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When green meets gen Z: A systematic review of influencer-based sustainable marketing strategies

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ABSTRACT

Background: The rapid growth of social media has placed influencer-based green marketing at the forefront of sustainability communication for generation Z. Although many studies highlight the importance of social media credibility, most still focus on intentions and have not yet examined actual ecological behavior or regional contextual differences, particularly in Southeast Asia. **Methods:** This study systematically reviews 50 Scopus Q1-Q3 journal articles published between 2020 and 2025 to synthesize theoretical, methodological, and contextual patterns in influencer-based sustainable marketing. The study was conducted following the PRISMA 2020 guidelines through keyword-based searches on the Scopus, ScienceDirect and SpringerLink databases and analyzed using thematic and bibliometric approaches. **Findings:** The results show that trust, message authenticity, and parasocial relationships are the most consistent predictors of green trust and generation Z's purchase intent, while value alignment between influencers and audiences is more influential than popularity. However, the technological efficiency offered by virtual influencers and artificial intelligence (AI)-based content often reduces perceptions of authenticity, creating an AI-green paradox. Cross-country comparisons also show that digital ecological literacy remains low in Southeast Asia. **Conclusion:** The effectiveness of influencer-based green marketing depends on transparent, value-based, and verifiable communication rather than on image or number of followers alone. **Novelty/Originality of this article:** This research integrates emerging digital phenomena such as AI and virtual influencers into the theoretical framework of green marketing, offering an ethical communication model that links digital credibility with measurable sustainable behavior.

KEYWORDS: digital sustainability; influencers; generation Z; green marketing; message authenticity.

1. Introduction

The swift evolution of social media has transformed the global marketing arena, particularly through the rise of influencer marketing as a pivotal approach to engage young customers. Generation Z, having been raised in a digital milieu, has emerged as the most receptive consumer demographic to social media-driven communication. Influencers, such as YouTubers, Instagram producers, and virtual personas, wield significant power to shape perceptions, preferences, and purchasing choices through their credibility, emotional connection, and social rapport with their audience. Instagram and TikTok are the preeminent platforms for gen Z's consumption of digital marketing content (Nadanyiova & Sujanska, 2023). Research trends in green marketing indicate a substantial rise over the past five years. According to Scopus indexing statistics, the volume of publications on green marketing has surged from approximately 120 documents in 2020 to over 450 documents

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in 2025. This rise affirms that sustainability issues and eco-friendly marketing techniques are progressively emerging as significant concerns in worldwide marketing literature. The increase in publications signifies a paradigm change towards communication techniques that prioritize ethical ideals, social responsibility, and environmental consciousness in fostering relationships between brands and consumers.

Conversely, increasing awareness of environmental concerns has resulted in the development of the green marketing paradigm a strategy that prioritizes environmental responsibility, sustainability, and the utilization of eco-friendly products. Generation Z is recognized for their heightened sensitivity to sustainability concerns and a greater propensity to endorse firms that exhibit a dedication to environmental preservation (Ridwan et al., 2025). In this context, green influencer marketing has arisen as a strategic innovation that merges social media's influence with sustainability messages, wherein influencers actively promote eco-friendly lifestyles, sustainable products, and responsible consumption practices (Theocharis & Tsekouropoulos, 2025). Numerous studies indicate that authenticity and trust are critical determinants of the efficacy of green influencer marketing on gen Z's purchasing behavior. Influencers deemed authentic and transparent in delivering environmental messages are more effective in fostering green trust and purchasing intention among their followers (Abate et al., 2025).

User-generated information, including reviews, testimonials, and personal narratives, further enhances perceptions of authenticity and social proximity in sustainability efforts (Panopoulos et al., 2023). Generation Z exhibits a predilection for information that is humanistic, personal, and visually engaging, featuring emotive narratives and authentic experiences related to the use of ecologically sustainable products (An & Ngo, 2025; Siddiqui & Warraich, 2021). Nonetheless, certain challenges persist in the execution of this plan. Generation Z exhibits skepticism towards conventional marketing messaging; thus, influencer strategies must strike a balance between persuasion and authenticity (Zatwarnicka-Madura et al., 2022). Moreover, enduring partnerships between businesses and influencers are considered more beneficial in establishing a consistent green image than transient collaborations alone (P. et al., 2025). Consequently, firms must incorporate sustainability concepts not only in brand marketing but also across their value chain and operational procedures.

This study seeks to answer the following research question: How do credibility, message authenticity, and digital technology influence the effectiveness of influencer-based sustainable marketing communication among generation Z? This study also aims to conceptually synthesize empirical patterns in green influencer marketing techniques targeted at generation Z and identify future research directions in social media-driven sustainable marketing. This article synthesizes findings from recent studies (2020-2025) to delineate the evolution of theory, methodologies, and empirical evidence, thereby advancing the formulation of more ethical, authentic, and sustainability-focused marketing strategies.

