wright 1994), which holds that consumers develop knowledge about the tactics used by marketers, and that once they recognize a persuasion attempt, they reinterpret it and discount it, and will look for other sources of information. Experience with misleading claims, and the ability to spot vague ones are both forms of persuasion knowledge. The model thus predicts that greenwashing exposure lowers consumers' belief that brands' claims reflect their practices (H3), that consumers who rely mostly on sustainability claims are those who are most motivated to scrutinize them and react strongly if they are misleading (H4), and that both claim discernment (H5) and greenwashing exposure (H6) shift trust from brand marketing toward independent sources.

Throughout this paper, the "greenwashing framework" refers to research on perceived greenwashing, a consumer's perception that a brand's environmental claims are exaggerated or misleading (Nyilasy et al. 2014; Suphasomboon & Vassanadumrongdee 2025), interpreted through these two theories.

The themes from the literature review, and the theoretical framework above, shape these six hypotheses aimed at understanding the relationship between supply-chain sustainability claims and consumer trust in the cosmetics and beauty industry.

A recurring theme in the relevant literature is that vague sustainability claims are associated with consumer skepticism, whereas specific, verifiable claims boost consumer trust. (Peyton & Purwanegara 2023; Suphasomboon & Vassanadumrongdee 2025; Orazi & Chan 2020). The content analysis reinforces this, as brands often utilize images of their ingredients and emotionally persuasive imagery in their online marketing. Additionally, the role of third-party verification has been revealed to be ineffective, as their credibility is inconsistent **(**Costa et al. 2026). Consumers must already trust eco-labeling for third-party verification to be effective (Hameed & Waris 2018; Gorton et al. 2021). The certification alone is not enough to build consumer trust. Beyond that, the literature review and content analysis reveal a misalignment between brands' claims and their actual practices, commonly referred to as greenwashing. This perceived gap leads to a direct decline in brand trust (Utami et al. 2022).

H1: Claim Discernment & Trust in Clear Communication

Supply-chain sustainability claims range from vague statements such as "ethically sourced" to detailed ones that name specific regions or percentages of recycled materials. Consumer trust refers to how credible a consumer finds a brand's sustainability communication. Vagueness is often a common sign of

greenwashing since vague claims are easy to make without supporting evidence (Suphasomboon & Vassanadumrongdee 2025). Specificity is what separates an accurate claim from a marketing tactic (Orazi & Chan 2020). Untraceable supply chains are a direct barrier to purchase because customers cannot verify the claim (Peyton & Purwanegara 2023). Certifications suffer a similar problem when they aren't specific to one aspect of sustainability (Costa et al. 2026). This suggests that when a brand uses concrete details rather than vague language, consumer trust increases, indicating that specificity is positively associated with consumer trust. If specificity matters to trust, consumers who are more confident in recognizing specific claims should also place more trust in brands that communicate clearly.

H1: Consumers' ability to distinguish specific from vague sustainability claims is positively associated with their trust in brands that clearly explain their supply-chain practices.

H2: Certification's role in trust

Perceived certification credibility refers to the extent to which consumers trust third-party labels such as Fair Trade, COSMOS, and B Corp. Source trust refers to whether people trust an independent source more than a brand's own marketing. Eco-labels have a positive impact on eco-conscious behavior (Adhikari et al. 2026), but eco-conscious behavior is not directly caused by eco-labeling. Instead, it activates existing environmental concerns among customers (Hameed & Waris 2018). Certification systems are fragmented and inconsistent; thus, the labels aren't always a perfect signal (Costa et al. 2026). The value of certification depends on the customer's beliefs about the certification's independence (Gorton et al. 2021; Lanero Carrizo et al. 2025).

H2: A consumer's general trust in independent sources over brand marketing is positively associated with how credible they find third-party certifications.

H3: Greenwashing exposure and perceived alignment

Greenwashing exposure is a consumer's experience of having encountered specific brands whose sustainability claims felt exaggerated or misleading. Perceived alignment is a consumer's general belief about whether brands' sustainability claims, as a whole, reflect their actual practices. The two are related, as both concern the gap between claims and practices, but exposure describes past encounters with individual brands, while perceived alignment describes a broader judgment about the industry. Brand trust is the customer's overall confidence in the brand; it is not correlated with the customer's opinions on the product. Communicating sustainability without transparency fails to build loyalty the way that genuine and verifiable practices do (Oe & Yamaoka 2022). Low brand trust is directly linked to skepticism toward greenwashing (Peyton & Purwanegara 2023; Nguyen et al. 2019). Marketing imagery reveals that sustainable claims are paired with emotionally persuasive imagery, such as farmers, communities, and ingredients, which creates a false sense of credibility. With the increasing popularity of sustainability

claims, any misalignment between claims and practices erodes trust, as customers can spot it (Utami et al. 2022).

H3: Greenwashing exposure has a negative association with consumers' perceived alignment between brands' sustainability claims and their actual practices

H4: Sustainability Importance & Trust Damage

The importance of sustainability is the weight a consumer places on a brand's environmental or social practices when making a purchase decision. Trust damage refers to the degree to which a consumer's trust in a brand declines after encountering exaggerated or misleading sustainability claims, independent of how much they like the brand's products. The greenwashing framework treats perceived misalignment between claims and practice as a direct threat to brand credibility (Suphasomboon & Vassanadumrongdee 2025). The Persuasion Knowledge Model suggests that this threat is not uniform across consumers: those for whom a topic matters are motivated to scrutinize persuasion attempts about it (Friestad & Wright 1994), so the damage should be proportional to the extent to which a consumer's decision-making depends on the claim being true. There is a link between greenwashing and declines in trust (Peyton & Purwanegara 2023; Utami et al. 2022): perceived greenwashing has been shown to reduce consumers' green trust (Chen & Chang 2013), and their evaluation of brands (Nyilasy et al. 2014), and consumers' green concern has been examined as a moderator of their responses to greenwashing (Zhang et al. 2018). Yet the importance of sustainability has rarely been examined as a factor that shapes how severely greenwashing damages trust in the cosmetics industry.

H4: Sustainability importance is positively associated with the degree to which misleading sustainability claims damage consumer trust in a brand.

H5: Claim Discernment & Source Trust

Claim discernment is a consumer's ability to distinguish a vague sustainability claim from a specific, detailed one. Source trust is the extent to which a consumer trusts independent, third-party sources over a brand's own marketing when evaluating sustainability claims. The greenwashing literature treats vagueness as a marketing strategy, as it allows brands to claim sustainability without providing any verifiable information (Suphasomboon & Vassanadumrongdee 2025; Sajeev 2024). Current studies treat specificity recognition and source-skepticism as separate constructs.

H5: A consumer's ability to distinguish specific sustainability claims from vague ones is positively associated with their trust in independent, third-party sources over brand marketing.

H6: Greenwashing Exposure & Source Trust

Greenwashing exposure is how frequently a consumer has personally encountered beauty brand sustainability claims that felt exaggerated or misleading. Source trust is the extent to which a consumer

trusts independent, third-party sources over a brand's own marketing when evaluating sustainability claims. Research suggests that independent verification is not fixed, but activated, as consumers turn to third-party sources when their confidence in a brand's own claims has already been shaken (Hameed & Waris 2018; Gorton et al. 2021). Low brand trust is closely linked to skepticism about greenwashing (Peyton & Purwanegara 2023; Nguyen et al. 2019).

H6: Greater exposure to exaggerated sustainability claims is positively associated with a consumer's trust in independent third-party sources over brand marketing.

RESEARCH METHODOLOGY

Research Design

Sustainability in the cosmetics and beauty industry is rapidly growing as environmental concerns become widespread. However, sustainability claims are having the opposite of their intended effect, increasing customer skepticism (Nguyen et al. 2019; Phan & Nguyen 2026). Supply chain processes are a key part of sustainable practices for cosmetics brands, spanning sustainable sourcing, transportation, and waste management (Bom et al. 2019; Acerbi et al. 2023). The alignment between claims of sustainable practices and reality has a profound effect on brand perception (Utami et al. 2022).

The research methodology employed in this study aims to explore how brands communicate supply chain sustainability claims and how consumers perceive and trust such claims, from both a consumer's and a company's perspective. Using a mixed-methods approach, the study examines both perspectives through a literature review, content analysis, and a customer survey. This design was selected to examine brand communication and consumer attitudes toward supply chain sustainability within a single study.

Literature Search

The literature review synthesizes existing research on consumer perceptions of sustainability claims, greenwashing, and internal- and external-facing Corporate Social Responsibility (CSR) communication. Relevant publications were identified through Google Scholar in July, August, and September of 2026. Search terms included keywords such as "upcycling," "cosmetics," "sustainable supply chains," "circular economy," "greenwashing," "sustainable credibility," "supply chain transparency," "corporate social responsibility," "ethical sourcing," and "transparency." The search focused on studies published between 2018 and 2026, which reflects the rapid growth of the sustainable beauty industry and of research on consumer trust in sustainability claims during this period (Mamta & Prakash 2025), together with foundational theoretical and earlier empirical work (e.g., Spence 1973, Friestad & Wright 1994; Shekari & Rajabzadeh Ghatari 2013). Studies were prioritized if they focused specifically on supply chain processes, ethical sourcing, and consumer perception. The number of records screened was not recorded. The reference list contains 32 sources, and seven core studies are summarized in Table 1. Most sources are peer-reviewed journal articles; the exceptions are a university thesis (Leskinen 2020), a preprint that

has not been peer reviewed (Holloway 2024), and a manuscript whose publication venue could not be confirmed (Adhikari et al. 2026).

