

Bridging the Attitude–Behaviour Gap: An AI-Driven Personalization Framework for Climate-Conscious Marketing in Developing Economies

Sajiramol AV¹, Dr. Jisana TK², Noorjahan Ambatt³, Dr. Sameera P⁴

¹Research Scholar, PSMO College (Autonomous), Tirurangadi, affiliated with the University of Calicut, Malappuram, Kerala, India.

²Assistant Professor and Research Guide, PSMO College (Autonomous), Tirurangadi, affiliated with the University of Calicut, Malappuram, Kerala, India.

³Research Scholar, PSMO College (Autonomous), Tirurangadi, affiliated with the University of Calicut, Malappuram, Kerala, India.

⁴Assistant Professor and Research Guide, PSMO College (Autonomous), Tirurangadi, affiliated with the University of Calicut, Malappuram, Kerala, India.

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ABSTRACT

While consumer protection of the environment has become a concern in recent years in all parts of the world, an attitude-behavior gap remains that hinders turning pro-environmental attitudes into sustainable purchases. While AI, specifically personalized AI, is slowly becoming a digital marketer's go-to, the ability of AI, and specifically of generative Artificial Intelligence (AI) and Large Language Models (LLMs) to leverage this innovation in digital marketing, and beyond conversion and engagement metrics, has yet to be fully explored in developing-economies settings. This paper suggests a conceptual model that will combine both models to gain a better understanding on how to effectively use AI-driven personalisation in order to help shift climate-conscious marketing from awareness raising to actionable. The framework also includes protections from algorithmic "greenwashing" and privacy issues, making ethical transparency a condition to maintaining consumer trust. It builds and discusses four propositions on the relation between AI personalization design choices and strategies for reducing the attitude–behaviour gap, and provides implications for scalable and technology-driven methods of climate communication for marketers, policymakers and environmental education advocates.

Keywords: Artificial Intelligence, Green Marketing, Attitude–Behavior Gap, Sustainable Consumer Behavior, Climate-Conscious Marketing, Developing Economies, Generative AI Personalization

INTRODUCTION

This article considers climate change as a new and emerging key marketing, policy, and consumer concern and examines the mass production of environmental music rights, a new category of environmental goods. The authors argue that climate change has shifted from being a niche corporate social responsibility concern to one that is now at the forefront of all strategic concerns affecting marketers, policymakers, and consumers alike, and that the production and sale of environmental music rights constitute a new environmental goods marketplace. Numerous consumer surveys have consistently found that a large majority of consumers are concerned about environmental degradation and are willing to change what they purchase for the sake of the environment. However, a significant stream of research well-documented a gap between these self-reported attitudes and the corresponding purchasing actions, known as the attitude–

behaviour gap or the green gap. The difficulty of making sustainable consumption a constant reality is exacerbated in developing economies, where there are infrastructural restraints, price sensitivity, lack of access to products, and lower environmental literacy.

In parallel, AI has revolutionized marketing. Gen-AI and large language models, alongside predictive analytics, recommendation engines, chatbots, and increasingly, generative AI and large language models, enable businesses to personalize content, timing, and framing on a scale and level that was unmixable before. A new line emerging in the scholarship literature has explored the effects of such AI driven personalisation on consumer engagement with messages about sustainability, and in most cases, it seems that personalisation has positively increased people's 'short-term' purchase intentions when it is perceived to be transparent and value congruent. But most of this literature has focused overwhelmingly on a business-to-consumer and developed-market, e-commerce context, rather than creating lasting behavioral shifts, and has focused more on engagement, click-through and conversion rate metrics. Far less is known about the possibility of designing AI for specifically closing the attitude-behavior gap and even less is known about designing AI to address the challenge in developing economies like India, where the impact of climate communication is formidable, due to ongoing and accelerated urbanization, industrialization and consumption. This paper aims to close this research void by proposing a conceptual framework that connect the AI driven personalization with the attitude-behaviour gap reduction in climate-conscious marketing with specific focus on the conditions under which climate-conscious personalization will succeed and fail in the developing economy context. The paper is conceptual: it draws on the then current behavioral knowledge that was available and recent empirical research on the impact of AI in marketing to create a body of propositions that can be tested and a practical framework that can be used in managerial and policy decision-making processes in the near future.

