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DIGITAL STORYTELLING AND ESG COMMUNICATION: SENTIMENT MINING OF CONSUMER ENGAGEMENT ON SOCIAL MEDIA

Minh T.H. Le¹, Think-Thai Dang^{2*}

¹Senior Lecturer in University of Economics Ho Chi Minh City (UEH), Vietnam.
Email: minhltth@ueh.edu.vn, ORCID iD: 0000-0003-2698-6552

²Senior Lecturer in University of Economics Ho Chi Minh City (UEH), Vietnam. Email: thinkhdt@ueh.edu.vn

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Corresponding Author: Think-Thai Dang
(thinkhdt@ueh.edu.vn)

ABSTRACT

Digital platforms such as TikTok and YouTube have emerged as primary channels for Environmental, Social, and Governance advertising. Figuring out how general audiences interpret those messages is increasingly imperative for stakeholders committed to sustainability and effective outreach. This study integrates sentiment analysis with methodologies including Latent Semantic Indexing (LSI) and Latent Dirichlet Allocation (LDA), complemented by word cloud visualizations, to analyze 400 ESG-focused videos alongside over a quarter-million user comments. Four predominant discourses emerge: concerns regarding greenwashing and foundational environmental awareness; ethical tensions inherent in conscientious consumption; an evolving optimism in technological solutions; and the ways in which platform-specific algorithms amplify emotional responses. Within the more positive domains of sentiment analysis, audiences endorse transparency and authenticity, whereas more critical zones resonate with skepticism whenever brands appear to be masking reputational shortcomings. Rapid emotional cues combined with compelling visuals carry substantial persuasive weight in short-form video content – an encouraging outcome consistent with the peripheral route of the Elaboration Likelihood Model. Furthermore, message clarity and demonstrable corporate follow-through sustain audience trust, lending theoretical support to Social Influence and Signaling theories. Collectively, these findings advocate for refined, platform-tailored ESG campaign strategies that anticipate and leverage viewer engagement through clicks and comments.

KEYWORDS: ESG Advertising; Sustainability Communication; Sentiment Analysis; Short-Form Video; Elaboration Likelihood Model; Signaling Theory; Consumer Engagement.

1. INTRODUCTION

In today's marketplace, brands increasingly showcase their green credentials, prompting marketers to investigate how emotional appeals—whether through fear, pride, guilt, or empathy—shape public perception and influence purchase behavior. Empirical studies consistently demonstrate that emotion-based messaging often outperforms fact-centric communication in the context of ESG narratives (Bünzli, 2021; Lee et al., 2024; Septianto & Paramita, 2021). These affective triggers activate automatic cognitive responses, aligning with the peripheral route of the Elaboration Likelihood Model (Petty & Cacioppo, 1986) and eliciting rapid, though sometimes superficial, consumer reactions. Message framing further complicates these effects: gain-framed appeals resonate more with individuals inclined toward abstract, long-term thinking, while loss-framed messages appeal to those with a focus on immediate, concrete outcomes (Baek et al., 2022). Cultural dimensions—such as individualism versus collectivism, power distance, and ethical dissonance—moderate these responses across markets (Bekmeier-Feuerhahn & Nguyen, 2021; Kim et al., 2021). Ultimately, credibility emerges as the critical determinant of persuasive success. When audiences perceive ESG claims as disingenuous or indicative of greenwashing, the backlash can negate even the most carefully crafted messages (Lee et al., 2022).

The growing prominence of AI-driven personalization is subtly transforming how advertisers evaluate the effectiveness of ESG messaging. By tailoring content to individual preferences, algorithmic systems enhance message relevance and amplify social endorsement—particularly in the context of prosocial campaigns (De Keyser et al., 2022). In doing so, this approach reinforces the social proof mechanism central to Social Influence Theory (Kelman, 1958), while simultaneously raising new ethical concerns regarding transparency and audience trust. Yet, several critical questions remain unresolved. It is still unclear whether emotional appeals outperform rational arguments in the long term when it comes to digital sustainability communication. The extent to which personalized content affects the perceived moral capital or social kudos of advertisers has yet to be fully theorized. Moreover, there is limited understanding of how local cultural norms and ethical frameworks modulate the persuasiveness of corporate responsibility messaging across diverse markets.

To address these gaps, this study poses the following questions:

1. How do emotional and rational appeals in ESG advertising influence consumer engagement over time?
2. What role does AI-driven personalization play in enhancing the effectiveness of sustainability advertising?
3. How do cultural factors moderate the effectiveness of CSR and ESG messaging?

2. LITERATURE REVIEW AND THEORETICAL BACKGROUND

2.1. ESG and ESG advertising

Environmental, Social, and Governance (ESG) analysis assesses how corporations manage risks and capitalize on opportunities across three interrelated domains: environmental impact, societal engagement, and governance practices. Initially designed for investment decision-making, the framework has since permeated corporate boardrooms, branding strategies, and investor communications (Choi et al., 2024). The environmental dimension focuses on issues such as greenhouse gas emissions, energy consumption, waste management, and resource sustainability, particularly in the context of climate change and water scarcity (Mulligan et al., 2020; Dhahri et al., 2021). The social pillar shifts attention to a company's relationships with employees, communities, and consumers, emphasizing labor equity, workforce diversity, human rights, and local engagement—factors increasingly linked to brand loyalty and corporate reputation (Huang et al., 2022). Governance addresses internal accountability structures, including board composition, anti-corruption policies, and adherence to the rule of law, thereby informing stakeholder perceptions of ethical integrity and operational transparency (Bünzli, 2022; Chang et al., 2015).