Content Analysis

The purpose of this content analysis is to gain further insights into how brands utilize social media marketing and digital channels to communicate sustainable supply-chain claims. In today's digital world, social media is a prominent marketing channel, and it's used by beauty and cosmetics companies to convey sustainability claims. Yet this also makes it a hub for greenwashing (Costa et al. 2026); thus, analyzing its use provides insight into how these claims reach customers. Brand websites, specifically those with a dedicated sustainability page, and Instagram posts were the primary sources of content. Brands were identified by searching Instagram and Google for beauty and cosmetics brands that make sustainability claims. Content was included if it was published on a brand's official website or Instagram account and communicated a sustainability, sourcing, or packaging claim. Posts were not restricted to a specific publication period, and content was collected in September 2026. A large number of websites and posts were reviewed. Themes were identified by reviewing the collected content and grouping recurring visual and textual elements across brands. This produced three themes: environmentally-friendly color palletes, high-quality photography of raw materials, and proof with statistics. Eight examples are presented to illustrate these themes. Since the number of posts reviewed was not recorded, the frequency of each theme across all content cannot be reported, and the analysis should be read as exploratory rather than representative. All brand images in Figures 1-3 are reproduced solely for the purpose of academic criticism and review. Use permissions have been verified and all images remain the property of their respective brands, and are credited in full beneath each figure.

Survey

Primary data were collected through a customer survey with 102 customers. The customer survey measured consumers' trust in cosmetic/beauty brands' sustainability claims in six ways: awareness and interpretation of supply chain claims, perceived source credibility, perceived alignment/greenwashing perception, brand trust, sustainability importance, and contextual/demographic factors. The survey data was used to test six hypotheses using Spearman's rank correlation. Spearman's correlation was appropriate because the survey items are ordinal (five-point Likert scales), so responses have a meaningful order but unequal intervals, and because the analysis examines whether variables tend to increase or decrease together, instead of assuming a linear relationship. For the same reason, item-level results are summarized using medians and interquartile ranges (IQR), with means reported alongside for reference. Because six hypotheses were tested, results were also evaluated against a Bonferroni-corrected significance threshold ($\alpha = 0.05/6 \approx 0.0083$) to account for multiple testing. Not all respondents answered every question, so each hypothesis test was conducted on the respondents who answered both relevant questions. As a result, sample sizes ranged from 72 to 81 across tests.

The following constructs are used throughout the study. Sustainability importance is the weight that respondents place on sustainability in purchase decisions (Q2). Claim discernment is respondents'

self-reported ability to distinguish specific claims from vague ones (Q6); it measures confidence in their own judgment rather than the specificity of any particular claim. Trust in clear communication is trust in brands that clearly explain their supply-chain practices (Q15). Certification credibility is the perceived credibility of third-party certifications (Q9). Source trust is trust in independent sources over brand marketing (Q10). Perceived alignment is the belief that brands' sustainability claims reflect their actual practices (Q11). Greenwashing exposure is having encountered exaggerated or misleading claims (Q12). Trust damage is the extent to which misleading claims reduce respondents' trust in a brand (Q13).

Participants were recruited through the researcher's personal network in the United States via messaging, email, and parent communication channels. Respondents' location was not collected, and respondents who reported their age were almost all between 10 and 34. Consent and other ethical procedures are described in the Ethics Statement below.

The survey was conducted over the course of 4 weeks. The survey collected data from members of the public across multiple age ranges and genders. The survey consisted of 102 people from the general public who are active consumers of cosmetics and beauty products. The survey questions measured consumers' concern about sustainability in beauty brands, their understanding of what sustainability meant, and their beliefs about the implications of sustainability as a marketing tool. The primary focus of the questions was to gauge consumers' perceptions of brands using sustainability marketing and to evaluate their overall understanding of sustainable marketing terms.

Ethics Statement

This study included collecting survey data from members of the public, recruited through the researcher's personal network. Participation in the survey was entirely voluntary. Before beginning the survey, participants read an introductory message explaining the study's purpose, what their participation entailed, and how their responses would be used. They also read that all submissions would be kept confidential and secure. Informed consent was obtained from all participants before they proceeded with the survey by their choosing to proceed after reading the introductory message, and participants could withdraw at any time before submitting their responses without penalty.

Because the survey was open to participants under the age of 18, additional safeguards were applied for minors. Participants aged 10 to 17 were reached through parent communication channels, so that parents received the survey information first and decided whether to share it with their child; a parent's decision to share the survey was treated as parental consent. These participants also gave their own assent by reading the introductory information and choosing to proceed. Although the questionnaire included a 0-10 age bracket, no respondent selected it.

No personally identifying information was collected in the survey. The only two demographic factors included in the survey were age range and gender. All survey submissions were securely stored in Google

Forms and Google Sheets and were accessible only to the researcher. Data were reported in aggregate form, and no single response was identified or analyzed in the survey or publication

The study was conducted in accordance with appropriate ethical principles relating to voluntary participation, informed consent, confidentiality, privacy, and responsible data handling

Table 2: Survey Questionnaire

Hi! My name is Asrita Yelisetti, a rising senior at Dougherty Valley High School. In this research paper, I'm examining how cosmetic/beauty companies communicate their supply chain sustainability practices to consumers and how this influences the credibility of sustainability claims and consumer trust in the brand. I would really appreciate it if you could fill out this survey for academic purposes. All information will be kept confidential and secure. Thank you!			
Dimension	**Question**	**Options**	**Frequency**
For the following statements, choose how much you agree on a scale of 1 to 5, with 1 = strongly disagree and 5=- strongly agree			
Frequency of Purchase	Q1:I frequently purchase beauty/cosmetic products (n=91)	1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree	1. 2.2% 2. 2.2% 3. 30.8% 4. 40.7% 5. 24.2%
Sustainability Importance	Q2: A brand's environmental or social sustainability is an important factor in my purchase decisions. (n=84)	1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree	1. 0.0% 2. 1.2% 3. 2.4% 4. 66.7% 5. 29.8%
Claim Exposure	Q3: I have seen beauty brands make claims about ethical sourcing, cruelty-free practices, or sustainable packaging. (n=86)	1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree	1. 0.0% 2. 0.0% 3. 0.0% 4. 69.8% 5. 30.2%
Self-Reported Comprehension	Q4: When a beauty brand says its ingredients are "ethically	1. Strongly disagree 2. Disagree	1. 0.0% 2. 32.7%

	sourced" or "sustainably sourced," I understand what that means. (n=101)	3. Neutral 4. Agree 5. Strongly Agree	3. 29.7% 4. 37.6% 5. 0.0%
Interpretation of Terminology	Q5: When a beauty brand describes its products as "ethically sourced" or "sustainably sourced," what do you understand this to mean? (Select all that apply). (n=101)	● Ingredients are grown/harvested without harming the environment ● Workers involved in sourcing are paid fair wages and treated well ● No child labor or exploitative labor practices are involved ● Ingredients are natural or organic (not synthetic) ● The full supply chain is traceable and transparent ● The brand has third-party certification (e.g., Fair Trade, COSMOS, NATRUE) ● Local or indigenous communities benefit economically from sourcing ● Packaging and transportation are also environmentally responsible ● No animal testing or animal-derived ingredients are used ● I'm honestly not sure what this means ● Other (please specify): _____	1. 60.4% 2. 54.5% 3. 5.9% 4. 53.5% 5. 2.0% 6. 49.5% 7. 2.0% 8. 5.0% 9. 56.4% 10. 0.0% 11. 0.0% *Note: Q5 allowed multiple selections; percentages are based on 101 respondents and do not sum to 100%*
Claim Discernment	Q6: I can distinguish between a vague sustainability claim and	1. Strongly disagree 2. Disagree	1. 1.1% 2. 3.3%

	a specific, detailed one. (n=90)	3. Neutral 4. Agree 5. Strongly Agree	3. 37.8% 4. 34.4% 5. 23.3%
Claim Verification	Q7: I actively look into the specifics behind a brand's sustainability claims (e.g., certifications, sourcing details) rather than taking them at face value. (n=101)	1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree	1. 1.0% 2. 49.5% 3. 48.5% 4. 1.0% 5. 0.0%
Brand Expertise	Q8: Beauty brands generally have the knowledge and expertise to support the sustainability claims they make. (n=101)	1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree	1. 32.7% 2. 37.6% 3. 27.7% 4. 2.0% 5. 0.0%
Certification Credibility	Q9: Third-party certifications (e.g., cruelty-free seals, Fair Trade, organic labels) make a brand's sustainability claims more believable to me. (n=86)	1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree	1. 1.2% 2. 0.0% 3. 37.2% 4. 41.9% 5. 19.8%
Source Trust	Q10: I trust independent, third-party sources more than a brand's own marketing when evaluating sustainability claims. (n=85)	1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree	1. 0.0% 2. 0.0% 3. 4.7% 4. 67.1% 5. 28.2%
Perceived Alignment	Q11: I believe beauty brands' sustainability claims usually reflect what actually happens in their supply chain. (n=101)	1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree	1. 35.6% 2. 35.6% 3. 26.7% 4. 2.0% 5. 0.0%
Greenwashing Exposure	Q12: I have encountered beauty brands whose sustainability claims felt exaggerated or misleading. (n=81)	1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree	1. 0.0% 2. 1.2% 3. 0.0% 4. 64.2% 5. 34.6%