2. Methods

This study employs a systematic literature review (SLR) methodology to address inquiries on the application of green influencer marketing methods to generation Z, while also identifying empirical trends and prospective research avenues in the domain of social media-driven sustainable marketing. A systematic literature review (SLR) is a methodical and organized technique for summarizing and synthesizing previous research on a particular question or subject (Višić, 2022). This procedure encompasses distinct and well-delineated procedures to guarantee transparency, reproducibility, and reduction of bias. This methodology was used as it enables the author to systematically synthesize prior research findings, identify theoretical trends, and uncover existing research gaps.

This research is descriptive qualitative in nature with a constructivist approach, in which social reality is understood as the result of dynamic interactions between humans, digital media, and the surrounding cultural context. This approach was chosen because it is

able to explain the meaning behind the phenomenon of sustainability communication, which cannot be reduced to mere numbers or statistical relationships. Within the constructivist framework, researchers play an active role in interpreting conceptual patterns that emerge from the synthesis of literature, rather than simply collecting empirical data. This approach also allows for cross-context analysis of culture and technology so that the synthesis results are not only descriptive but also reflective of the development of the digital paradigm and the ethics of sustainable communication in generation Z.

The data for this study were sourced from scholarly articles published in esteemed worldwide journals indexed in Scopus, ScienceDirect, and SpringerLink. The selected publication era was 2020-2025, during which there was a notable surge in research pertaining to green marketing and influencer sustainability. The article search utilized a combination of keywords: green marketing, influencer marketing, gen Z, eco influencer, green consumer behavior, and digital sustainability. The initial search process yielded approximately 1,611 documents. The screening phase was executed utilizing the title, abstract, and topic relevancy, yielding 50 primary articles that satisfied the specified inclusion criteria: The inclusion criteria included empirical or theoretical publications that were published in reputable international journals, specifically those ranked Q1-Q3 in Scopus. The investigation focused on subjects related to green marketing, influencers, or sustainable consumer behavior within generation Z. We are disseminating data, models, or hypotheses pertinent to the aims of this investigation. Articles lacking scientific rigor, editorials, conferences devoid of empirical data, and unrelated publications were omitted from the analysis. The study selection process followed the PRISMA 2020 framework to ensure transparency and reproducibility in article identification, screening, eligibility assessment, and inclusion. The initial database search yielded 1,611 records. After duplicate removal and title abstract screening, 178 full-text articles were assessed for eligibility. Following the inclusion and exclusion criteria, 50 articles were selected for the final systematic review.

The analysis was performed in four primary stages that adapted the systematic literature review approach (Turk, 2021). First, planning encompassed the formulation of research questions, the development of a review protocol, and the establishment of objectives, search strategy, and criteria for article inclusion and exclusion. This measure guaranteed that the research was executed transparently and could be reproduced. Second, conducting entails searching for papers across many databases (Scopus, Science Direct, and SpringerLink) via a combination of pertinent keywords, followed by the selection of publications based on topic relevance, quality, and study originality. Third, synthesizing entails obtaining pertinent material from chosen papers, including the publication year, methodologies, employed theories, and study findings. This phase involves categorizing the primary themes via content analysis and recognizing variability or discrepancies in findings across research. Fourth, reporting entails the aggregation of review findings into a systematic and accessible scientific narrative, adhering to the FAIR (Findable, Accessible, Interoperable, Reusable) principles, hence facilitating future reuse and verification by other researchers. The gathered data was examined utilizing two methodologies. Initially, thematic content analysis was employed to categorize articles according to principal topics, including source credibility, message authenticity, green trust, and the function of virtual influencers. Secondly, a descriptive bibliometric study w conducted to elucidate publishing trends, countries of origin, and the most prolific journals pertaining to this subject. The synthesis results are provided in a narrative format to illustrate the evolution of the concept and the existing trajectory of study.