Contemporary consumers increasingly evaluate Environmental, Social, and Governance (ESG) standards when making purchasing decisions. In response, many firms showcase their ESG credentials through polished campaigns that resemble philanthropic initiatives. However, consumer reactions remain divided, as skepticism often tempers perceptions of brand goodwill (Moon & Kim, 2022). Psychological research attributes this divergence to differences in emotional versus rational information processing. Promotion-focused individuals respond more favorably to gain-framed messages that emphasize potential benefits, while prevention-focused consumers exhibit heightened sensitivity to loss-framed appeals (Choi & Choi, 2024). Consequently, marketers frequently test multiple message frames to determine which elicits the strongest audience response. Parallel to this trend, a growing

countermovement highlights concerns about greenwashing. When marketing efforts appear insincere or manipulative, consumer scrutiny intensifies rapidly. Scholars argue that a demonstrable record of environmental commitment—supported by credible third-party certifications—can mitigate suspicion and restore trust (Jo & Kim, 2017). Signaling Theory further suggests that concrete, verifiable ESG claims enhance credibility, whereas vague or exaggerated assertions risk eroding stakeholder confidence over time (Bünzli, 2022).

Recent research on message framing suggests that gain-framed communications are more persuasive for consumers who habitually engage in abstract, long-term thinking, while loss-framed appeals are more effective for those focused on immediate, short-term outcomes (Chang et al., 2024). Emotionally charged visual or narrative content tends to enhance engagement among viewers with low baseline empathy, whereas audiences with greater prior knowledge often prefer messages grounded in logical consistency and data-driven evidence (Bünzli, 2022). Although ESG messages tailored to individual interests may initially appear relevant, they may also provoke psychological reactance if perceived as overtly manipulative (Bartsch & Kloß, 2019). The perceived credibility of the message source remains a critical factor: communications delivered by independent influencers or trusted non-governmental organizations are typically regarded as more persuasive than those issued directly by corporations (Moon & Kim, 2022). Furthermore, ESG advertising embedded within native platform formats tends to outperform conventional placements. Cultural context further moderates effectiveness—assertive ESG framing often resonates in collectivist cultures but may produce adverse reactions in more individualistic societies (Huang & Yoon, 2022; Bang et al., 2021).

2.2. Theoretical Foundations

2.2.1. Elaboration Likelihood Model (ELM) and ESG Advertising

The Elaboration Likelihood Model (Petty & Cacioppo, 1986) proposes two distinct routes of persuasion—central and peripheral—that influence how consumers process ESG advertising. Highly involved consumers, who actively seek information on environmental claims, are more likely to engage with content through the central route, requiring evidence-based arguments and transparent disclosures (Choi & Choi, 2024; Li et al., 2025). For these audiences, message credibility depends on alignment between the brand's past performance and

its current sustainability claims; inconsistencies can lead to rapid disengagement (Jo & Kim, 2017). In contrast, low-involvement consumers often rely on peripheral cues such as vivid imagery, emotional tone, or recognizable brand symbols, which may evoke immediate but shallow persuasion (Moon & Kim, 2022). While this heuristic approach can produce short-term engagement, its effectiveness diminishes when audiences perceive the content as overly polished or insincere (Bartsch & Kloß, 2019; Bünzli, 2022). Ultimately, the persuasive success of ESG campaigns depends on how well the messaging is calibrated to the audience's level of involvement and demand for substantiation. Excessive emphasis on stylistic appeal without credible follow-through risks alienating even initially receptive viewers.

2.2.2. Regulatory Focus Theory and Message Framing

Regulatory Focus Theory (Higgins, 1997) posits that consumers' motivational orientations influence their responsiveness to ESG advertising. Individuals with a promotion focus are typically driven by aspirations and the pursuit of positive outcomes; they tend to respond favorably to gain-framed messages that emphasize environmental progress and optimistic future scenarios (Choi & Choi, 2024). In contrast, prevention-focused consumers are more attuned to potential risks and tend to resonate with loss-framed appeals that underscore ecological threats and the costs of inaction. Effective ESG communication thus relies on achieving regulatory fit—aligning the message framing with the audience's motivational focus to enhance persuasive impact. Furthermore, prevention-oriented audiences are particularly skeptical of vague claims or superficial information. For these consumers, persuasive efficacy increases when ESG messages are grounded in transparent data, verifiable facts, and clearly articulated evidence, thereby minimizing resistance and reinforcing credibility.

2.2.3. Signaling Theory and ESG Credibility

Spence's (1973) original Signaling Theory remains foundational in addressing information asymmetries. In the context of Environmental, Social, and Governance (ESG) communication, firms increasingly apply this framework to convey the otherwise intangible quality of ethical commitment. Effective ESG marketing leverages credible signals—such as third-party certifications and consistent reporting practices—to mitigate knowledge gaps and foster stakeholder trust (Jo & Kim, 2017). When corporate messaging lapses into vague promises or opportunistic timelines, however,

skeptical audiences often interpret such efforts as greenwashing, leading to reputational damage, social media backlash, or even regulatory intervention. The persuasive power of ESG communication thus lies not in the frequency or volume of claims, but in the perceived authenticity and alignment with a firm's demonstrated track record. Established brands with a sustained history of verifiable progress are far more likely to gain consumer trust than recent entrants who pivot toward sustainability as a reactive branding tactic. Consequently, ESG communication must be grounded in transparent, evidence-based disclosures. Over time, this disciplined approach not only enhances credibility but also redirects limited consumer attention toward the foundations of enduring brand equity.

3. HYPOTHESES DEVELOPMENT

Advertisers have long relied on emotional cues to attract attention, foster trust, and stimulate purchasing behavior. A growing body of empirical research indicates that emotionally charged advertisements consistently outperform rational, logic-based messaging on key metrics such as engagement, memory retention, and sales outcomes (Whitley et al., 2024; Yoon et al., 2023). Positive emotions—such as joy and inspiration—tend to sustain viewer attention, while negative emotions like fear and guilt are more effective in prompting immediate behavioral responses (Todri et al., 2021). This affective dynamic also enhances the impact of sustainability and ESG narratives; when such content is perceived as authentic and visually compelling, it significantly improves brand attitudes and message effectiveness (Parguel et al., 2011). According to the Elaboration Likelihood Model (Petty & Cacioppo, 1986), these emotional appeals operate via the peripheral route of persuasion, particularly among audiences who are distracted, cognitively overloaded, or time-constrained. This mechanism aligns with the fast-paced nature of platforms like TikTok and YouTube Shorts, where content is consumed rapidly and often passively. While the present dataset has not yet undergone sentiment or topic analysis, existing literature strongly suggests that emotionally infused ESG messaging is more likely to resonate than rational appeals in visually saturated, high-tempo digital environments.