Trust Damage	Q13: Exaggerated or misleading sustainability claims make me trust a brand less, even if I still like their products. (n=81)	1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree	1. 0.0% 2. 2.5% 3. 1.2% 4. 55.6% 5. 40.7%
Claim Skepticism	Q14: I am generally skeptical of beauty brands' sustainability marketing. (n=85)	1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree	1. 1.2% 2. 0.0% 3. 36.5% 4. 40.0% 5. 22.4%
Trust in Clear Communication	Q15: I trust a brand more when it clearly explains its supply chain practices, rather than using vague language. (n=82)	1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree	1. 0.0% 2. 1.2% 3. 0.0% 4. 64.6% 5. 34.1%
Trust Sensitivity	Q16: If I learned that a brand's sustainability claims didn't match its actual practices, my trust in that brand would decrease significantly. (n=87)	1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree	1. 0.0% 2. 1.1% 3. 0.0% 4. 60.9% 5. 37.9%
Communication Impact	Q17: A brand's sustainability communication influences my purchase decisions. (n=84)	1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree	1. 1.2% 2. 1.2% 3. 1.2% 4. 66.7% 5. 29.8%
Demographic	Q18: What is your age range? (n=75)	0-10 10-17 18–24 25–34 35–44 45–54 55–64 65+	1. 0.0% 2. 38.7% 3. 37.3% 4. 22.7% 5. 0.0% 6. 1.3% 7. 0.0% 8. 0.0%
Demographic	Q19: How would you describe your gender?	Male Female	Not reported (See Survey

		Non-binary Prefer not to say	Summary)

RESULTS

Content Analysis Findings

Environmentally-Friendly Color Palette

This theme showcases how brands use natural, earth-toned color palettes as a visual backdrop for sustainability and sourcing claims. Across the posts analyzed, greens, creams, and golds are the dominant colors. They're often utilized with foliage, botanicals, or plant oils. Instead of showing where an ingredient comes from, these palettes signal "natural" and "sustainable" through color alone. Tata Harper Skincare's "Guided by Standards" post places green juniper sprigs and dark berries on a soft, cream background (Figure 1). The text states that its certified products are evaluated under Ecocert and COSMOS standards. Aveda sets a "free from" list of excluded ingredients such as parabens, phthalates, and animal-derived ingredients, over a deep green leaf on a dark background. On their website, they overlay sourcing commitments on a close-up image of golden-green oils and leaves, and state that their suppliers are held to "social, ethical, and environmental metrics, and that sourcing communities benefit from on-the-ground programs. The color palette is nearly identical across the image board, so regardless of specificity, they all create a similar sense of visual credibility. In these posts, natural imagery and color appeared to add emotional and moral credibility to claims that might otherwise be perceived as vague, consistent with the greenwashing literature's account of how vague claims gain credibility (Suphasomboon & Vassanadumnrongdee 2025).

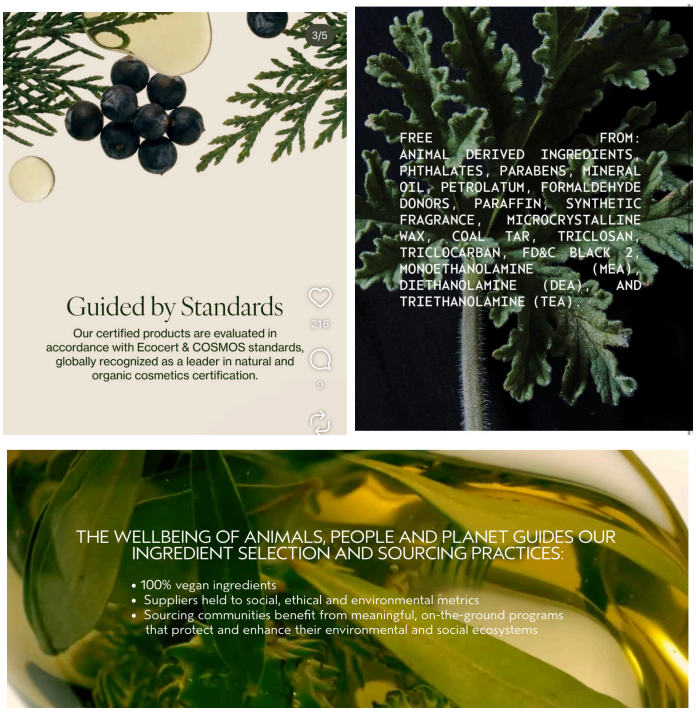


Figure 1: Environmentally-Friendly Color Palette

Image credits: (a) Tata Harper Skincare, "Guided by Standards," Instagram post. © Tata Harper Skincare. (b) Aveda, "free from" ingredient list post, Instagram. © Aveda. (c) Aveda, ingredient sourcing commitments, aveda.com. © Aveda. All images accessed 2026 and reproduced for academic criticism and review.

High-Quality Photography of Raw Materials

This theme showcases how studio-lit photography is used to display raw ingredients in sustainable marketing posts. It also supports claims of sustainable supply-chain sourcing. In the posts analyzed, rather than showcasing the people or places behind an ingredient, brands showcased the ingredient itself with high-quality photography. Aveda's website partners its ingredient traceability claims with an image of a white vanilla orchid against a soft pink background and text indicating that the Vanilla originates from Madagascar (Figure 2). Similarly, Yunalang Skin showcases each ingredient alongside an image of the finished product, showing customers exactly what goes into it. Glow Recipe takes a similar approach, surrounding its products with fresh avocado to visually connect the product to its key ingredient. This technique is similar to what's seen in food or luxury products, and the use of high-quality ingredient imagery appeared to shape the supply chain narrative so that claims did not appear vague. This is consistent with research suggesting that pairing visuals with specific details reinforced credibility (Suphasomboon & Vassanadumrongdee 2025), and that sustainability schemes ofte provide limited coverage of the wider supply chain (Costa et al. 2026).

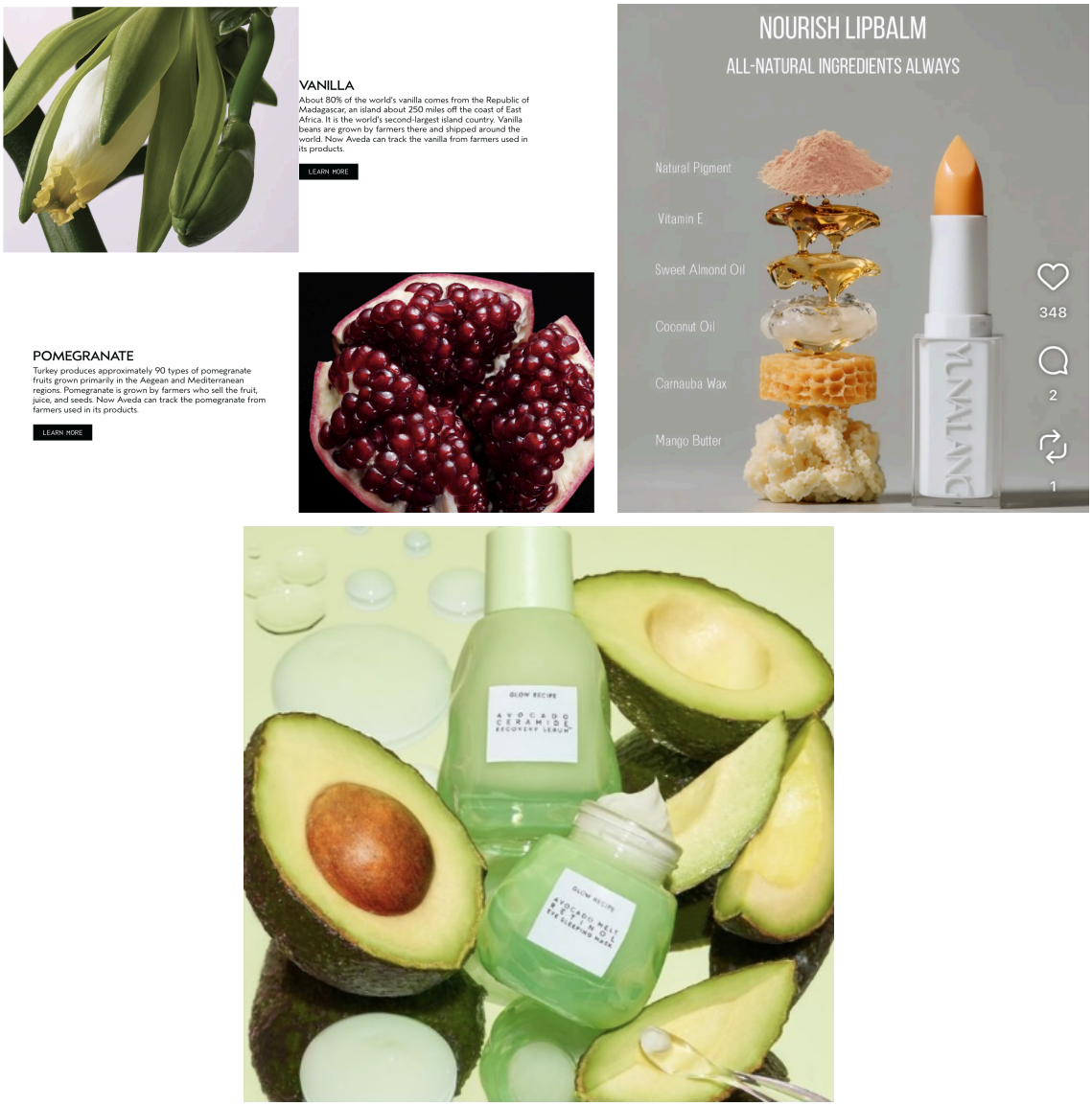


Figure 2: High-Quality Photography of Raw Materials

Image credits: (a) Aveda, vanilla orchid ingredient traceability page (vanilla sourced from Madagascar), aveda.com. © Aveda. (b) Yunalang Skin, ingredient and product image, Instagram post. © Yunalang Skin. (c) Glow Recipe, product with avocado, Instagram post. © Glow Recipe. All images accessed 2026 and reproduced for academic criticism and review.