LITERATURE REVIEW

The Attitude–Behavior Gap in Sustainability Marketing

One of the most replicated findings in the literature of pro-environmental marketing studies is the fact that pro-environmental attitudes are not always accompanied by pro-environmental behaviour. White et al. (2019) review and combine twenty years of this research into a framework more useful for practitioners, suggesting that ending the gap must ultimately be accomplished by marketers who consider social influence, habit formation, individual selfconcept, the tangibility of outcomes, and hassle reduction, not just attitude change. The following implications of this SHIFT framework apply to the present paper: Any technology, such as AI for personalisation, that only affects attitudes and beliefs (the cognition dimension) is not likely to close the loop on sustainable behaviour on its own, as it will also need to reduce the practical difficulty of adopting sustainable behaviours and embed other elements of social and habit-based support. A more subtle warning was already raised by Peattie and Crane (2005), who saw much of what had been dubbed 'green marketing' in the past as a myth, or even a farce, as the only change often was either a change of message or the absence of the change. This warning is a precursor to the so-called "greenwashing" hazard the same issue will be reprised in the context of Artificial Intelligence towards the end of this review.

AI-Driven Personalization and Consumer Response

Recent research papers have explored the impact of AI-driven personalization on consumer interactions with green marketing messages. There are a series of recent studies which have looked at how the use of AI to personalise affects the response and engagement of consumers to sustainability-related marketing information. In a quantitative study of 501 social media users, Acatrinei et al. (2025) identify that raising the perceived transparency and the presence of social norms have a positive effect on making consumers more trusting of AI in marketing tools, whereas perceived risk and negative emotion have a negative effect; they conclude that AI could be used to facilitate more efficient targeting of ecoconscious information after provoking greater transparency and presence of social norms. Building on the Elaboration Likelihood Model, Self-Congruity Theory, and Privacy Calculus Theory, two experiments in China (one simulation and the

other a time-lagged field-based study) conducted by Qadri et al. (2026) reveal that the impact of AI personalization on sustainable purchase intention extends through the message applicability dimension and that the effects of privacy concern and AI transparency disclosure on applicability present inverse and direct linkages, respectively. Of note, their immediate, untemplated personalization impact on purchase intention had no significant impact in the controlled experimental setting, thus supporting that personalization, while helpful at a relevant and trusted level, is insufficient, in the absence of trust and relevance, to directly influence behavior. In a similar study by Surbakti et al. (2025) with 517 students at universities in Java, Indonesia, the adoption of the perception of AI-induced personalization also positively impacts GPI, although its effect is lower compared to environmental knowledge and attitude, which more directly drive green purchasing behavior. The finding is relevant to the present framework in that it offers clear empirical evidence (from an emerging economy youth-based sample) of exactly the intention-behavior relationship link that is intended to be captured within this paper presented in a framework.

Theoretical Foundations: Elaboration, Planned Behavior, and Technology Acceptance

The Elaboration Likelihood Model (Petty & Cacioppo, 1986) suggests that a message can lead to relatively enduring change by using "central route" processing involving careful analysis of message content, or through using "peripheral route" processing by relying on heuristic cues, likely leading to attitude change that is less

enduring over time. When applied to AI personalization, this predicts that when AI personalization boosts a true sense of relevance, it can foster central route processing and create more lasting sustainability attitudes, while personalization jobs that make use of shallow cues like generic eco-labels or algorithmically generated urgency messages will improve peripheral processing, which is less likely to endure the face of actual buying constraints. Complimentary and essential for this paper is the other dimension, introduced by the Theory of Planned Behavior (Ajzen, 1991), that involves intention to engage and eventually involvement in the behavior, which is influenced by attitude and subjective norm as well as perceived behavioral control. The majority of the literature reviewed on AI marketing only measures the attitude and intention component. Although the dimension is most directly related to the attitude-behavior gap, it is comparatively less studied, namely perceived behavioural control, which is the belief that a behaviour could happen in real-life due to the constraints (such as cost, availability, convenience) of the real world. In addition to these, the constructs of perceived usefulness and perceived ease of use are added to the TAM and are adapted by several reviewed studies from the literature to explain why consumers accept AI-mediated marketing tools, and not their acceptance of the sustainable behaviours that they facilitate.