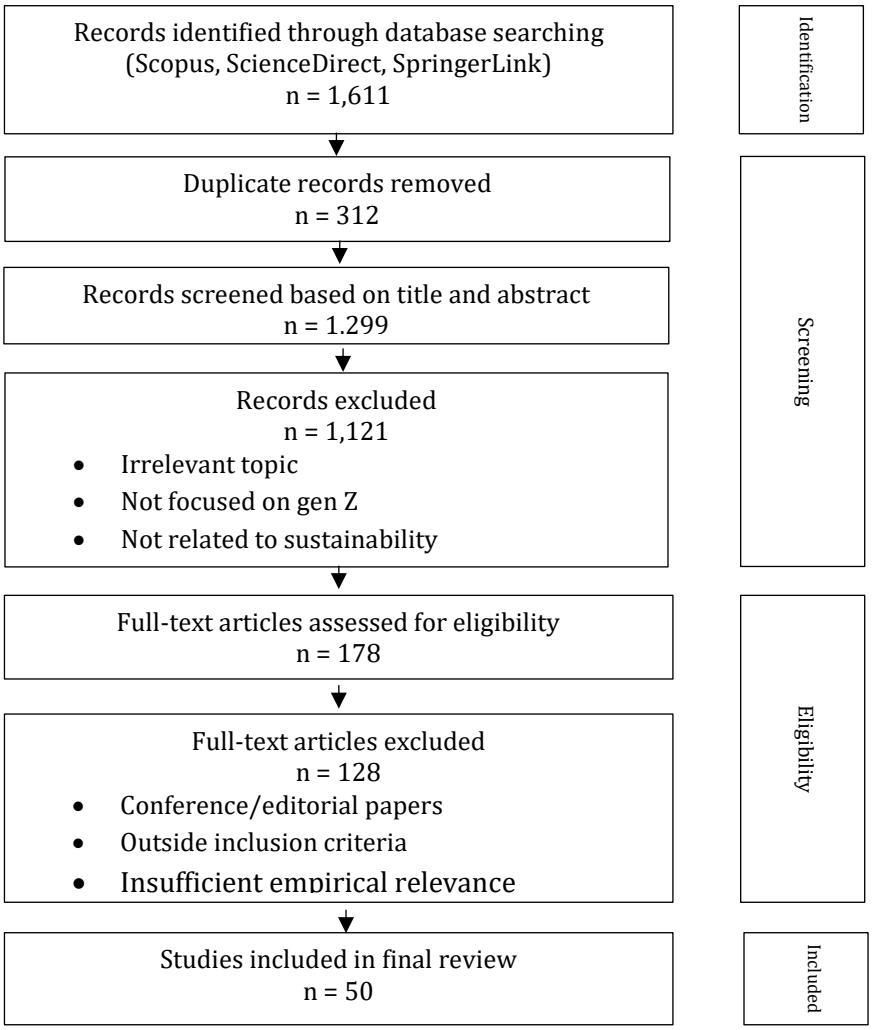


Fig. 1. PRISMA 2020 flow diagram of article selection process

Furthermore, to ensure the transparency and reproducibility of the research, all search result data are preserved in a spreadsheet that includes the article identifier, publication year, journal title, research methodology, and study focus. Every article is assessed for its pertinence to green influencer marketing, and the accuracy of citations is meticulously verified. This methodology is anticipated to guarantee the validity of the synthesis outcomes and facilitate the replication of analogous research in the future by broadening the temporal scope or data sources.

3. Results and Discussion

A systematic review of 50 peer-reviewed journal articles from Scopus Q1-Q3 published between 2020 and 2025 shows that the combination of green marketing and influencer-based strategies among generation Z has developed into a new paradigm in digital sustainability communication. Instead of focusing solely on product promotion, recent studies place greater emphasis on the formation of social identity, authenticity, and responsible consumption in the digital ecosystem. A summary of representative studies that have been clustered is presented in Table 1.

Table 1. Summary of representative studies from 50 Scopus Q1-Q3 articles (2020-2025)

Cluster	Representative Studies	Methodological Focus	Key Findings	Core Gap/Novelty	Relevance to Green Influencer Marketing
1. Mapping and Conceptual Foundations	(Halibas et al., 2025; Taylor & Carlson, 2021)	Bibliometric and conceptual synthesis	Publication growth fast; digital & ethical consumption converge	Fragmented link between influencer and sustainability outcomes	Establishes theoretical base for digital-green marketing convergence
2. Credibility and Authenticity	(Nazir & Wani, 2024; Rizomyliotis et al., 2024)	Quantitative, structural equation modeling (SEM)	Trustworthiness and moral congruence drive purchase intent	Overemphasis on traits; lack of algorithmic and social congruence lens	Credibility depends on shared values, not follower counts
3. Parasocial and Emotional Mechanisms	(Chen & Hsieh, 2023; Flecha-Ortiz et al., 2023; Le et al., 2025; Marklen et al., 2025)	Survey and SEM cross-national	Parasocial relationship (PSR) mediates purchase intent; cultural differences matter	Ethics of emotional dependency and decoupling behavior unexplored	PSR can strengthen or weaken sustainability engagement
4. Message Design and Ethical Persuasion	(De Keyzer, 2023; König & Maier, 2024; Pittman & Abell, 2021)	Experimental and content framing	Gain framing and clear disclosure enhance engagement	No study on persuasion fatigue; transparency-credibility trade-off	Balancing ethics and appeal is central to green persuasion
5. Technology and Virtuality	(Jiang et al., 2024; Lin et al., 2024; Narayanan, 2025; Wang et al., 2025)	Experimental/ computers are social actors (CASA) & artificial intellegence (AI) models	Human-like VIs increase engagement; AI visuals reduce authenticity	AI-green paradox underexplored	Digital tools improve reach but risk authenticity crisis
6. Green Identity and Status Signaling	(Islam et al., 2024; (Yeeun) Huh & Kim, 2024)	Experimental/SEM	Green acts as social capital & moral prestige	Shifts sustainability from ethics to elitism	Raises concern of green virtue-signaling among gen Z
7. Greenwashing and Transparency	(De Keyzer, 2023; O'Hagan, 2022; Söderlund & Mattsson, 2020)	Critical discourse & experimental	Greenwashing is historical; disclosure helps but limits credibility	Ecological literacy gap persists	Ethical transparency is key to sustainable messaging
8. Regional and Cross-Context Studies	(Abate et al., 2025; Almestarihi, 2024; Zatwarnicka-Madura et al., 2022)	Cross-country surveys	Contextual differences in awareness vs. behavior	Southeast Asia underexplored; sectoral bias	Expands scope beyond Europe-Asia focus

3.1 Research mapping and general orientation

The bibliometric analysis conducted by Halibas et al. (2025) indicates that the number of publications related to green marketing and influencer-based sustainability communication has shown a significant upward trend, particularly between 2023 and 2025.