Proof with Statistics

This theme showcases brands' use of bold, standout statistics to numerically validate their claims. Lush's dedicated sustainability page on their website displays this clearly (Figure 3), with oversized text stating "100% recycled plastic packaging" and "67% ingredients sourced directly from suppliers," with minimal supporting text and no accompanying image of a person, place, or product. The site also uses an interactive "Buying Map" that lets visitors click on points on a world map to see where ingredients are sourced. Maybelline uses similar numeric marketing, equating the tons of plastic saved in packaging with the weight of six subway cars. Prior research describes numerical quantification in sustainability marketing as an attempt to validate claims with evidence (Costa et al. 2026), and the posts analyzed here follow this pattern. However, these statistics are presented by the brand itself, and consumers typically don't have a way to verify how they were calculated (Sajeev 2024).

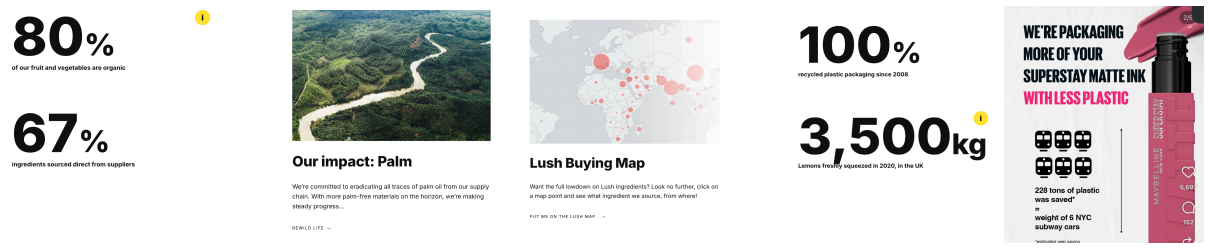


Figure 3: Proof with Statistics

Image credits: (a) Lush, sustainability page ("100% recycled plastic packaging"; "67% ingredients sourced directly from suppliers"), lush.com. © Lush. (b) Maybelline, plastic packaging savings post, Instagram. © Maybelline. All images accessed 2026 and reproduced for academic criticism and review.

Survey Summary

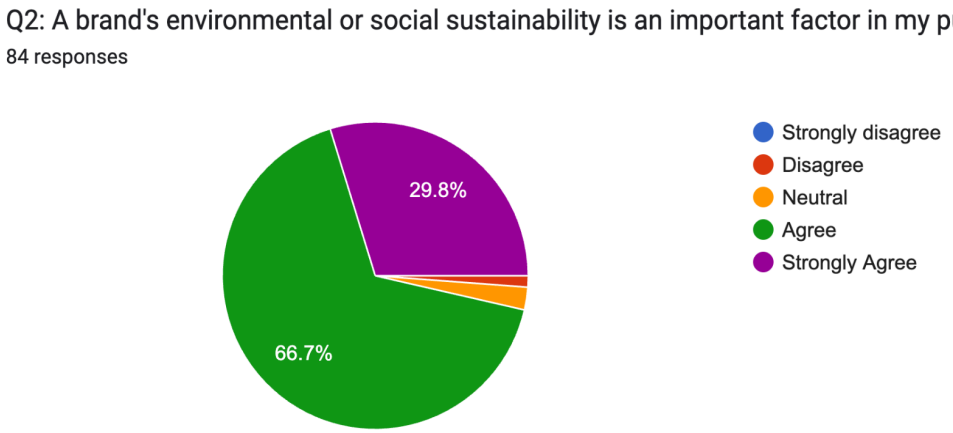
The survey results are analyzed to identify major themes in respondents' answers. Themes were identified by grouping questions that measured the same variable and by comparing response patterns across those groups. By identifying gaps between respondents' values and their behavior, the survey reveals consumer attitudes toward different forms of sustainable marketing.

This survey was designed to measure how consumers in the cosmetics and beauty industry interpret and trust brands' sustainability claims, and how that trust relates to purchasing behavior. The survey received 102 responses and was administered via Google Forms. Because the questions were not mandatory, the number of responses varies by question (75 to 101); the number of respondents for each item is reported in Table 2. The survey was distributed through personal messaging and email to a convenience sample across multiple age ranges and genders. Gender was also collected (Q19), but because of concerns about the accuracy of these responses, the gender distribution is not reported or used in the analysis. Of the respondents who reported their age, 38.7% were aged 10-17, 37.3% were 18-24, and 22.7% were 25-34; only one respondent was older than 34 (45-54), and 27 respondents did not report their age. The survey

consisted of 16 questions measured on a Likert scale, one multiple-select question, and two demographic questions on age and gender.

The findings below are organized into multiple graphs to address the questions central to the study's hypotheses. These findings include baseline attitudes towards sustainability as a purchasing factor, consumers' understanding of sustainability terminology, verification behavior, perceived brand expertise, trust in certifications, and perceived alignment between brands' claims and practices.

Sustainability Importance

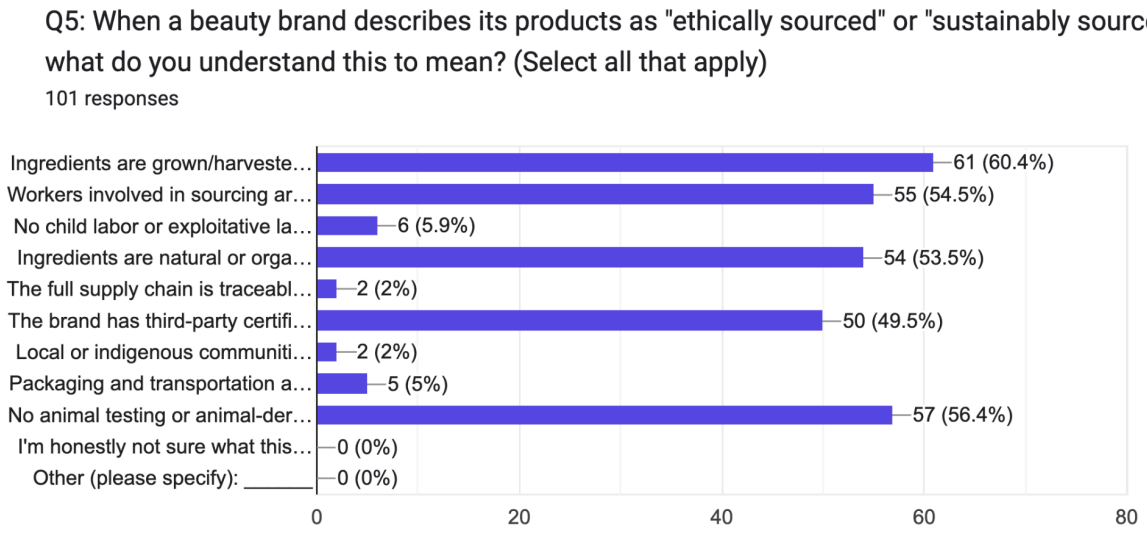


This pie chart represents responses to question two: "A brand's environmental or social sustainability is an important factor in my purchase decisions." The chart exemplifies an overwhelming skew toward agreement 66.7% of respondents selected "Agree" and 29.8% selected "Strongly Agree," meaning 96.5% of respondents affirmed that sustainability factors into their purchasing decisions, with almost no respondents disagreeing. This affirms that sustainability is a factor in the purchasing decisions of beauty and cosmetics respondents. This finding is expected, given the significant increase in sustainability marketing in the cosmetics industry (Dwivedi et al. 2025; Mamta & Prakash 2025).