Generative AI, Trust, and the Emerging Greenwashing Risk

While search, recommender engines and rule-based personalisation systems have been the focus of previous research, a smaller, but growing, body of work about generative AI (or 'large language models')'s implications is receiving attention. Generative systems can generate dynamically composed, individually tailored narrative content in real-time, a feat plausibly greater than what can be attained using a template method of personalization that leads to increased perceived relevance and central route engagement. Yet, the same general 'generative flexibility' allows for persuasive sustainability narratives to be produced without any underlying environmental change in the company, a specific and, at this moment, overlooked type of algorithmic greenwashing. This worry echoes the traditional admonition of Peattie and Crane (2005) against green marketing values creation, but it is now accentuated by the individualization and real-time adaptability which generative AI brings, as a green marketing claim can now be tailored for each customer, aiming at making maximum impact.

Synthesis and Positioning of the Present Study

The literature reviewed lends support to three conclusions that directly motivate the framework developed in this paper. All of the reviewed literature leads to three conclusions that are qualified to motivate the framework developed in this paper. This is undoubtedly the first of a series of advantages, as studies from

Romania, China, and Indonesia have demonstrated that there is a linear correlation between perception of relevance and transparency of a personalised message and increase in engagement, trust, and stated purchase intention when the message is perceived relevant and transparent. Second, although there is a consistent effect on intention, such gains on intention do not always persist onto actual behavior; at least the relevant components of intention do not, i.e., the relevant components are between relevance and trust, not necessarily between intention and behavior. Third, among the examined constructs, perceived behavioural control is the most likely to account for this intention-behaviour gap and as such has not been prominently suggested as a direct design variable in any previous research on research-based AI to personalise learning programs to date. There are no reviewed studies exploring this mechanism in an Indian or broader South Asian context of developing economies and none looking at industrial or business to business sustainability communication. The framework created in Section 4 is framed to be able to fill just this gap.

Objectives of the Study

The following are the aims of the study:

Objective 1: To explore the mechanisms through which AI-enabled personalisation can affect attitudes and behavioural intentions of consumers with regards to sustainable consumption and climate action.

Objective 2: To pinpoint the barriers to the ability of AI-personalized sustainability marketing to change the attitudes of consumers into sustainable behavior, specifically among emerging economies.

Objective 3: To establish a comprehensive conceptual framework based on Elaboration Likelihood Model and theory of planned behavior to guide personalization design options of AI to reduce attitude-behavioral gap.

To frame propositions and practical recommendations for stakeholders representing marketers, policy makers and environmental educators in less developed economies to apply AI-driven personalization as a mechanism for climate action communication under burden of ethical concerns like algorithmic greenwashing and privacy concerns.

METHODOLOGY

As this study is exploratory and focused on building theories to advance the scholarship on the topic of “Using generative AI in sustainability marketing”, it has been designed as a concept-based, rather than as an empirical, study that collects or integrates data. The methodology consists of three steps.

Structured Literature Synthesis – a structured review of peer-reviewed and newly published scholarship (primarily from the time frame 2019–2026) among the areas of AI, DKMP and sustainable / green consumer behaviour. The keywords included variations of the concepts of “AI personalization”, “generative AI marketing”, “green marketing”, “sustainable consumer behaviour”, “attitude-behaviour gap” and “climate communication”. The sources included marketing, sustainability, and information systems journals, and focused on the last 24 months of publications to reflect the developments in a materially new technological paradigm — generative AI and LLM technology — rather than the previous use of recommendation engines or rule-based personalizations in the older literature.