H1. Emotionally framed ESG messages elicit more positive sentiment than rationally framed messages.

In today's digital environment, users scroll through an endless stream of short-form content on platforms such as TikTok and YouTube Shorts, where a five-second window often determines

whether content is noticed or ignored. As a result, creators increasingly rely on emotionally charged hooks to capture attention before viewers engage in deliberate processing. This instinct is supported by empirical evidence. Todri et al. (2021) found that engagement behaviors—such as clicks, shares, and rapid comments—serve as mechanisms that translate visual appeal into offline outcomes, including increased store visits. Similarly, Yoon and colleagues (2023) reported that cause-related content gains social traction and stimulates public discourse only when the imagery elicits emotions strong enough to provoke conversation. Additional findings from social psychology suggest that video loops incorporating dynamic visuals and music consistently outperform static images or text-based messages across key indicators such as shareability, emotional impact, and viewer retention. Based on this evidence, the present study hypothesizes that ESG video content will outperform text-based messaging in eliciting emotional responses, expanding reach, and driving viral engagement.

H2. Video-based platforms (e.g., TikTok, YouTube Shorts) enhance emotional engagement with ESG messages more effectively than text-based platforms.

Brands that consistently align their environmental claims with measurable, long-term action are more likely to be perceived as credible and trustworthy. This perception of authenticity is not instantaneous; it must be cultivated over time through repeated disclosures and demonstrated accountability. Yoon et al. (2023) underscored this in an experimental study, showing that identical ESG messages generated warmer responses when delivered by established sustainability leaders compared to newer entrants. Social media sentiment analysis further reinforces these findings: user-generated content that praises corporate environmental initiatives frequently references tangible evidence, while accusations of greenwashing tend to dominate discussions where claims appear superficial or unsubstantiated. This pattern supports a clear empirical expectation—consumers are more inclined to respond positively to brands with robust sustainability track records, while reacting critically or even indignantly toward those perceived as engaging in symbolic or surface-level ESG efforts.

H3. Brands with high ESG credibility receive more favorable sentiment responses to ESG advertising than brands with low credibility.

Regulatory Focus Theory, introduced by Higgins (1997), distinguishes individuals by their motivational orientation: promotion-focused individuals are driven

by aspirations and the pursuit of gains, whereas prevention-focused individuals are motivated by a desire to avoid losses. Experimental evidence suggests that gain-framed messages emphasizing innovation and collective benefit resonate strongly with promotion-minded audiences, eliciting positive affect and engagement. In contrast, loss-framed appeals—such as warnings about environmental degradation or reputational harm—evoke greater responsiveness among prevention-oriented consumers. This heightened sensitivity is often accompanied by increased cognitive resistance, echoing Brehm's (1966) concept of psychological reactance, wherein perceived persuasive pressure triggers defensive counter-reactions. In the ESG context, skeptical audiences are especially attuned to signs of inauthenticity. Social media discourse often reflects this, with prevention-focused users labeling content as "fake," "greenwash," or "trash." Sentiment analysis of comment clusters reveals that such language frequently signals early disengagement and message rejection. Aligning message framing with the audience's regulatory focus can mitigate this defensive response, fostering more open engagement and enhancing the persuasive potential of ESG communication.

H4. Promotion-focused consumers respond more positively to gain-framed ESG messages, while prevention-focused consumers respond more strongly to loss-framed messages.

4. METHOD

4.1. Demographic data collection

This analysis draws on multiple data sources, combining publicly available short-form videos from TikTok and YouTube with ESG-focused brand

advertisements. To avoid the limitations of self-reported data, the researchers prioritized behavioral metrics such as view counts, likes, replies, and shares (Lira et al., 2022; Todri et al., 2022). The dataset focused on 42 videos that generated at least 50 user comments, enabling in-depth exploration of dialogic interaction and audience sentiment. Data were extracted via public platform APIs, capturing timestamps, usernames, and full comment text. The resulting text corpus was then preprocessed—cleaned, tokenized, and manually validated—prior to the application of sentiment and thematic coding classifiers. To triangulate findings, a follow-up questionnaire was distributed to real-world consumers to assess whether terms such as *greenwashing* and *carbon neutral* still held relevance in contemporary discourse. This multi-method approach strengthens the empirical foundation for understanding how everyday audiences engage with ESG messaging across digital platforms.

Preliminary results reveal dynamic audience sentiment shifts across brands. LG and Nike led in total reach, each attracting millions of views and thousands of positive reactions within the first week. Patagonia and Greenpeace, both long-standing advocates of environmental causes, elicited dense comment threads but received fewer likes—suggesting deeper engagement from niche, values-driven audiences rather than mass appeal. Heineken's dual campaigns triggered intense comment activity but plateaued at mid-tier impression levels, highlighting a disparity between reach and resonance. In contrast, ESG ads from MANGO and a Coca-Cola sub-brand generated minimal traction. Full comparative figures are reported in Table 1.

Table 1: Data collection.