Self-Reported Comprehension

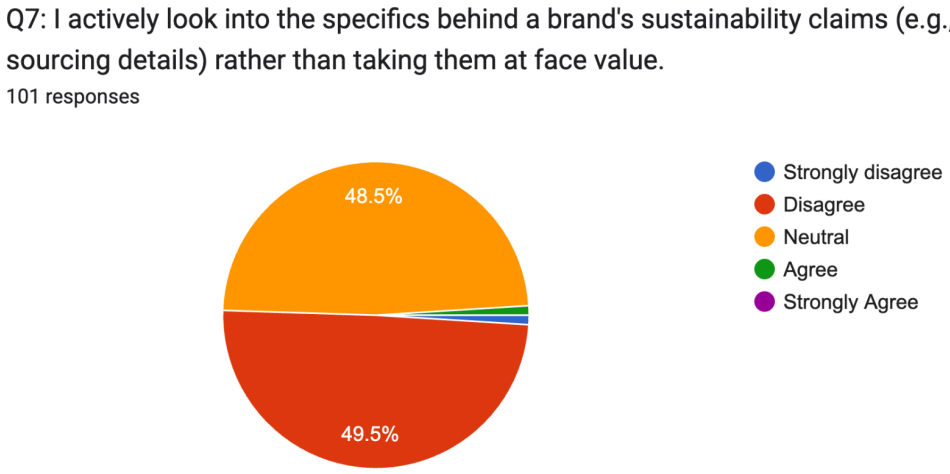
Responses to question four, "When a beauty brand says its ingredients are 'ethically sourced' or 'sustainably sourced,' I understand what that means," were divided; 37.6% agreed, 29.7% were neutral, and 32.7% disagreed (n=101). Nearly a third of respondents therefore reported not understanding a term that brands commonly use in sustainability marketing.

Interpretation of Terminology



This bar chart shows responses to question five, a multiple-select item asking respondents whether they associate with the phrase "ethically sourced" or "sustainably sourced." The results reveal a clear multimodal pattern, as four interpretations were selected by a majority of respondents and a fifth by nearly half: "ingredients are grown/harvested without harming the environment" at 60.4%, "no animal testing or animal-derived ingredients" at 56.4%, "workers involved in sourcing are paid fair wages and treated well" at 54.5%, "ingredients are natural or organic" at 53.5%, and "the brand has third-party certification" at 49.5%. On the other hand, "the full supply chain is traceable and transparent" and "local or indigenous communities benefit economically from sourcing" both received 2% of responses, 'packing and transportation are environmentally responsible' received 5%, and "no child labor or exploitative labor practices are involved" received 5.9%. Respondents associated sustainable sourcing with a mix of environmental, product, labor and certification qualities, including fair wages for workers, while dimensions such as supply-chain traceability, community benefit, and child labor protections were rarely selected. These results should be interpreted with caution: the four rarely selected options were chosen by only seven respondents, all of whom responded early in data collection, and no respondent selected "I'm honestly not sure." This pattern may reflect how the options were displayed or recorded rather than consumers' genuine interpretations. This ties back to findings from the content analysis, showing that customers may not even understand claims such as "ethical sourcing" when they see them, and that sustainability labels cover a limited dimension of sustainability, with insufficient attention to labor practices and supply-chain accountability (Costa et al. 2026). A similar unevenness exists on the consumer side.

Claim Verification



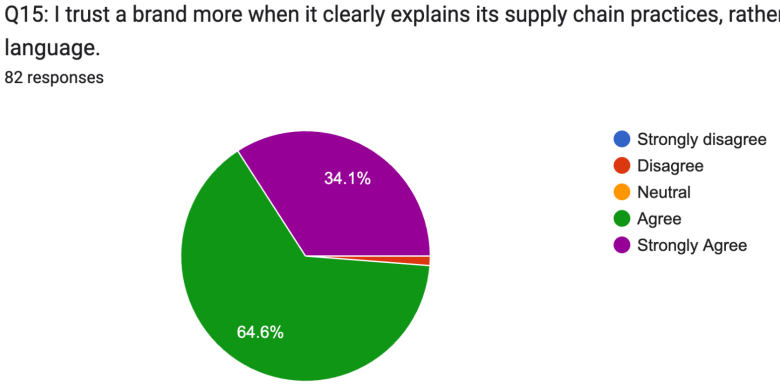
This pie chart represents responses to question seven, "I actively look into the specifics behind a brand's sustainability claims rather than taking them at face value." This chart shows a near-even split towards the lower end, with 49.5% selecting disagree and 48.5% selecting neutral, accounting for 98% of all responses. This indicates that most respondents reported not actively looking into sustainability claims. This reveals a gap between attitudes and behavior: the majority believe that sustainability is an important purchase factor, yet few report investigating if a specific claim is backed by real data. This may suggest that sustainability claims succeed or fail based on the consumer's first impression of the claim rather than any verification process. This finding is consistent with the fact that lack of accessibility to supply-chain processes acts as a major barrier to sustainable purchasing because consumers lack the tools to verify claims themselves (Peyton & Purwanegara 2023).

Brand Expertise



This pie chart represents responses to question eight, which measured respondents' beliefs on "beauty brands generally have the knowledge and expertise to support the sustainability claims they make." The distribution skews toward disagreement, with 37.6% selecting "Disagree" and 32.7% selecting "Strongly Disagree," compared with 27.7% selecting "Neutral" and only about 2% "Agree" or "Strongly Agree" responses. These results show that even though consumers don't fully believe that brands have the knowledge to make such claims, most do not report taking steps to investigate their sustainability claims, even though they treat sustainability as a major decision-making factor (Nguyen et al. 2019; Phan & Nguyen 2026).

Trust in Clear Communication



This pie chart represents responses to question fifteen, "I trust a brand more when it clearly explains its supply chain practices, rather than using vague language." The chart shows a large skew towards

agreement, as 64.6% of respondents selected “Agree” and 34.1% selected "Strongly Agree.” This exemplifies that respondents report higher trust in a brand when its supply chain communication is specific rather than vague (Orazi & Chan 2020). This is one of the highest combined agreement rates among all questions in this analysis and provides direct descriptive evidence that claim specificity is positively associated with consumer trust, with 98.8% of respondents agreeing or strongly agreeing.

Hypothesis Testing

Each correlation was calculated using only the respondents who answered both questions in that test, so sample sizes differ across hypotheses and from the item totals in Table 2.

H1: Consumers’ ability to distinguish specific from vague sustainability claims is positively associated with their trust in brands that clearly explain their supply-chain practices.

This hypothesis is based on a greenwashing framework which indicates that vagueness is a marker of inaccurate marketing (Suphasomboon & Vassanadumrongdee 2025), and that untraceable supply chains undermine consumer trust (Peyton & Purwanegara 2023). Specificity is what distinguishes a real sustainability claim from vague marketing language, so a consumer’s ability to notice that difference should be tied to how much they trust brands that communicate clearly.

For the first hypothesis, a Spearman correlation was used to measure the relationship between respondents’ ability to distinguish specific claims from vague ones (Q6) and their trust in brands that clearly explain their practices (Q15). Q6 is the independent variable, and Q15 as the dependent variable.

Table 3: Statistical results comparing consumers’ ability to distinguish specific claims compared to vague claims, and their trust in brands with clear supply-chain communication

Statistic	**Value**
Respondents (n)	79
Degrees of freedom (df)	77
Correlation coefficient (ρ)	0.0348
t-statistic	0.3059
p-value	0.761
Significance (α=0.05)	0.761 > 0.05 - Not Significant

Results from Table 3 show no statistically significant correlation between respondents' ability to differentiate between specific and vague claims and their trust in brands with clear supply-chain communication. This result fails to reject the null hypothesis and suggests that a consumer's ability to differentiate between vague and specific claims is not correlated with their trust in brands with clear communication.

However, respondents scored consistently high on both statements when analyzed separately. Question 6 had a median of 4 (IQR = 3-5; mean = 3.81), which indicates that consumers feel confident in their ability to differentiate claims. Question 15 had a median of 4 (IQR 4-5; mean = 4.33), indicating that respondents value communication and have more trust in transparent communication. This suggests that recognizing specificity and rewarding it with trust may be two separate consumer attitudes rather than a single linked relationship. This test therefore does not measure whether claim specificity itself increases trust. Q15 addresses that question directly: 98.8% of respondents agreed or strongly agreed that they trust a brand more when it clearly explains its supply-chain practices.

H2: A consumer's general trust in independent sources over brand marketing is positively associated with how credible they find third-party certifications.

This hypothesis is based on research showing that eco-labels increase eco-conscious behavior, but this effect works by activating environmental concerns that the consumer already holds, rather than the label itself creating trust (Hameed & Waris 2018). For the second hypothesis, a Spearman correlation was used to measure the relationship between respondents' trust in independent sources compared to the brand's own marketing (Q10) and their perceived credibility of third-party certifications (Q9). Q10 acted as the independent variable, and Q9 acted as the dependent variable.

Table 4: Statistical results of comparing consumers' trust in independent sources and their perceived credibility of third-party certifications.

Statistics	**Value**
Respondents (n)	77
Degree of freedom (df)	75
Correlation coefficient (ρ)	0.0681
t-statistic	0.5911
p-value	0.556
Significance (α=0.05)	0.556 > 0.05 - Not Significant

Results from Table 4 show that there is not a statistically significant correlation between respondents' trust in independent sources and their perceived credibility of third-party certifications (ρ=0.068, t=0.591, df=75, p=0.556). This result fails to reject the null hypothesis and suggests that a consumer's preference for independent sources over brand marketing isn't associated with how credible they find third-party certifications.

Both variables scored high independently, with medians of 4 for Question 10 (IQR = 4-5; mean = 4.26) and 4 for Question 9 (IQR = 3-4; mean = 3.86). This suggests that trusting certifications may be closer to an assumption that consumers hold, regardless of how they weigh independent versus brand-sourced information (Lanero Carrizo et al. 2025).