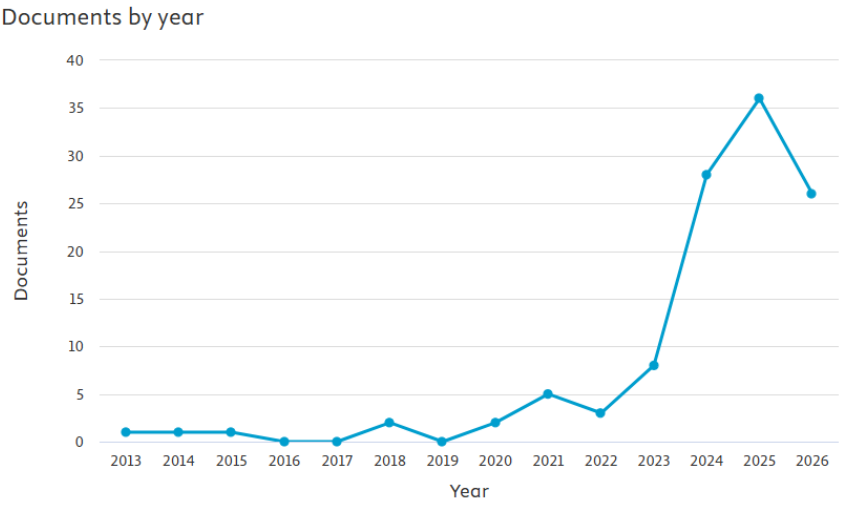


Fig. 2. Growth trend of publications on green influencer marketing and digital sustainability communication

As illustrated in Figure 2, publication trends on green influencer marketing have increased substantially in recent years. This growth indicates that sustainability issues are no longer positioned solely as a moral discourse on ethical consumption, but have evolved into a strategic domain in digital marketing and young consumer behavior. However, it should be noted that this quantitative development has not been fully accompanied by conceptual depth and methodological consistency. Most research is still fragmented, focusing on testing the surface relationship between influencer credibility, purchase intent, and green trust, without linking it to measurable ecological behavior change. As a result, the current research landscape is still dominated by studies that are behavioral-intent heavy oriented towards behavioral intent, but with minimal discussion of actual behavioral transformation.

These limitations are evident in the homogeneous methodological tendencies. The majority of studies use cross-sectional survey designs with structural equation modeling (SEM) analysis to identify relationships between variables, while experimental and longitudinal approaches that can explain causal relationships and long-term dynamics are still rare. Furthermore, the practice of triangulating quantitative and qualitative data has not been optimised, so that the interpretation process still focuses on perceived data rather than actual actions. This condition shows that research in this field is still stuck in a descriptive paradigm and has not moved on to an evaluative approach that is capable of empirically assessing sustainability effectiveness.

From a geographical perspective, publication patterns also show significant imbalances. Europe and East Asia dominate scientific contributions, while Southeast Asia which has the largest gen Z population and the highest social media penetration rate is still underrepresented. This implies a limited understanding of the socio-cultural and structural contexts that influence the effectiveness of sustainability messages in developing regions. Meanwhile, conceptual research such as that proposed by Taylor & Carlson (2021) has emphasised the importance of integrating social responsibility and technology as the future direction of advertising. However, most empirical studies still maintain traditional models that place media as a passive channel, failing to adopt approaches that consider the role of

algorithms, platform logic, and the dynamics of social interaction between creators and audiences in shaping the credibility and authenticity of green messages in the digital space.

3.2 Credibility, authenticity, and the trust deficit

Various studies (Nazir & Wani, 2024; Rizomyliotis et al., 2024; Wright & Cherry, 2023) consistently show that source credibility is the most decisive factor in shaping trust and green purchase intention among generation Z consumers. However, excessive research focus on personal influencer attributes such as attractiveness, expertise, and self-confidence creates a conceptual bias that overlooks the role of media structures and algorithmic dynamics in shaping perceptions of credibility itself. In other words, credibility often does not arise organically from individual authenticity, but is constructed through platform logic, algorithmically regulated visibility, and legitimacy conferred by brands or sponsors. When these structural dimensions are not taken into account, analyses of influencer impact become partial and detached from the digital context that shapes them.