Brands	Campaign	Total watched	Total Comments	Total Likes
		215,019,341	13,152	622,324
LG	We donate make life good, you do	83,000,000	201	79,000
Nike	What if you can?	37,000,000	707	193,000
Levi's	Use your voice	692,803	92	425
Greenpeace International	There's a monster in my kitchen	621,492	202	3,200
Patagonia	Don't buy this jacket"	456,000	27	722
Heineken	Home gatherings	337,198	242	3,000
Heineken	The best driver	279,073	201	5,400
Lacoste	Lacoste x save our species	216,000	37	864
MANGO	Committed	128,000	32	1,900
Coca-Cola	World without waste	81,000	29	313
Mercedes-Benz	Land. Sea. Air.	66,641	213	3,100
Ben & Jerry's	Justice for all	14,936	51	139
Corona	Plastic fishing tournament	9,155	1	90

4.2. Method for Sentiment Analysis

This investigation integrates sentiment analysis within the framework of the Elaboration Likelihood

Model (ELM), conceptualizing viewers' emotional reactions to video-based Environmental, Social, and Governance (ESG) campaigns as indicators of peripheral-route processing. In contrast, user-

generated textual responses to the same campaigns are interpreted as evidence of central-route elaboration. A secondary theoretical lens, Social Influence Theory, is employed to examine audience engagement by differentiating between its normative and informational components. A purposive sample of 42 ESG-related videos from TikTok and YouTube—each generating at least 50 public comments—was curated to ensure robust, multi-perspective discourse around individual media artifacts. Public platform APIs were used to extract objective engagement metrics, including view counts, likes, comments, and shares, thereby reducing dependence on self-reported behavior.

Text data were preprocessed using tokenization, stop-word removal, lemmatization, and emoji conversion to minimize noise while preserving colloquial sentiment indicators. Sentiment classification combined VADER's rule-based lexicon with outputs from a fine-tuned BERT transformer, enabling nuanced detection of contextual cues and categorization of comments into positive, negative, or neutral sentiment (Deerwester et al., 1990). Latent Dirichlet Allocation (LDA) was applied separately to positive and negative comment sets to extract thematic clusters, including perceived transparency, authenticity, and accusations of greenwashing (Blei et al., 2003). Results were visualized through scatter plots, word clouds, and bar graphs to illustrate how sentiment intensity aligns with viewer engagement. Reliability was strengthened through manual coding of 500 comments, achieving Krippendorff's alpha above 0.85, and through five-fold cross-validation of classifier performance. Together, these methods form a scalable analytical pipeline capable of evaluating the real-world impact of ESG messaging in fast-paced, emotionally charged social media environments.

5. SENTIMENT ANALYSIS RESULTS

Figure 1 presents a two-dimensional scatter plot of sentiment polarity derived from user comments. The horizontal axis represents positive sentiment scores, while the vertical axis captures negative sentiment scores. A yellow-to-blue color gradient overlays the plot, with shades ranging from neutral green and moderate yellow to deep blue, indicating the relative emotional intensity of each comment. The majority of data points cluster in the lower-left quadrant, suggesting that most user responses exhibit mixed or muted emotional tones rather than extreme reactions. A concentrated area of deep blue in the lower-right quadrant reflects strongly positive sentiment—typically associated with favorable

responses to corporate ESG communications and expressions of brand trust. In contrast, the sparse distribution of points in the upper-left quadrant denotes high negative sentiment, likely linked to accusations of greenwashing or skepticism toward sustainability claims. This distribution pattern aligns with previous research indicating that emotionally extreme content—whether positive or negative—tends to generate higher engagement (Berger & Milkman, 2012). Overall, the visualization suggests that ESG campaigns more often prompt moderate approval than provoke strong praise or backlash, challenging assumptions that all sustainability messaging incites polarized reactions.

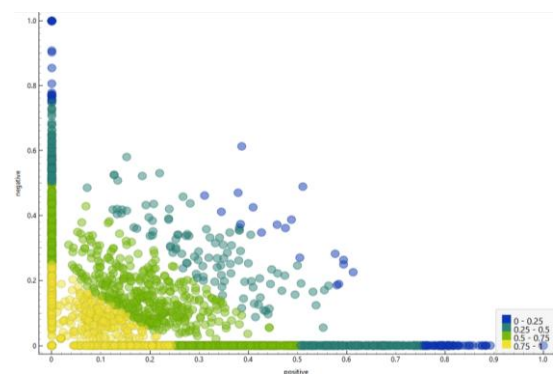


Figure 1: Sentiment analysis.

Positive word clouds

Analysis of positively valenced user comments reveals five distinct thematic clusters. The first centers on environmental concerns, with terms such as *sustainability*, *deforestation*, and *palm* suggesting that many commenters actively evaluate ecological impact alongside brand messaging. The second cluster references specific corporate entities—*Nike*, *Google*, *Samsung*—which are frequently cited as exemplars of responsible corporate behavior, though often with an implicit invitation for critique. Emotional expressions emerge prominently in the third cluster; words like *love*, *amazing*, and *video* highlight the persuasive power of emotionally resonant visuals to convert neutral viewers into brand advocates (Ludwig et al., 2022). Economic language appears in the fourth group, where terms such as *cheap*, *labor*, *Shein*, and *Temu* reflect ongoing public concerns about fast fashion, labor ethics, and superficial sustainability efforts. The final cluster includes words like *branding*, *advertising*, and *digital*, drawing attention to the persuasive mechanisms at play and indicating that audiences are critically aware of underlying media strategies. Collectively, these thematic strands suggest that while emotionally engaging public relations content can

elicit positive sentiment, audiences remain emotional receptivity and ethical scrutiny (see Table 2 and Figure 2). discerning – evaluating ESG messages with both

Table 2: Thematic Analysis of Positive Sentiment in ESG Advertising.

Theme	Key Keywords	Key Insights
Environmental Concerns	"sustainability," "environment," "deforestation," "oil," "palm"	Strong consumer awareness of climate-related issues, emphasizing deforestation, oil use, and environmental sustainability.
Corporate Responsibility	"Nike," "Google," "Samsung," "corporate," "responsibility"	Discussions focus on how corporations contribute to sustainability, with tech companies (Google, Samsung) viewed positively.
Consumer Sentiment & Engagement	"love," "amazing," "friendly," "video," "storytelling"	Consumers engage with ESG messaging when it includes emotional storytelling, digital content, and visually appealing narratives.
Greenwashing & Ethical Scrutiny	"cheap," "labor," "trash," "Shein," "Temu," "greenwashing"	Negative sentiment clusters around greenwashing concerns, unethical labor practices, and skepticism toward fast fashion brands.
Marketing & Digital Influence	"advertising," "branding," "innovation," "digital," "influence"	Digital storytelling and marketing play a crucial role in shaping ESG perceptions, with advertising and branding influencing sentiment.