The framework was based on two well-known behavioral theories, which were chosen as the theoretical foundation for this integration task. According to the Elaboration Likelihood Model, the process of a message being received through a “central” route, where the person thinks about the message in an effortful way, and thus forming a stronger and more lasting attitude than receiving the message via the “peripheral” route, which is thought about heuristically or superficially, dictates whether the message is processed through a central or peripheral route. Theory of Planned Behavior describes the influence of these factors—attitudes, subjective norms, perceived behavioral control—on behavioral intention, and from there, actual behavior, given that there are other real-world factors to take into account. These two theories linked to

explain both if personalisation of AI modifies attitudes and also if there is any strengthening of the perceived support of a behaviour in terms of its control and norms, which are key to the attitude – behaviour gap problem.

Framework and Proposition Development is building from the literature synthesis and theoretical integration, a conceptual framework consisting of four interacting components: message relevance/ depth of personalization, perceived trust/ algorithmic transparency, perceived behavioural control/ contextual enablement, and ethical safeguards against “green washing” and privacy erosion. This framework leads to four propositions that hypothesize a relationship between some AI personalization design decision and the reduction of the attitude–behavior gap. These propositions are proposed as empirical testable where and when it is possible – in developing economy countries like India – and in both consumer and business/business marketing – aka industrial marketing. This paper is a conceptual paper thus there are no primary data collection, human subjects or proprietary data involved in this paper, so ends up not to raise ethical clearance requirements which are required when doing empirical human subjects research. Its role is theoretical synthesis and framework development, which is a form of information to guide and inform further validation of the theoretical.

FINDINGS: A CONCEPTUAL FRAMEWORK FOR AI-DRIVEN, BEHAVIOR-CLOSING CLIMATE MARKETING.

The results from the literature synthesis culminate in several converging findings which inform the proposed framework.

AI Personalization, Increasing Engagement Does Not Automatically Increase Behavior.

A series of recent studies show that AI-driven personalization, if it appears relevant, timely and emotionally resonant, is associated with elevated consumer engagement and boosts short-term purchase intention when using sustainability-focused marketing messages. But they also share that consumer trust in the AI system is a prerequisite: when personalization is perceived as intrusive, opaque, or manipulative, it can have a ‘creepiness’ effect, doing more harm than good in the marketing relationship. Most current measurement methods only support intention or conversion metrics, potentially leaving the question of whether AI-personalised engagement leads to ongoing behavioural change or to a short-term boost in a single transaction.

Attitude-To-Behavior Gap Shrinks With High Engagement

Despite some success by AI personalization in boosting engagement and stated intention, a large portion of environmentally conscious consumers does not translate that into ongoing sustainable behavior. This is in line with previous research in the field of sustainability marketing that attitude change is not enough – there has to be perceived behavioural control, belief that the behaviour is actually possible, considering the price, availability, habit and social context. The work being done with AI personalisation at this stage, in most of the reviewed studies, focuses on the attitude–relevance side of the equation and does not seem to have given as much thought to strengthening perceived behavioral control or situational enablement, which is why there is a relatively small focus on the latter part of the equation and the attitude–behavior gap continues when engagement rates are increased.

Trusted and Transparent Moderate Personalization Effectiveness

In all studies analyzed, perceived transparency (deliberate disclosure of AI use, algorithmic explainability, or trustworthy eco-labelling) has been found to bolster the link between personalization and positive consumer response, whereas perceived risk and low perceived transparency have been shown to reduce or even reverse the relationship between personalization and positive response. It implies that it is the design of the AI personalised systems, and not just their targeting capabilities, that may make or break their ability to help achieve true sustainability results or be subject to consumers’ suspicion and disaffection.

Developing-Economy Contexts are Still Underrepresented

Most, if not all, empirical studies on AI-supported sustainable marketing personalisation are based on samples, platforms and markets of developed economies, or large global e-commerce platforms. The literature cited lacks discussion of the various conditions of developing economies, such as reduced penetration of digital infrastructure in certain sectors, increased price sensitivity, a larger informal retail sector, and different cultural and normative frameworks surrounding sustainability reporting. This is a substantive gap, as developing economies, such as India, are also key areas of heightened consumption growth, and key areas of climate action, such as resource-intensive industrial and extractive sectors that directly affect environmental outcomes.

Generative AI as A New and Unique Paradigm That Hasn't Been Studied Thoroughly.