H3: Greenwashing exposure has a negative association with consumers' perceived alignment between brands' sustainability claims and their actual practices

This hypothesis is based on research showing that sustainable communication without transparency cannot build the same loyalty that genuine, verifiable practices do (Oe & Yamaoka 2022). Low brand trust is closely tied to skepticism about greenwashing as a central barrier to purchasing sustainable products (Peyton & Purwanegara 2023). The content analysis conducted in this study reinforces this pattern, showing that brands usually pair sustainability claims with persuasive imagery. This creates a sense of credibility that doesn't always hold up once a consumer realizes these claims are unsubstantiated. Consumers who have encountered more misleading claims should be less likely to believe that brands' claims generally reflect real practice (Utami et al. 2022). For the third hypothesis, a Spearman correlation was used to measure the relationship between respondents' exposure to greenwashing (Q12) and their belief that brands' claims truly reflect their practices (Q11). Q12 is the independent variable, and Q11 is the dependent. variable

Table 5: Statistical results comparing greenwashing exposure and perceived alignment between brands' claims and practices.

Statistic	**Value**
Respondents (n)	81
Degrees of freedom (df)	79
Correlation coefficient (ρ)	-0.1884
t-statistic	-1.705
p-value	0.092

Significance (α=0.05)	0.092 > 0.05 - Not significant

Results from Table 5 indicate a negative correlation between greenwashing exposure and perceived alignment between a brand's claims and its practices. Although the result was not statistically significant ($p = 0.092 > 0.05$), the correlation was negative, in the predicted direction, suggesting a weak trend. Among the 81 respondents who answered both questions, Q11 responses skewed heavily toward disagreement (37.0% disagreed and 35.8% strongly disagreed). Most of these respondents (72.8%) did not believe that brand claims reflect real practice, regardless of their specific greenwashing exposure. Because both items concern the gap between brands' claims and their practices, the two constructs overlap conceptually, and some association between them would be expected by definition. The test therefore asks whether specific encounters with misleading claims translate into a general belief about the industry. That the correlation is weak and non-significant despite this overlap suggests that encountering misleading claims from particular brands does not necessarily shape consumers' general view of brands. This is reinforced by Q13, which confirms that consumers report greenwashing damages their trust in brands.

H4: Sustainability importance is positively associated with the degree to which misleading sustainability claims damage consumer trust in a brand.

This hypothesis is based on the greenwashing framework that treats perceived misalignment between claims and practice as a direct threat to brand credibility (Suphasomboon & Vassanadumrongdee 2025). Low brand trust has also been shown to be closely tied to greenwashing skepticism as a central barrier to purchasing sustainable products (Peyton & Purwanegara 2023). If sustainability plays a genuine role in a consumer's purchase decision, then a sustainability claim is not a peripheral detail. Consumers for whom sustainability isn't a meaningful purchase factor were never relying on the claim to justify their decision, consistent with the Persuasion Knowledge Model's view that motivation to scrutinize a message depends on its relevance to the consumer (Friestad & Wright 1994).

For the fourth hypothesis, a Spearman correlation was used to measure the relationship between respondents' ratings of the importance of sustainability to their purchasing decisions (Q2) and the degree to which misleading claims damage their brand trust (Q13). Q2 acted as the independent variable, and Q13 acted as the dependent variable.

Table 6: Statistical results comparing sustainability importance and trust damage from misleading claims

Statistic	**Value**
Respondents (n)	73
Degrees of freedom (df)	71
Correlation coefficient (ρ)	0.502
t-statistic	4.892
p-value	< 0.001
Significance (α=0.05)	< 0.001 < 0.05
Bonferroni-corrected significant (α = 0.0083)	< 0.001 < 0.0083 - Significant

Results from Table 6 show a statistically significant positive correlation between respondents' ratings of the importance of sustainability to their purchase decisions and the extent to which misleading claims damage their trust in a brand. This rejects the null hypothesis and suggests that consumers who rely on sustainability as a purchase factor report greater trust damage from misleading claims.

Table 6a: Cross-tabulation of sustainability importance (Q2) and trust damage (Q13)

Q2/Q13	SD	D	N	A	SA
Strongly Disagree	0	0	0	0	0
Disagree	0	1	0	0	0
Neutral	0	1	0	1	0
Agree	0	0	1	30	14
Strongly Agree	0	0	0	6	19

Table 6a shows the responses behind this correlation. Only three respondents rated sustainability importance below "Agree," and three rated trust damage below "Agree," so these respondents contribute to the association. However, the association does not depend on them: among the 69 respondents who selected "Agree" or "Strongly Agree" on both items, the correlation remained significant (ρ = 0.43, p <

0.001). Most of the association comes from respondents who strongly agreed with one item also strongly agreeing with the other, with 19 respondents selecting "Strongly Agree" on both.

H5: A consumer's ability to distinguish specific sustainability claims from vague ones is positively associated with their trust in independent, third-party sources over brand marketing.

This hypothesis is based on the greenwashing framework, which treats vagueness as a marketing strategy because it allows brands to imply sustainability without offering anything a consumer can verify (Suphasomboon & Vassanadumrongdee 2025; Sajeev 2024). A consumer who can reliably distinguish a vague claim from a specific one can understand differences in brand language. Noticing vagueness and preferring independent verification should go hand in hand as expressions of underlying skepticism (Nguyen et al. 2019).

For the fifth hypothesis, a Spearman correlation was used measure the relationship between respondents' ability to distinguish specific claims from vague ones (Q6) and their trust in independent sources over brand marketing (Q10). Q6 is the independent variable, and Q10 is the dependent variable.

Table 7: Statistical results comparing claim discernment and trust in independent sources

Statistic	**Value**
Respondents (n)	81
Degrees of freedom (df)	79
Correlation coefficient (ρ)	0.4952
t-statistic	5.067
p-value	< 0.001
Significance (α=0.05)	< 0.001 < 0.05
Bonferroni-corrected significant (α = 0.0083)	< 0.001 < 0.0083 - Significant

Results from Table 7 show a statistically significant positive correlation between respondents' ability to distinguish specific sustainability claims from vague ones and their trust in independent sources over brand marketing. This result rejects the null hypothesis and indicates that respondents who reported greater ability to distinguish specific claims from vague ones also reported greater trust in independent sources over brand marketing. Claim discernment had a median of 4 (IQR = 3-5; mean = 3.78), while source trust had a median of 4 (IQR = 4-5; mean = 4.25).

Table 7a: Cross-tabulation of claim discernment (Q6) and source trust (Q10)

Q6/Q10	SD	D	N	A	SA
Strongly Disagree	0	0	0	1	0
Disagree	0	0	3	0	0
Neutral	0	0	1	25	4
Agree	0	0	0	19	7
Strongly Agree	0	0	0	8	13

Table 7a shows the responses behind this correlation. Claim discernment varied more than the other items, with 34 respondents selecting "Neutral" or below, while only four respondents rated source trust below "Agree." Among the 47 respondents who selected "Agree" or "Strongly Agree" on both items, the correlation was weaker but remained significant ($\rho = 0.35$, $p = 0.015$). Though this restricted test would not meet the Bonferroni-corrected threshold.

H6: Greater exposure to exaggerated sustainability claims is positively associated with a consumer's trust in independent third-party sources over brand marketing.

This hypothesis is based on eco-labeling research, which suggests that trust in independent verification isn't fixed but is instead activated when confidence in a brand's own claims has already been questioned (Hameed & Waris 2018; Gorton et al. 2021). Low brand trust has been shown to be closely tied to greenwashing skepticism as a central barrier to purchasing sustainable products (Peyton & Purwanegara 2023; Nguyen et al. 2019).

For the sixth hypothesis, a Spearman correlation was used to measure the relationship between respondents' exposure to exaggerated or misleading sustainability claims (Q12) and their trust in independent sources over brand marketing (Q10). Q12 is the independent variable and Q10 is the dependent variable.

Table 8: Statistical results comparing greenwashing exposure and trust in independent sources

Statistic	**Value**
Respondents (n)	72
Degrees of freedom (df)	70
Correlation coefficient (ρ)	0.4747
t-statistic	4.512
p-value	< 0.001
Significance (α=0.05)	< 0.001 < 0.05
Bonferroni-corrected significant (α = 0.0083)	< 0.001 < 0.0083 - Significant

Results from Table 8 show a statistically significant positive correlation between respondents' exposure to misleading sustainability claims and their trust in independent sources over brand marketing. This result rejects the null hypothesis and indicates that respondents who reported more exposure to misleading claims also reported greater trust in independent sources over brand marketing. Greenwashing exposure had a median of 4 (IQR = 4-5; mean = 4.36), and source trust had a median of 4 (IQR = 4-5; mean = 4.28).

Table 8a: Cross-tabulation of greenwashing exposure (Q12) and source trust (Q10)

Q12/Q10	SD	D	N	A	SA
Strongly Disagree	0	0	0	0	0
Disagree	0	0	0	1	0
Neutral	0	0	0	0	0
Agree	0	0	4	32	7
Strongly Agree	0	0	0	11	17

Table 8a shows the responses behind this correlation. Only one respondent rated greenwashing exposure below "Agree," and four rated source trust below "Agree." Among the 67 respondents who selected "Agree" or "Strongly Agree" on both items, the correlation remained significant (ρ = 0.44, p < 0.001), with 17 respondents selecting "Strongly Agree" on both items.