Figure 2: Positive word clouds.

Negative Sentiment Theme Analysis

Thematic analysis of negative sentiment in response to ESG advertising reveals a persistent undercurrent of public skepticism. Key terms such as oil, palm, trash, and cheap frequently co-occur with accusations of greenwashing and questionable sourcing, indicating that consumers readily associate these words with environmental insincerity. The fast

fashion sector is particularly scrutinized, with brand references like Nike, Temu, and Shein prompting concerns about labor practices, product durability, and a lack of transparency regarding country-of-origin disclosures. Although digital storytelling techniques – such as short-form video and content marketing – remain dominant modes of ESG communication, audiences are quick to dismiss such messaging when it is perceived as performative or overly scripted. Broader distrust is further reflected in recurring keywords such as banned, bad, money, and trash, forming a lexical field that resembles civic disillusionment with unfulfilled sustainability promises. Across all thematic domains, the central takeaway is clear: brands may excel in message delivery and platform optimization, yet falter in building lasting credibility and accountability if their ESG narratives lack substance (see Table 3 and Figure 3).

Table 3: Thematic Analysis of Negative Sentiment in ESG Advertising.

Theme	Key Keywords	Key Insights
Sustainability and Environmental Concerns	"oil," "palm," "trash," "wool," "cheap"	Consumers are concerned about environmental sustainability, greenwashing, and unethical sourcing practices.
Fast Fashion and Ethical Issues	"Nike," "shoes," "cheap," "Temu," "Shein," "China"	Discussions focus on labor exploitation, product quality, and transparency issues in fast fashion brands.
Role of Digital Media and Storytelling in ESG Communication	"video," "marketing," "storytelling," "advertising"	Digital media, especially video content, plays a crucial role in ESG communication, but authenticity is key.
Consumer Sentiment and Skepticism	"banned," "trash," "cheap," "bad," "money"	Consumers express skepticism and criticism regarding misleading ESG claims and poor corporate sustainability practices.



Figure 3: Negative word clouds.

Comparative Sentiment Analysis

Analysis of positive and negative sentiment in Environmental, Social, and Governance (ESG) advertising reveals a pronounced divergence in consumer responses. Positive engagement is frequently driven by emotionally resonant storytelling, vivid visual presentation, and perceived brand authenticity. Sentiment clusters containing terms such as video, love, and eco suggest that audiences feel acknowledged and believe the brand has followed through on its publicly stated

sustainability commitments. Brands such as Nike and Adidas regularly appear in these affirmative narratives, earning praise for responsible sourcing practices and for producing immersive, narrative-driven campaigns. In contrast, negative sentiment is strongly linked to perceived superficiality. Accusations of greenwashing, opaque labor practices, and ambiguous ESG language dominate critical commentary. Fast fashion brands like Shein and Temu are frequent targets, with emotionally charged keywords such as *oil*, *trash*, and *cheap* indicating deep mistrust and dissonance between marketing claims and observable practices.

Patterns of public engagement reinforce this polarity. Transparency and demonstrable action amplify positive sentiment, whereas secrecy and documented misconduct intensify negative reactions. Apparel brands, in particular, are often caught in this reputational flux—commended for environmental innovation one day and criticized for labor violations the next. While frequency-based dashboards offer a snapshot of which narrative dominates at a given moment, they often oversimplify nuanced public opinion. As Ludwig et al. (2022) note, such patterns warrant deeper qualitative investigation to capture the full complexity of consumer sentiment.

Table 4: Comparison findings of sentiments analysis.

Aspect	Positive Sentiment	Negative Sentiment
Dominant Themes	Support for sustainability, engagement with ESG content, emotional connection to brands	Skepticism toward greenwashing, concerns over labor ethics, criticism of corporate sustainability claims
Engagement Factors	Emotional storytelling, visual content, verified ESG efforts	Lack of transparency, misleading sustainability claims, unethical labor practices
Most Frequent Words	"video," "love," "amazing," "shoes," "wool," "Nike," "eco," "green"	"oil," "palm," "trash," "bad," "Nike," "Temu," "Shein," "cheap"
Consumer Perception	Brands that communicate sustainability authentically receive positive sentiment	Brands perceived as engaging in greenwashing face backlash
Fashion Industry Focus	Ethical sourcing, sustainable materials, brand storytelling (e.g., Nike, Adidas)	Fast fashion criticism, labor exploitation, poor sustainability practices (e.g., Shein, Temu)

6. TOPIC MODELING RESULTS

Topic modeling in general

LDA

A recent Latent Dirichlet Allocation (LDA) analysis categorizes positive consumer sentiment into four distinct thematic clusters. The first centers on corporate environmental responsibility, with keywords such as *carbon*, *green*, *Google*, *waste*, and *planet*, indicating that consumers are actively monitoring brand commitments related to emissions reduction and waste management. The second cluster focuses on apparel and sustainability imagery, anchored by terms like *Nike*, *wool*, *plastic*, *palm*, and *deforestation*. These tokens reflect enduring concerns about fast fashion’s sourcing practices and the supply chain transparency increasingly highlighted in ESG disclosures.

The third theme underscores the persuasive impact of digital storytelling. Keywords such as *video*, *animation*, *watch*, and *amazing* suggest that dynamic visual content plays a critical role in delivering sustainability narratives that capture and retain consumer attention on short-form platforms. The final cluster, composed of words like *love*, *fun*, *benz*, *people*, *choice*, *meat*, and *animals*, points to an emerging group of ethically motivated consumers. For this segment, brand selection is closely tied to personal values, with purchases serving as

expressions of support for environmental and social causes (see Table 5).

Table 5: LDA topic keywords in general.