This phenomenon leads to what Tirocchi (2023) and Spálová et al. (2021) refer to as authenticity weariness a saturation with authenticity that arises precisely because of the banality of the 'genuine' image on social media. Generation Z no longer judges authenticity based on a 'natural' appearance or uncontrived aesthetics, but rather on the alignment of the influencer's personal values with the social values held by the audience. Thus, trust does not only stem from individual reputation, but from value congruence or the alignment of moral values between the sender and receiver of the message.

In this context, authenticity is no longer understood as a static condition, but as the result of social interactions that are continuously negotiated between influencers, followers, and platform algorithms. Credibility becomes a relational phenomenon it arises from collective perceptions formed in the digital space, not merely from personal image. Therefore, the trust deficit that often occurs in influencer-based green campaigns is not only caused by a lack of message transparency, but also by value mismatches, algorithmic manipulation, and performative authenticity that creates a gap between representation and reality. To overcome this problem, a sustainability communication model is needed that not only emphasises individual integrity but also assesses the extent to which digital systems support transparency, honesty, and value coherence in the dissemination of environmental messages.

3.3 Parasocial relationships (PSR) and socio-emotional mechanisms

Research on parasocial relationships (PSR) shows that emotional closeness between influencers and their followers has a significant influence on purchase intent and engagement in pro-environmental behavior (Flecha-Ortiz et al., 2023; Marklen et al., 2025). PSR creates a sense of false intimacy that encourages audiences to trust and imitate influencers' behavior as if the relationship were personal and reciprocal. However, most studies still treat PSR as a neutral psychological variable, without critically examining the ethical dimensions and risks inherent in this type of relationship. When emotional closeness is overused for commercial purposes, PSR can transform into a form of emotional dependence that reduces followers' ability to think critically about misleading sustainability messages or claims. In the context of green marketing, this condition has the potential to normalise greenwashing where audiences believe environmental claims without evaluating the scientific evidence or real impact.

The findings of Le et al. (2025) introduce the concept of decoupling behavior as an important dimension in understanding the paradox of parasocial relationships. The study shows that even though individuals feel emotionally close to influencers who campaign for a sustainable lifestyle, this does not always lead to actual environmentally friendly behavior. When followers detect insincerity or manipulation in the green messages conveyed, emotional closeness actually causes dissonance and social distance. This phenomenon

indicates that social closeness can be ambivalent: it can strengthen sustainability engagement, but it can also weaken credibility when trust is violated.

In line with this, research by Chen & Hsieh (2023) found that environmental self-identity and self-efficacy play an important role in shaping individuals into organic green opinion leaders (GOLs), i.e. users who voluntarily spread sustainability values in their digital communities. This mechanism strengthens the socio-emotional foundation of sustainability engagement, where a sense of belonging to environmental values becomes a key factor that fosters concrete actions. Thus, PSR and the self-identification process not only serve as an emotional bridge between influencers and audiences, but also as a social catalyst that determines the extent to which sustainability messages can be translated into authentic ecological behavior among generation Z.

3.4 Message design, timing, and ethical persuasion

Research by König & Maier (2024) shows that messages with a gain-framed approach i.e., an emphasis on the positive benefits of environmentally friendly behavior and messages with a low level of abstraction (low-construal messages) have been proven to increase audience engagement. This approach is considered more effective because it provides a concrete picture of the direct impact of sustainable actions, making it easier for generation Z to associate environmental values with personal and social interests. However, this effectiveness has not been studied in depth in the context of persuasion wear-out, a phenomenon where excessive exposure to messages actually reduces audience response and trust levels. In the fast-paced and content-dense practice of digital communication, repetitive sustainability messages risk losing their meaning and being perceived as mere symbolic rhetoric.

In the context of influencer-based green marketing, ethical issues become increasingly complex when the balance between transparency and message appeal is not well managed. Pittman & Abell (2021) highlight the ethical dilemma that arises from excessive openness in advertising disclosure. On the one hand, openness is considered necessary to maintain credibility and accountability; on the other hand, overly explicit disclosure can reduce the perceived authenticity and spontaneity of the message. Conversely, a lack of transparency has the potential to lead to greenwashing or false imagery that actually reinforces the stereotype of green elitism (green elitism prejudice). These two extreme conditions confirm that the effectiveness of a message depends not only on rhetorical strategy, but also on the balance between ethical honesty and emotional appeal.

Thus, the main challenge in designing sustainability messages lies in creating communication that is persuasive yet ethical, transparent yet not artificial. Effective messages must be able to combine rational argumentation and emotional closeness without sacrificing moral integrity. To that end, a message design approach oriented towards authenticity of values, the use of contextual visual narratives, and content scheduling that considers the intensity, variety, and timing of audience engagement is required. This approach not only maintains the credibility of influencers, but also ensures that sustainability messages are perceived as a long-term commitment, not just a temporary communication strategy.