DISCUSSION

This study examines how brands communicate supply-chain sustainability claims and how consumers report trusting such claims in the cosmetics and beauty industry. It tested six hypotheses built around trust in clear communication, certification credibility, greenwashing exposure, sustainability importance, claim discernment, and source trust. The results were more nuanced than expected, as neither claim discernment (H1) nor trust in independent sources (H2) showed a statistically significant relationship with its outcome variable. Greenwashing exposure (H3) also did not have a statistically significant correlation, but it showed a weak, non-significant trend in the predicted direction. In contrast, all three remaining hypotheses (H4-H6) were statistically significant, and all three remained significant after Bonferroni correction for multiple testing ($p < 0.001$ in each case, below the corrected threshold of 0.0083). The importance of sustainability was positively associated with the extent to which greenwashing damages trust (H4). Claim discernment (H5) and greenwashing exposure (H6) were both positively associated with trust in independent sources rather than in brand marketing.

The lack of significant correlations for H1 and H2 has two possible explanations. The first is a ceiling effect, as nearly all respondents reported high agreement on individual trust-related statements, leaving little variation to detect a correlation. H4-H6 reached significance even though several of their variables also had high scores (Q10 and Q12 both had a median of 4, IQR = 4-5; means = 4.28 and 4.36), but this does not weaken the ceiling-effect explanation. When most responses sit at the top of the scale, a correlation becomes more sensitive to a small number of unusual respondents, so that the significant results for H4-H6 are likely more fragile than the null results for H1 and H2 and should be interpreted with caution. The cross-tabulations in Tables 6a-8a show how many respondents produce each association; each correlation remained significant when respondents below "Agree" were excluded, but was weaker in every case. Because every survey item was a positively worded agreement statement, acquiescence bias may also have contributed to these positive correlations, as discussed in the Limitations.

The second possibility is that recognizing specificity and trusting certifications are distinct attitudes instead of linked ones. Respondents have favorable attitudes towards transparency and independent verification, but a respondent's specific score on one attitude isn't associated with their score on another. This finding does not contradict the greenwashing framework, which treats specificity as the main driver of trust (Suphasomboon & Vassanadumrongdee 2025; Orazi & Chan 2020), since 98.8% of respondents reported trusting clear communication more (Q15); rather, it suggests that a consumer's confidence in spotting specificity does not determine how much they value it. The H2 result does, however, deviate from the finding that green trust mediates the effect of eco-labels (Hameed & Waris 2018). One reason for this difference may be that these prior studies measured trust in behavioral terms, while this study measured consumer attitudes. This study's data cannot determine which explanation applies. Future research with behavioral measures or a wider response scale could test this.

This interpretation is reinforced by earlier findings in the survey. Despite 96.5% of respondents agreeing that sustainability factors into their purchasing decisions (Q2), only 1% of respondents reported looking into the specifics behind a brand's sustainability claims (Q7). This gap between stated values and self-reported behavior is consistent with an attitude-behavior gap and may help explain why H1 and H2 were not significant. Transparency and verification are valued as principles, but are not transformed into judgments or practice (Dwivedi et al. 2025).

H3 tells a different story, as Q11 captured a genuine spread in response rather than clustering, although Q12 responses were concentrated at agreement (98.8% Agree or Strongly Agree). Although not statistically significant, the correlation was negative, in the predicted direction.This aligns with the finding that low brand trust is closely tied to greenwashing skepticism (Peyton & Purwanegara 2023; Nguyen et al. 2019) and with the finding that sustainability communication without transparency doesn't build the same loyalty as genuine practices (Oe & Yamaoka 2022). The supplementary analysis of Q13 offers support for this relationship, suggesting that greenwashing's effect on trust is recognized among consumers (Utami et al. 2022).

H4, H5, and H6 add an important layer to these findings. H4 showed that consumers who rate sustainability as more important to their purchase decisions report greater trust damage from misleading claims ($\rho = 0.502$, $p < 0.001$). This supports the greenwashing framework's view of misalignment as a direct threat to brand credibility (Suphasomboon & Vassanadumrongdee 2025), and shows that this threat isn't uniform across consumers, as the Persuasion Knowledge Model predicts (Friestad & Wright 1994; Zhang et al. 2018). Brands may experience greater reported trust damage among consumers who place the most importance on sustainability if their claims don't hold up.

H5 and H6 both reveal where consumers place their trust. Respondents who reported greater ability to distinguish specific claims from vague ones also reported greater trust in independent sources over brand marketing ($\rho = 0.495$, $p < 0.001$). This suggests that noticing vagueness and preferring independent verification are expressions of skepticism (Nguyen et al. 2019; Sajeev 2024), consistent with the Persuasion Knowledge Model's prediction that consumers who recognize persuasion tactics turn to other sources of information (Friestad & Wright 1994). Similarly, consumers with greater exposure to exaggerated claims reported more trust in independent sources ($\rho = 0.475$, $p < 0.001$). This aligns with the finding that trust in independent verification is activated rather than fixed (Hameed & Waris 2018). Greenwashing exposure was not significantly associated with perceived alignment (H3), but it was associated with source trust (H6). This suggests that exposure to greenwashing may be more closely related to where consumers look for information than to their general view of brands.

Additionally, consumers' understanding of "ethical" or "sustainable" sourcing is uneven, as indicated by Q5. Most respondents associated these terms with environmental protection, animal welfare, fair wages, natural ingredients and nearly half with certification, while supply-chain traceability, community benefit,

and child labor protections were rarely selected. As noted in the Survey Summary, this finding should be interpreted with caution, as the rarely selected options were chosen by only seven early respondents. This uneven understanding is also reflected in Q4, where 32.7% of respondents disagreed that they understand what "ethically sourced" means. This sits uneasily with Q6, where about 58% agreed that they can tell vague sustainability claims from specific ones. Of the 31 respondents who reported not understanding the term, 14 (45.2%) still reported being able to distinguish vague from specific claims, and the two items were only weakly and non-significantly correlated ($\rho = 0.18$, $p = 0.08$, $n = 90$). This suggests that consumers' confidence in judging sustainability claims may exceed their understanding of the terms those claims use. This mirrors the finding that certification labels themselves cover a limited dimension of sustainability (Costa et al. 2026).

For beauty and cosmetics brands, these findings suggest that securing more certifications may not be enough to meaningfully differentiate a brand's trustworthiness in a consumer's eyes, but consumers do value clear, specific communication. Thus, brands may benefit from closing the gap between communication about supply-chain traceability and labor practices such as child labor, since these are among the dimensions of sustainability that respondents least associated with sustainable sourcing (Holloway 2024; Charalampidis et al. 2023). This could differentiate them from current practices that solely lean on environmental and ingredient-based framing, which dominates the current market. The H4 results add urgency, as consumers who consider sustainability most also report losing trust due to misleading claims. Respondents who reported more exposure to greenwashing also reported greater trust in independent sources over brand marketing (H6), so a brand's own messaging can lose credibility compared to outside sources.

For policymakers and regulators, the finding that consumers unevenly interpret these terms supports the case for clearer labeling standards for sustainability certification (Adhikari et al. 2026). If consumers already assume that ethical sourcing includes fair wages for workers when it may not, current marketing claims may mislead consumers. The results of H5 and H6 strengthen this case, as respondents who reported greater claim discernment and greater greenwashing exposure reported greater trust in independent sources. Clearer standards would make those independent sources more reliable.

IMPLICATIONS

This study contributes to the existing academic literature on sustainability in the cosmetics and beauty industry by focusing on specific supply chain processes, including but not limited to sourcing, traceability, and transportation (Salsabila et al. 2025; Acerbi et al. 2023). It combines a content analysis of brand communications with a survey of consumer attitudes within a mixed methods design (Leskinen 2020; Peyton & Purwanegara 2023). However, the two components are reported side by side, rather than linked: survey respondents were not shown the communications analyzed, so the study describes how brands communicate and how consumers report trusting sustainability claims in general, but does not test how specific communications affect trust. Within the survey, the study identifies how the importance

consumers place on sustainability, their claim discernment, and their exposure to greenwashing are associated with trust-related attitudes in the cosmetics and beauty industry (Oe & Yamaoka 2022; Peyton & Purwanegara 2023).

Existing research in this area focuses on general green claims and greenwashing in a broader sense, but supply-chain-specific processes are rarely examined in isolation (Suphasomboon & Vassanadumrongdee 2025; Persakis et al. 2025). Many existing studies also focus on ambiguity surrounding sustainability certifications and the role these certifications play in brand perception and customer trust (Costa et al. 2026; Hameed & Waris 2018; Gorton et al. 2021; Adhikari et al. 2026). Existing studies of the beauty/cosmetics industry also focus largely outside the U.S., particularly on Asian markets. (Salsabila et al. 2025; Oe & Yamaoka 2022; Utami et al. 2022). Additionally, many of these studies lack analysis of how firms communicate sustainability claims and instead focus solely on the customer perspective. Current studies have a heavy focus on upcycling and the circular economy (Martins et al. 2025; Leskinen 2020; Bom et al. 2019), but lack a specific focus on how supply chain processes in the U.S. affect sustainability in the beauty industry. This study examines not only supply-chain processes in the beauty industry but also how these processes are used as marketing tools by cosmetic companies. Its content analysis focuses on brands in the U.S. market, and its survey sample was recruited through a U.S.-based personal network, although respondents' locations were not recorded. It also considers both brand communication and the customer perspective within a single study, although future research is needed to test the relationship between them directly.