Topic	Topic keywords
1	carbon, future, sell, awesome, shoe, adidas, green, money, buying, job
2	trash, shoes, nike, apple, guys, energy, companies, expensive, recycled, cool
3	nuclear, vegan, wait, feel, save, earth, life, greenwashing, mirrors, plural
4	nice, samsung, god, google, software, solution, fleeb, lindo, video, watch
5	car, meat, eating, en, children, yeah, eat, gonna, usa, development
6	love, mercedes, google, benz, change, 0, neutral, sad, support, b
7	video, wow, amazing, plumbus, animation, beautiful, favorite, rick, morty, companies
8	google, wool, day, snl, funny, smiling, ready, blue, salute, planet
9	bad, 1080p, temu, hai, shein, youtube, meaning, melhor, battery, google
10	cars, sounds, n£o, electric, commercial, hydrogen, bom, 3, logo, happy

Latent Semantic Indexing (LSI)

A recent application of Latent Semantic Indexing (LSI) identified ten salient themes in social media discourse related to Environmental, Social, and Governance (ESG) topics and sustainability. Notably, nearly half of this discourse – grouped into four dominant clusters – centered on similar concerns.

Sustainability and Environmental Issues. Keywords such as *oil, palm, deforestation, and plastic* frequently appeared, reflecting widespread anxiety about environmental degradation, resource extraction, and waste generation. These concerns are consistent with earlier findings on public unease around ecological sustainability (White et al., 2019).

Emotional and Perceptual Reactions. Words like *smiling, glasses, purple, yellow, and diamond* highlight the role of visual cues and color perception in shaping initial reactions to ESG advertising. Prior research suggests that such sensory triggers function as subtle yet effective persuasive elements (Parguel et al., 2011; Ludwig et al., 2022).

Skepticism and Criticism. Terms including *wool, plastic, Nike, and people* reflect persistent consumer suspicion toward greenwashing and superficial corporate claims. This aligns with established literature indicating that consumers are highly attuned to inauthentic sustainability messaging (Delmas & Burbano, 2011).

Behavioral and Consumption Trends. Words such as *eating, car, takeout, meat, and Chipotle* suggest growing interest in plant-based diets and ethically aligned consumption. These patterns resonate with documented shifts toward sustainability-oriented purchasing behavior (White et al., 2019).

Collectively, these themes illustrate how consumers process ESG messaging through a multidimensional lens. Audiences simultaneously evaluate environmental impact, labor ethics, and emotional resonance—often within a single interaction. LSI and natural language processing tools thus offer a valuable but partial map of this complex sentiment landscape, giving marketers a directional compass for optimizing future sustainability communication strategies (see Table 6).

Table 6: Latent semantic indexing.

Topic	Topic keywords
1	energy, video, beautiful, shoes, awesome, bag, plastic, initiative, nike, wool
2	video, amazing, job, loved, single, women, android, happily, 3d, 1080p
3	love, fleeb, pair, fun, innovative, hai, pretty, resource, choice, youtube
4	google, carbon, future, green, apple, day, money, snl, increase, delivery
5	chipotle, love, nike, video, yeah, gonna, hope, people, idea, company
6	samsung, earth, cool, google, god, ready, waste, time, guys, lol
7	love, mercedes, wow, google, temu, benz, people, wool, shein, care
8	oil, palm, amazing, meat, animals, deforestation, love, sounds, people, watching
9	planet, companies, true, people, friendly, goal, hours, save, trash, eco
10	nice, car, design, eating, watch, 2, animation, amazing, 3, water

Positive Topic Modelling analysis

Latent Dirichlet Allocation (LDA) revealed a consistent structure within consumer-generated ESG discourse, uncovering ten distinct thematic clusters. The first cluster merges vivid visual language with prominent brand references—*long live energy, video, beautiful, shoes, plastic, initiative, Nike, Wool*—capturing a convergence of aesthetic appeal and environmental signaling. A second theme emphasizes multimedia-driven positivity, with terms like *amazing, job, loved, and android* suggesting that digital culture plays a central role in shaping public perception of sustainability narratives.

Two additional categories reflect dual public expectations: one centers on innovation (*love, innovative, Google*), while the other emphasizes accountability (*carbon, green*), revealing a discourse that simultaneously builds a consumer wishlist and an implicit evaluation framework. Mentions of *chips, running shoes, and Galaxy phones* form part of two further clusters, linking everyday product choices to broader ethical considerations and corporate ESG commitments.

The final four clusters delve into deeper critiques and contextual cues. Topics include environmental degradation (*oil, palm, deforestation*), skepticism toward specific companies (*Mercedes, Shein*), and the persuasive mechanics of storytelling (*animation, watch*), underscoring that climate concerns and sustainability judgments surface across product categories and digital formats. Collectively, these clusters reflect the multidimensional ways in which consumers interpret and engage with ESG messaging (see Table 7).

Table 7: Positive LDA method.

Topic	Topic keywords
1	clothes, labor, nike, hard, care, cheap, brands, funny, love, countries
2	oil, people, palm, bad, china, change, snl, animals, climate, hours
3	wool, video, damn, people, funny, production, china, product, animation, lol
4	fleeb, oil, palm, gonna, grumbo, rubbed, shoes, deforestation, car, chipotle
5	video, trash, wrong, shoes, religion, expensive, company, person, talking, watch
6	temu, shit, shein, wool, people, buying, fast, fashion, products, companies
7	people, oil, palm, shoes, trash, 3, clothes, advert, money, paid
8	sad, fashion, nike, banned, fast, bad, people, products, money, quality
9	nike, trash, cheap, people, shoes, quality, adidas, wool, pay, 100
10	oil, palm, snl, wool, video, people, temu, crying, banned, vegan

8. CONCLUSION

8.1. Discussion

The statistical analyses reported in this study offer actionable metrics for evaluating the performance of ESG-themed advertisements across digital platforms. Sentiment analysis confirmed that emotionally framed appeals tend to elicit more favorable consumer responses than purely factual messaging, lending support to the initial hypothesis (H1) that affective content drives engagement. This pattern aligns with findings by Ludwig et al. (2022), who argue that emotionally charged narratives frequently outperform rational appeals in environmental persuasion. On TikTok, for example, positive comments commonly included terms such as *love*, *amazing*, and *friendly*, reflecting user affinity for emotionally resonant content. However, this positivity was not universal. Clusters of critical commentary—marked by keywords such as *trash*, *cheap*, and *greenwashing*—signaled that emotional storytelling can provoke backlash when perceived as disingenuous. Thus, while H1 is partially supported, the data emphasize that emotional appeals must be paired with authentic corporate behavior to avoid consumer skepticism. This finding echoes Parguel et al. (2011) but adds a contemporary nuance: today's consumers assess narrative style in conjunction with brand credibility, often with striking precision.