3.5 Technology, virtuality, and the emerging authenticity crisis

Studies on the role of technology in influencer-based green marketing show a significant paradigm shift from a crisis of trust to a crisis of existence. A number of studies on virtual influencers (Jiang et al., 2024; Wang et al., 2025; Lin et al., 2024) and artificial intelligence-based content (Narayanan, 2025) confirm that the emergence of non-human digital entities has fundamentally changed the landscape of sustainability communication. On the one hand, the existence of virtual influencers offers greater efficiency, narrative control, and message consistency compared to human influencers. Human-like cues and the use of warm language are considered capable of rebuilding social proximity with the

audience (Gerrath et al., 2024). However, on the other hand, this artificial closeness creates an authenticity deficit, as audiences realize that the figures interacting with them lack moral awareness or real experience of the environmental issues being conveyed.

Narayanan (2025) identifies a sharp epistemological contradiction in this practice: AI-based content, which inherently requires high computational energy and thus has a large digital carbon footprint is often used to campaign for sustainability. This paradox creates an ethical dilemma, where messages about environmental preservation are produced through potentially unsustainable processes. Ironically, this dilemma is still rarely acknowledged, both by business practitioners and academics, so that the discourse on digital sustainability is stuck at the rhetorical level and has not touched on the ecological dimensions of digital media itself. This phenomenon shows that the issue of authenticity in green marketing is no longer just about the individuals delivering the message, but also about the technology that mediates the message.

Authenticity is not only tested at the level of the moral honesty of influencers, but also at the level of the transparency of the digital systems that underpin their production. Therefore, future research needs to adopt a more critical perspective on the ecological footprint of digital communication, including assessing the energy impact of AI-based content production and recommendation algorithms. The fundamental question that needs to be answered is whether digital innovation can truly be a means of sustainability, or whether it simply shifts the carbon footprint from the physical world to the virtual space. Thus, the debate about technology and sustainability not only touches on the ethical dimension of communication, but also redefines the boundaries of sustainability itself in the digital age.

3.6 Green status, identity, and social capital

Research conducted by Huh & Kim (2024) and Islam et al. (2024) shows that environmentally friendly behavior often operates within the framework of symbolic capital, where green consumption is perceived not only as an ethical act, but also as a marker of moral reputation. In this context, being 'green' not only reflects ecological awareness, but also serves as an instrument for gaining social legitimacy in the digital space. This phenomenon illustrates the emergence of what is known as green-as-status when sustainability is interpreted as a classy lifestyle attached to the social identity of certain groups. This shift has significant sociological consequences, as it encourages symbolic exclusivity that has the potential to obscure the egalitarian goals of the sustainability movement itself. The aesthetically constructed image of sustainability on social media risks shifting the focus from behavioral transformation to virtue signaling, which is the act of displaying environmental concern as a form of moral performativity.

Influencers who promote green products or sustainable lifestyles often act as moral entrepreneurs, but in many cases, the sustainability narratives they construct emphasize style and status rather than real ecological impact. In the context of generation Z, which is highly sensitive to issues of authenticity, this phenomenon can actually cause ambivalence: on the one hand, they appreciate the moral values promoted, but on the other hand, they reject the impression of exclusivity and commercialization of green values.

Criticism of 'sustainability as a status symbol' challenges researchers and practitioners to re-examine the social function of green influencer marketing. Does this strategy truly serve as an educational tool that encourages sustainable behavioral change, or does it reinforce a new form of social stratification labelled as green? To answer this question, an interdisciplinary approach combining social identity theory, symbolic consumption, and communication ethics is required. Such an approach allows for a more in-depth analysis of how sustainability values are mediated, negotiated, and reproduced in the digital space. Thus, understanding 'green status' is not only related to an individual's moral image, but also to the dynamics of symbolic power that shape the discourse of sustainability in the era of social media.

3.7 Greenwashing, transparency, and information bias

Studies conducted by Söderlund & Mattsson (2020) and O'Hagan (2022) confirm that greenwashing is not a new phenomenon, but rather a historical practice that continues to evolve alongside the development of media. Whereas in the past this practice took the form of unverified environmental claims on packaging or in traditional advertising, in the digital media era, greenwashing has taken on a new, more subtle and persuasive form through influencer-based communication. Social media allows companies and influencers to produce visually appealing sustainability narratives that often lack scientific evidence. This transformation shows that the essence of greenwashing is not merely explicit lies, but rather the way commercial messages are disguised in the guise of seemingly 'green' ethics and social empathy. Ironically, the increase in digital literacy among generation Z is not always directly proportional to their digital ecological literacy.

This generation is sensitive to ethical symbols and the aesthetics of sustainability, but rarely verifies the validity of the data or scientific evidence underlying these claims. This gap creates a paradox: audiences who are critical of social issues are actually vulnerable to emotional green narratives because of their tendency to prioritize moral resonance over factual accuracy. In the context of influencer marketing, this phenomenon is evident in content that emotionally and visually highlights an environmentally friendly lifestyle, but ignores factual dimensions such as the carbon footprint of products, supply chains, or the ecological impact of digital consumption itself.