The findings of this study are relevant for several groups. The first being beauty/cosmetic brands and marketing executives, as this study offers insight into which consumer attitudes toward sustainable supply chain communication are associated with trust and skepticism. For policymakers and regulators, the findings support a discussion on sustainable labeling for beauty products. Many are often marked as "green," "natural," or "sustainably sourced" without a proper definition of what that actually looks like for a brand (Costa et al. 2026). Lastly, for consumers, the findings may enable them to effectively distinguish misleading sustainability claims from genuine ones, reducing overall skepticism when purchasing such products.

Beyond its academic and industry-specific relevance, this addresses the broader issue of greenwashing and false sustainability claims across various industries (Persakis et al. 2025). Greenwashing is a genuine barrier to environmental progress, as it prevents customers from distinguishing credible claims from marketing claims (Suphasomboon & Vassanadumrongdee 2025). Thus, the market pressure that should drive companies towards more sustainable practices is weakened (Sajeev 2024). The study's findings have implications not only for consumer protection and market transparency, but also may extend beyond the beauty industry.

LIMITATIONS AND FUTURE RESEARCH DIRECTION

All studies carry constraints that shape how findings should be interpreted, and acknowledging them is not a weakness but a necessary part of responsible research. Recognising these limitations contextualizes the results of this study honestly and identifies specific, actionable directions for researchers building on this work.

1. Methodological Limitations

This study relied on a convenience sample of 102 respondents who were recruited via personal messaging and email. This skewed the sample toward younger age brackets, as almost all respondents who reported their age were between 10 and 34, and toward people in the same social circle, and thus similar demographics.This means that it may not be a sample that well represents the population. Gender data (Q19) were not reported because of concerns about the accuracy of the responses, so the gender composition of the sample is unknown. Because 38.7% of respondents who reported their age were under 18, all six hypothesis tests were repeated without these respondents. The pattern of results was unchanged: H1-H3 remained non-significant, and H4 ($\rho = 0.37$, $p = 0.010$), H5 ($\rho = 0.46$, $p < 0.001$) and H6 ($\rho = 0.49$, $p < 0.001$) remained significant, although H4 no longer met the Bonferroni-corrected threshold. Additionally, not all respondents answered every survey question, and individual hypothesis tests were conducted on the subset of respondents who provided complete answers to the relevant questions. This may have introduced bias if respondents who skipped certain questions systematically differed from those who answered them. This study also relied exclusively on correlational analysis, which can identify relationships between variables but cannot establish causation. In addition, some constructs overlap conceptually. Greenwashing exposure (Q12) and perceived alignment (Q11) both concern the gap between brands' claims and their practices, so H3 examines two closely related attitudes rather than two fully independent constructs. Future research should use a larger, random sample that is more representative of the broader consumer base. It should also consider an experimental design rather than a correlational one, such as a within-subject design in which each respondent rates the credibility of several real or adapted brand claims that vary in specificity, certification, and imagery. This would allow H1 and H2 to be tested directly, and would bring the content analysis into the survey.

2. Scope of Study

This study focused exclusively on the U.S. cosmetics and beauty industry, and the content analysis examined a limited set of brands' websites and social media posts. Survey respondents were recruited through the researcher's personal network in the United States, but their location was not recorded, so the sample cannot be confirmed as representative of U.S. consumers. The selected content was based on visible sustainability marketing rather than a random sample of the industry. This narrow scope may not reflect international consumer trust dynamics, as demonstrated by the literature review, which is heavily concentrated in Europe, Indonesia, Thailand, and Brazil. Future research could expand this study's approach to other regions to allow for direct comparison, or apply the same framework to similar industries (fashion, personal care) to see whether attitude-behavior gaps are unique to cosmetics or represent a broader pattern in sustainability marketing.

3. Data Limitations

This study is entirely reliant on self-reported survey data. Thus, the data is subject to social desirability bias, as respondents may overstate their concern for sustainability or their skepticism toward vague claims, since these are typically socially favorable positions. In addition, each construct in this study was measured with a single survey item. As a result, the reliability of each measure could not be assessed, and measurement error is likely to have weakened the observed correlations, which may partly explain the non-significant results for H1-H3. All survey items were also positively worded agreement statements, so respondents who tend to agree with statements regardless of their content (acquiescence bias) may have inflated the positive correlations found for H4-H6. To check for this, responses were screened for straightlining: no respondent gave the same answer to every item, no respondent selected "Agree" or "Strongly Agree" on every item they answered, and 95 of 101 respondents disagreed with at least one item. Majorities also disagreed with several positively worded statements including Q7 (50.5%), Q8 (70.3%) and Q11 (71.3%). These checks suggest that responses were not driven by uniform agreement, but they cannot rule out a milder tendency to agree. In addition, the distribution of responses to the multiple-select item (Q5) showed an irregular pattern that could not be fully explained, and its results are therefore treated as exploratory. Additionally, the content analysis component of this study relied on one researcher to categorize brand imagery into themes, and brands and posts were selected purposely rather than systematically, without recording the total number reviewed. As a result, the frequency of each theme could not be quantified and the themes are illustrative rather than representative of the industry. Future research should use a systematic sampling procedure, record the number of posts examined, and code each post for each theme. Future research could also address these limitations by including behavioral data (purchasing records, eye-tracking on marketing materials) and self-reported attitudes, by using multiple independent themes, and by measuring each construct with short, validated multi-item scales that include reverse-worded items.

CONCLUSION

The primary aim of this study was to examine how cosmetic and beauty companies communicate sustainable supply-chain practices to consumers, and how consumers perceive the credibility of sustainability claims and trust the brands that make them. The content analysis and the survey addressed these questions separately, as the survey measured general attitudes toward sustainability claims rather than responses to the specific communications analyzed.

The analysis revealed that claim discernment and trust in independent sources did not show statistically significant relationships with consumer trust, although nearly all respondents (98.8%) reported trusting brands more when they communicate clearly, which may be partly attributable to uniformly high responses and low variance, although nearly all respondents (98.8%) reported trusting brands more when they communicate clearly. Exposure to greenwashing showed a relationship trending in the expected direction, and most respondents reported that greenwashing damages brand trust, even when a consumer is satisfied with the brand's products. In contrast, three relationships were statistically significant, and all

three remained significant after correction for multiple testing. Respondents who value sustainability more report greater trust damage from misleading claims, and both claim discernment and exposure to greenwashing were positively associated with trust in independent sources over brand marketing. Because responses were concentrated at the top of the scale, these significant associations are sensitive to a small number of respondents, and should be interpreted with caution. The survey suggested that terms like "ethical" or "sustainable" sourcing are unevenly understood: they are commonly associated with environmental, product, fair-wage and certification qualities, but rarely with supply-chain traceability, community benefit, or child labor protections. The pattern parallels the content analysis but was not tested against it.

These findings suggest that consumers value clear, specific communication, but that their trust may depend most on whether a claim avoids the perception of a difference between a promise and actual practice. This changes the central challenge for brands, as instead of assuming that more detailed claims or certifications will automatically build trust, the findings suggest that brands may benefit from closing the gap between sustainable supply-chain practices and labor conditions. They should avoid even minor inconsistencies between marketing claims and actual practice, since respondents report negative attitudes toward brands once such inconsistencies are noticed. The significant results also suggest that the cost of this gap is highest among consumers who care most about sustainability, and that greenwashing pushes consumers away from brand marketing toward independent sources.

The study was also limited by its reliance on a convenience sample recruited through personal messaging, which skewed younger and may not generalize to the broader population of cosmetics consumers. The study also relies entirely on self-reported survey data, which can be susceptible to social desirability bias. In addition, the survey did not show respondents the brand communications analyzed, so the relationship between specific communications and consumer trust remains untested. The content analysis is based on a single researcher's categorization of brand communications into themes. These constraints mean the findings should be interpreted as an initial picture of those dynamics.

Future research could build on these findings by incorporating behavioral data to test whether the attitude-behavior gaps identified here hold up when consumer trust is measured through purchasing decisions rather than self-reported attitudes alone. Future studies could also show participants real or adapted brand claims drawn from the content analysis, varying in specificity, certification, and imagery, and ask each participant to rate the credibility of several claims. Such a within-subject design would test directly how specific claims affect trust, connecting brand communication and consumer perception within a single analysis. Expanding the study's scope to other countries or adjacent industries could show whether these patterns are specific to the U.S. cosmetics market or reflect a broader phenomenon in sustainability marketing.

For industry professionals, these findings indicate that cosmetics and beauty brands seeking to build genuine consumer trust may benefit from focusing less on the volume of their sustainability claims and

more on ensuring those claims are fully substantiated and clearly communicated. This is especially important for brands targeting sustainability-driven consumers, since this group reported the greatest trust damage by misleading claims. For policymakers, the uneven interpretation of sourcing terms identified in this study strengthens the case for clearer, standardized sustainability labeling requirements.

In conclusion, this study suggests that consumer trust in sustainability marketing may be shaped less by the presence of a claim, and more by whether it is perceived to align with a brand's actual practices. This distinction is essential for an industry facing increasing scrutiny over greenwashing, and for consumers navigating a crowded marketplace full of sustainability promises.

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