Strong support emerged for H2, which proposed that consumer-generated content increasingly shapes the reception of ESG messaging. Positive sentiment frequently originated from peer users rather than from the brands themselves, suggesting that shared values and organic advocacy among consumers play a central role in amplifying corporate messages. In contrast, critical commentary also stemmed from consumers, reinforcing the idea that public perception of ESG initiatives is largely co-produced through social discourse. These patterns are consistent with Kelman's (1958) Social Influence Theory, reinforcing the view that meaning in digital environments is socially constructed rather than top-down.

Partial support was found for H3, although the effects varied by platform. TikTok threads were saturated with emotional language—*fun*, *video*, *amazing*—whereas YouTube comment sections leaned toward more technical or evaluative terms such as *carbon*, *recycled*, and *hydrogen*. These differences point to the influence of platform architecture on engagement styles, as noted by Whitley et al. (2024). However, the current analysis extends prior work by demonstrating that TikTok's

short-form video format expands reach without necessarily enhancing message credibility. Due to limitations in tracking exact impressions and shares, this conclusion remains provisional and warrants further investigation.

Hypothesis H4 received strong empirical support. A brand's prior ESG track record significantly influenced audience reception of its messaging. Firms with a history of consistent, transparent action were praised, while companies perceived to be engaging in opportunistic behavior—such as sudden shifts in pricing strategy or labor practices—faced public criticism, regardless of how polished the messaging appeared. These findings mirror those of Jo and Kim (2017), yet the present study contributes a novel perspective by employing unsupervised text mining on naturally occurring consumer discourse. Unlike earlier studies based on experimental simulations or self-report surveys, this research analyzes real-time engagement across platforms, revealing the dual influence of emotional resonance and source credibility. The results reaffirm the role of emotionally rich content in algorithmic amplification, while highlighting the importance of user trust and social discourse in shaping online perceptions of ESG communication.

8.2. Theoretical implications

This study offers new insights into corporate virtue signaling by linking the effectiveness of Environmental, Social, and Governance (ESG) advertising to three interdependent factors: message framing, platform context, and perceived brand credibility. Using a mixed-method approach that combines sentiment analysis and topic modeling of user-generated content, the findings challenge and extend several established theoretical frameworks.

First, the results contribute to the Elaboration Likelihood Model (Petty & Cacioppo, 1986) by demonstrating how platform design mediates the route of message processing. Fact-based ESG content supported by statistics tends to activate central processing, encouraging reflective evaluation. In contrast, emotionally charged and visually dynamic short-form videos—particularly on platforms such as TikTok and YouTube Shorts—induce peripheral processing, where decisions are made quickly and with minimal cognitive effort (Ludwig et al., 2022; Moon & Kim, 2022).

Second, Regulatory Focus Theory (Higgins, 1997) provides a lens to interpret how motivational orientation shapes audience response. Promotion-focused consumers respond favorably to gain-framed messages emphasizing clean energy or

environmental restoration. However, loss-framed statements often backfire when they are vague or lack empirical grounding, triggering demands for concrete language and third-party validation (Chang, Zhang, & Xie, 2024; Jo & Kim, 2017).

Third, the findings refine Signaling Theory (Spence, 1973) by identifying brand credibility as a key moderating factor in ESG communication. Positive consumer sentiment clustered around legacy brands with consistent ESG performance—such as Nike and Google—while skepticism was pronounced for fast-fashion firms like Shein and Temu, whose messaging was perceived as opportunistic. This suggests that effective signaling depends not only on message clarity but also on transparency and a verifiable behavioral track record (Jo & Kim, 2017).

Fourth, the data align with Psychological Reactance Theory (Brehm, 1966), indicating that perceived manipulation or moral coercion in ESG messaging—particularly from firms with reputational baggage—can provoke resistance. When audiences detect inauthenticity, they often respond with openly negative sentiment, including direct accusations of greenwashing (Bartsch & Kloß, 2019).

Finally, the results offer partial support for Media Richness Theory (Daft & Lengel, 1986). While rich media formats such as interactive ESG video narratives can enhance engagement and perceived message depth, these same formats are susceptible to backlash in algorithm-driven environments. Content perceived as insincere or exaggerated may be amplified by dissenting users, leading to reputational risks (Bakshy et al., 2015).

Collectively, these findings suggest that effective ESG communication is not solely a function of content richness or emotional appeal but is mediated by platform affordances, message framing, perceived sincerity, and the social context of reception. Future research should continue to investigate the dynamic interplay among these factors in shaping digital consumer responses to corporate sustainability claim.

8.3. *Practical implications*

Recent fieldwork reveals the evolving landscape of ESG storytelling across digital platforms, offering practical insights for brands developing future communication strategies. A recurring pattern underscores the effectiveness of emotionally charged content on fast-paced platforms, where rapid scrolling favors affective hooks over complex propositions. TikTok, in particular, rewards content

that combines sound, color, and creator charisma to anchor sustainability claims within users' short emotional windows—often before viewers consciously process the message. For Gen Z audiences, this format resonates because it mimics peer interaction more than traditional corporate communication. Impact, in this context, is often judged by the visual energy and positivity conveyed, rather than by detailed evidence.

In contrast, platforms such as YouTube afford longer attention spans and support more elaborated content. Here, seven-minute videos that feature factory tours, certification documentation, and annotated charts are well-suited to prevention-focused audiences—many of whom came of age during the 2008 financial crisis and prioritize accountability over spectacle. For this segment, transparency and detail signal credibility, and emotionally excessive messaging may appear manipulative or insincere. As one consistent refrain suggests: show us tomorrow not because it appears exciting today, but because today's promises often fail by the next quarter.