De Keyzer (2023) notes that disclosure regulations and sustainability message design are still normative and have not achieved interpretive transparency at the user level. Many campaigns only fulfil the formal aspects of disclosure without ensuring that the audience truly understands the context, sources, and validity of these environmental claims. Thus, the main problem is not merely a lack of administrative transparency, but a deficit of critical understanding in interpreting sustainability information. Therefore, a communication framework is needed that places transparency not only as an ethical obligation, but also as an educational process that helps audiences critically and evidence-based assess environmental claims. Such an approach is important to reduce information bias while restoring the credibility of sustainability communication in the digital realm.

3.8 Global disparity and contextual orientation

Cross-country studies conducted by Zatwarnicka-Madura et al. (2022), Abate et al. (2025), and Almestarihi (2024) show that the effectiveness of influencers in encouraging sustainable behavior is highly dependent on the social and cultural structure, as well as the level of environmental literacy in each region. Developed countries generally show a smaller attitude-behavior gap due to green infrastructure support, consistent public policies, and regulatory systems that enforce environmental accountability. Conversely, in developing countries, sustainability awareness often stops at the level of recognition without being followed by concrete actions. This is due to weak institutional support, limited access to sustainable products, and low digital ecological literacy, which makes influencer messages function more as symbolic information than as triggers for behavioral change.

An important criticism that arises from these findings is the geographical imbalance in the literature. Most research on green influencer marketing is still centered in Europe and East Asia, while Southeast Asia which has a large generation Z population and is a highly dynamic digital market has not been explored much. In fact, the social and cultural characteristics of this region are very distinctive: the people tend to be collectivistic, highly sensitive to social norms, and show strong loyalty to online communities. These factors can produce different dynamics in the formation of trust and perceptions of authenticity towards influencers. The absence of empirical studies in this region has led to global literature tending to be biased towards individualistic cultural contexts, thereby limiting

understanding of the social mechanisms that influence sustainable behavior in developing regions.

In addition to geographical imbalances, the sectoral focus of research remains narrow. Most studies centre on the tourism, cosmetics, and fashion industries, which have high symbolic value but relatively little ecological impact. Meanwhile, the energy, agriculture, and environmental education sectors which have the potential to generate more concrete sustainability changes are still rarely studied. This gap indicates that future research needs to broaden its scope of analysis, not only in the context of consumers and brand image, but also in the social systems and infrastructure that support green behavior. A cross-context approach that considers cultural, economic, and public policy factors is crucial to building a more holistic understanding of the effectiveness of influencers in mediating sustainability transformation in various regions of the world.

3.9 Theoretical synthesis and evaluation

The integration of various theoretical frameworks including Stimulus-Organism-Response (S-O-R), Signaling Theory, Social Identity Theory, Computers Are Social Actors (CASA), and Schema Congruity Theory shows that the relationship between stimulus factors, psychological mechanisms, and behavioral responses forms a coherent conceptual system in explaining the effectiveness of influencer-based green marketing. In this context, stimulus includes forms of communication, source credibility, visual representation, and message framing strategies; organism reflects internal audience factors such as trust, parasocial relationships (PSR), environmental awareness, and perceptions of authenticity; while response refers to attitudes, intentions, environmentally friendly behavior, and the potential for disengagement when audiences detect value incongruence or greenwashing practices. This integrative model emphasizes that sustainability communication is not merely a one-way persuasive process, but rather a relational ecosystem involving dynamic interactions between messages, mediums, and social values embedded in the digital context.

A major criticism of previous research is its tendency to stop at the cognitive-intentional response stage, without tracing measurable changes in ecological behavior. Thus, the existing literature explains more how generation Z thinks and responds to environmental issues than how they actually act on them. In fact, the performative dimension of sustainability demands empirical evidence of behavioral impact, not just attitudes. Therefore, future research needs to shift from micro-evaluations of influencer effectiveness to systemic analyses that assess the energy and emission consequences of green digital communication practices, the ethics of algorithms in determining credibility, and data bias in building trust.

These synthesized findings confirm that the effectiveness of green influencer marketing on generation Z is not determined by popularity or number of followers, but rather by credibility, sincerity of values, and tangible evidence of environmental commitment. Parasocial relationships and value alignment can indeed increase participation, but without transparency and verification, such closeness can easily shift into performative greenwashing. The presence of virtual influencers and the use of artificial intelligence, on the one hand, increase communication efficiency, but on the other hand, they give rise to a crisis of authenticity that threatens the integrity of green messages. Thus, the success of digital green initiatives depends heavily on the balance between social appeal, ethical persuasion, and measurable ecological impact. The main contribution of this research lies in emphasizing the need for a paradigm shift from symbolic green campaigns to transformative communication strategies connecting digital credibility with authentic and verifiable sustainable behavioral change.