The empirical research reviewed in this paper tends to focus on personalisation based on previous generation of recommendation systems and predictive analytics. Generative AI and LLM's offer qualitatively different abilities, such as dynamically generated narrative content, conversational/dialogic engagement, and ability to adapt tone, framing and argumentative structure to the individual in real time. These capacities are likely to boost the central-route effortful processing that gives rise to durable attitude change according to the Elaboration Likelihood Model, but they also increase the potential for subtle greenwashing owing to the fact that AIOs can generate convincing sustainability narratives without substantiated environmental claims. The risk aspect of this has been pointed out in recent literature and is little studied empirically.

Proposed Framework: AI-Enabled Behavior-Closing Loop

Based on these learnings, the paper outlines a proposed framework with four interacting elements, each influencing and being influenced by the others, across multiple consumer interactions and not in a linear sequence.

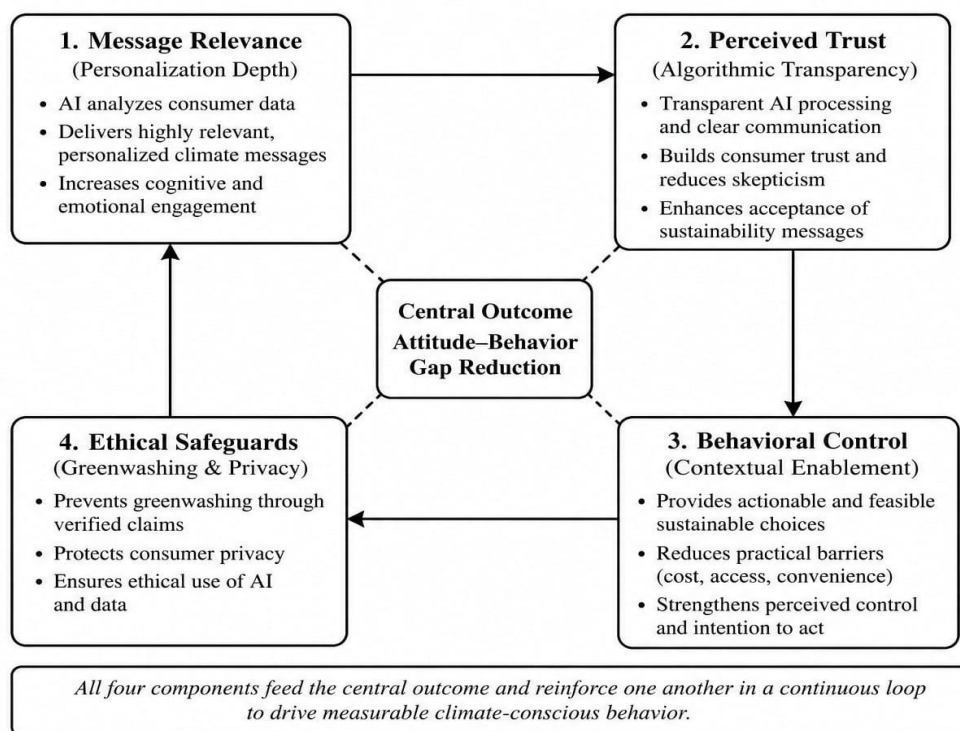
Component 1 : In Message Relevance and Personalization Depth, AI-generated messages are customized to individual consumer values, context and previous interactions, based on predictive and generative AI capabilities, to maximize the central-route processing as per Elaboration Likelihood Model.

Component 2 : Perceived Trust and Algorithmic Transparency in Component Two reflects consumers' understanding and trust of AI's role in content delivery and whether sustainability claims are explicitly communicated and independently verified by a trusted third party.

Component Three : Perceived Behavioral Control and Contextual Enablement is the third dimension, in the Theory of Planned Behavior, where AI personalization is accompanied by practical enablement (such as personalised information on the sustainable option available in the area, price-comparison support, logistical guidance etc.) that directly strengthens the consumers' perceived and actual ability to act on their attitudes on sustainability.

Component Four : Ethical Safeguards Against Greenwashing and Privacy Erosion, documents governance measures, from human oversight of generative content, through verification of environmental claims, to privacy-protective data practices, that help ensure that this enhanced personalisation doesn't endanger consumer trust or regulatory compliance.