These observations are consistent with recent research on psychological reactance, which highlights the defensive response triggered when viewers—especially prevention-oriented individuals—perceive an ESG message as vague, dramatic, or coercive. This phenomenon is especially pronounced on fast-moving platforms like TikTok, where compressed formats can inadvertently amplify feelings of manipulation. To mitigate this, marketers are encouraged to embed verifiable data, third-party certifications, and one-click access to detailed ESG reports into their content. Emotional storytelling remains important but must be substantiated to avoid backlash and erosion of brand trust.

Content strategy must adapt to platform-specific affordances. On Instagram, ESG narratives thrive through visually engaging formats such as infographics, image-rich carousels, and minimal text overlays that highlight tangible sustainability achievements. Conversely, jargon-heavy or static corporate language tends to disengage audiences in spaces designed for visual consumption. Moreover, the algorithmic nature of these platforms amplifies emotional responses—whether positive or negative—making real-time sentiment monitoring essential. Brands must invest in dedicated social listening teams capable of identifying early signals of potential reputational threats, such as accusations of greenwashing, and responding promptly before these escalate into viral criticism.

Ultimately, ESG messaging cannot operate in isolation from the technological and psychological dynamics of each platform. Marketers must understand the structural features that shape message circulation, account for users' motivational orientations—ranging from altruism to cynicism—and embed clear authenticity cues throughout each campaign. When executed successfully, this strategic blend of emotional resonance and informational depth not only generates engagement but cultivates lasting consumer trust, even in environments where messages are rapidly dissected and debated by users and influencers alike.

8.4. *Limitation and Future research*

While this study offers valuable insights into consumer responses to ESG-promoted messaging, several practical limitations merit discussion. First, sentiment analysis, while powerful, captures only the polarity and strength of textual emotion (e.g., a tweet marked as “positive” or “negative”) without linking that affective tone to behavioral outcomes such as clicks, shares, or continued engagement. As such, the analysis cannot confirm whether the emotions detected on screen translate into active decision-making. This limitation challenges the predictive power of the Elaboration Likelihood Model (Petty & Cacioppo, 1986), which presumes a pathway from emotional response to behavioral intent. Future research would benefit from linking observed sentiment to backend analytics (e.g., dwell time, click-throughs, or scrolling behavior) to distinguish between central and peripheral processing more precisely—even when responses are emotionally ambivalent, as signaled by the co-occurrence of “heart” and “trash” emojis within the same comment.

Second, the study treats the dataset as a monolithic text corpus, analyzed through topic modeling and word cloud visualizations. While methodologically efficient, this approach overlooks how demographic variables—such as culture, gender, age, or value orientation—mediate reactions to the same ESG content. Recent findings by Yoon et al. (2023) suggest that regulatory focus, risk tolerance, and social motivation vary significantly across cultural contexts. Future research should stratify datasets along these lines to assess how audience heterogeneity influences the reception, interpretation, and propagation of ESG narratives. This refinement would contribute to a more nuanced application of Social Influence Theory (Kelman, 1958) in digital marketing contexts.

Third, although the study alludes to platform-specific dynamics, it does not conduct formal cross-platform comparisons. As a result, hypotheses

regarding the emotional resonance of short-form videos on TikTok versus more deliberative content on YouTube remain largely anecdotal. Prior studies (Whitley et al., 2024) support the idea that audiovisual storytelling exerts a stronger emotional impact than text alone, particularly on younger audiences. However, empirical validation is needed. Future experiments should systematically compare user responses across content formats and platforms—tracking how platform algorithms, user demographics, and media richness interact. This approach would help operationalize Elaboration Likelihood and Media Richness Theories in the fragmented, multi-platform environment of contemporary advertising.

Fourth, the dataset primarily focuses on high-profile brands such as Google, Nike, and Shein. While this offers visibility into public discourse around established players, it limits generalizability to emerging or niche brands where ESG signals may be less pronounced. Testing Signaling Theory (Spence, 1973) in low-visibility or early-stage brand contexts would provide a more comprehensive understanding of how ESG credibility is earned—or lost—under weaker signal conditions. Additionally, the cross-sectional nature of the data restricts analysis of trust evolution over time. Longitudinal research, ideally through panel or repeated-measures designs, would allow scholars to observe how trust in ESG claims builds or erodes across product cycles, crises, and rebranding efforts. This would align with newer models of ESG trust as a dynamic construct (Lee et al., 2022).

Lastly, although word clouds offer a useful visual overview, they emphasize frequency over semantic nuance. For example, the appearance of “Nike” in a word cloud does not differentiate between contexts of praise (e.g., for recycled materials) and criticism (e.g., labor practices). Following Ludwig et al. (2022), future analyses should incorporate more advanced natural language processing (NLP) techniques such as semantic networks, context-aware modeling (e.g., BERT), or discourse analysis to better capture the layered and sometimes contradictory sentiment embedded in online ESG discourse.

Despite these limitations, this study provides a valuable starting point for examining how ESG advertising is received in real-world digital environments. Progress in this area will require methodological triangulation, platform-specific experimentation, audience segmentation, and longitudinal tracking. Together, these extensions can offer a more comprehensive understanding of how sustainability messaging influences consumer perception, brand equity, and trust in an increasingly volatile online marketplace.

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Conflict of Interest Statement:

The authors declare no potential conflicts of interest with respect to the research, authorship, or publication of this article.

Ethical Statement

This research adheres to the ethical standards for social media and digital data use. All data were collected from publicly available sources (TikTok and YouTube), and no personally identifiable information was used or disclosed. The study complies with platform terms of service and follows ethical guidelines for observational research in digital environments.

No human participants were directly involved in the study, and therefore institutional ethical approval was not required. AI tools (e.g., ChatGPT) were used solely for language editing and formatting purposes under the authors' full control. All analyses, interpretations, and conclusions are the original work of the authors. The authors confirm that the study was conducted with academic integrity and transparency.

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