From a theoretical standpoint, the present review indicates that current models still privilege individual-level cognitive mechanisms at the expense of structural and technological determinants. Most studies assume that once message credibility, authenticity, and parasocial intimacy are optimized, sustainable behavior will follow in a

relatively linear manner. However, contradictory findings on the attitude-behavior gap among generation Z suggest that even highly engaged followers do not necessarily translate their moral stance into consistent green consumption. This tension points to the need for models that more explicitly incorporate situational constraints (such as income, product availability, and social norms), as well as platform-level forces such as algorithmic curation and attention economics, which systematically privilege certain types of content over others. Without this broader lens, theory risks overstating the agency of influencers and followers while underestimating the invisible infrastructures that shape what is seen, liked, and ultimately imitated.

The synthesis also reveals that many studies treat gen Z as a culturally homogeneous cohort defined mainly by age and high digital literacy, whereas the empirical evidence points to deep internal segmentations. Differences in socio-economic status, educational background, geographical location, and cultural capital significantly affect how sustainability messages are interpreted and acted upon. Influencer strategies that are effective in urban, higher-income settings may be less resonant in peripheral regions where environmental problems and consumption possibilities are experienced very differently. This implies that future theoretical and empirical work should move from generic gen Z narratives toward more granular, intersectional analyses that recognize the multiple identities, aspirations, and vulnerabilities that coexist within this generation. Context-sensitive theorization is especially important in the Global South, where green influencer campaigns intersect with issues of environmental justice, labor precarity, and unequal access to digital infrastructure.

Methodologically, the dominance of cross-sectional surveys and self-reported behavioral intentions has produced a body of evidence that is rich in correlations but limited in causal insight. Many studies report positive relationships between exposure to green influencers, attitudinal change, and stated willingness to purchase sustainable products, yet they rarely track actual long-term behavior or differentiate between one-off symbolic actions and durable lifestyle transformations. To strengthen the explanatory power of prevailing theories, future research should employ more diverse designs, including field experiments, longitudinal digital trace analyses, qualitative and ethnographic approaches, and mixed-methods triangulation. Such designs would make it possible to capture how meaning, trust, and resistance are negotiated over time in online communities, and how these negotiations interact with offline practices in households, campuses, and workplaces.

Finally, this review highlights important implications for both practitioners and policymakers that can feed back into theoretical refinement. For brands and organizations, the findings underline that selecting influencers purely on the basis of follower count or aesthetic coherence is insufficient; what matters is the alignment between an influencer's long-term identity narrative and the concrete sustainability commitments of the brand. Campaigns that invite co-creation, critical dialogue, and transparent disclosure of trade-offs are more likely to build resilient forms of trust than those that rely on polished but generic eco-aesthetics. For regulators and platform designers, the evidence suggests the need to advance beyond minimal disclosure rules toward mechanisms that enhance interpretive transparency, such as standardized sustainability labels, verifiable environmental impact claims, and clearer signaling of sponsored content. Embedding such mechanisms into the architecture of social media environments would not only reduce the space for greenwashing, but also provide a more realistic foundation for future theory-building on how digital influence can contribute to substantive, rather than merely symbolic, ecological transition.

4. Conclusions

This study confirms that the effectiveness of influencer-based green marketing on generation Z is not determined by popularity, but by the credibility of the source, the authenticity of the values promoted, and tangible evidence of commitment to environmental issues. Parasocial relationships have been proven to strengthen consumer

participation, but when message transparency is neglected, this closeness has the potential to lead to greenwashing practices. The increasing use of virtual influencers and artificial intelligence (AI)-based content does improve communication efficiency, but at the same time raises a crisis of authenticity that threatens the integrity of sustainability messages. Thus, the effectiveness of digital green initiatives depends heavily on the balance between social appeal, ethical persuasion, and measurable ecological impact.

These findings directly answer the research question: How do the mechanisms of credibility, message authenticity, and digital technology influence the effectiveness of influencer-based sustainable marketing communication among generation Z? The synthesis results show that a combination of aligned values, information transparency, and ethical emotional engagement are the main factors linking digital trust to real pro-environmental behavioral change.

Practically, brands need to operationalize value-based transparency through verifiable environmental claims, build long-term partnerships with influencers, and develop metrics that assess measurable sustainable behavior, not just green consumption intentions. This study has several limitations. First, the review only included articles published between 2020 and 2025 and indexed in Scopus Q1-Q3 journals, potentially excluding relevant studies from other databases and grey literature. Second, the thematic categorization process may involve subjective interpretation despite efforts to maintain analytical consistency. Third, the reviewed literature remains geographically concentrated in Europe and East Asia, limiting broader contextual generalization, particularly for Southeast Asian settings.

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Author Contribution

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Not available because this research does not directly involve human participants.

Data Availability Statement

The secondary data used in this study were obtained from scientific articles that are openly available and accessible through the Scopus database and related public sources. No new data were created specifically for this study.

Conflicts of Interest

The authors declare no conflict of interest.

Declaration of Generative AI Use

During the writing of this manuscript, the author used Quillbot and ChatGPT (OpenAI, GPT-5) to a limited extent to assist with sentence structure, academic style editing, and

grammar checking. After using these tools, the author reviewed and edited the entire manuscript thoroughly and takes full responsibility for the final content of this publication.

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