The framework suggests that the four components need to be delivered together and in a consistent manner to create the most impact on reducing attitude–behavior gaps, and that the absence of Component Three – contextual enablement – is one of the key drivers behind the failure of current AI-personalized sustainability marketing to drive equal behavior change.



Propositions

Preposition 1: AI-PC, which integrates high message relevance with algorithmic transparency, will yield more central-route attitude change towards sustainable consumption than personalization optimized for message relevance. Hypothesis 1: AI-PC (AI-driven personalization that integrates high message relevance with explicit algorithmic transparency) will lead to more central-route attitude change towards sustainable consumption than personalization optimized for message relevance.

Preposition 2 :The effect on actual purchasing behavior of using AI personalization with sustainability messaging will be significantly mediated by perceived behavior control, meaning that personalizing sustainability messaging with providing contextual enablement (e.g., local information on availability and affordability) will lead to substantially larger behavioral effects than personalizing sustainability messaging alone with persuasive content.

Proposition 3: Contextual enablement will have a more significant marginal impact on the reduction of attitude–behavior gap in the developing-economy contexts than in the developed-economy contexts, because the barriers to sustainable consumption in developed-economy contexts are relatively low in terms of infrastructure and information.

Proposition 4: Generative AI-powered personalization will be more effective than previous generation recommendation-engine based personalization in minimizing the attitude–behavior gap when combined with verified environmental claims and human oversight, but without these protections, personalization generally risks greenwashing and may be potentially counterproductive.

DISCUSSION

Implications and Recommendations

Implications for Marketers

The use of AI personalization should not be seen as just a targeting and conversion mechanism, but rather as a tool that should be carefully considered and developed to create the capacity of consumers to act

sustainably in practice. This suggests that the personalised sustainability message should be combined with useful information too, such as the local retail availability, price parity schemes, or using tips.

Lessons Learned and Future Directions

Policymakers and/or industry regulators need to consider the disclosure provisions of advertising standards frameworks, but tailored to the scale and dynamism of generative marketing content, in light of the heightened greenwashing potential of such claims. A particular focus for regulatory attention should be on keeping up with verification of environmental claims in the pace of generative systems producing new marketing narratives.

Implications for Environmental Educators and Public Communication Campaigns

The implications for environmental educators and for public communication campaigns are discussed below. Implications for environmental educators and public communication campaigns are discussed below.

The behavior-closing loop framework can be applied to public sector and non-governmental campaigns for communicating about climate change, as well as to AI personalization features to customize messages for local languages, local contexts, and local literacy levels, and to explicitly include contextual enablement by linking to local resources or community programs on climate change, rather than generic awareness messaging.

The implications for the Industrial and Mining Sector are as follows:

The framework was created with the consumer marketing in mind, but the underlying logic applies to business-to-business and industrial marketing as well as sustainable communication by and for resource-intensive markets like mining and heavy industry. The same attitude – behaviour gap risk applies when the content of stakeholder communication is personalized to the individual using AI principles, such as personalised sustainability reporting or targeted investor, regulator and community engagement, and when it is not supported by evidence of environmental performance and action pathways. The framework proposed here could be applied to future empirical research in a variety of industrial applications, beyond the context of consumer marketing.

LIMITATIONS

This study is conceptual in nature and the propositions are theoretical rather than empirical, but are based on theory and recent literature. The literature synthesis was not performed according to a formal systematic review methodology with a pre-registered inclusion criteria, so it may not comprehensively represent the extent of relevant literature, especially with the high rate of publication for generative AI related research. The extension to industrial and business-to-business environments (including the mining and extractive industry mentioned in Section 5.4) is provided as a possible theoretical extension, not as a confirmed finding. The four propositions put forward in this paper can be tested with future empirical studies that rely on survey, experimental, or field studies in both consumer and industrial settings in India and other developing economies.

CONCLUSION

While the use of AI-driven personalization has shown strong promise to drive consumer engagement with climate-conscious marketing, the attitude-behaviour gap has shown that engagement and behaviour change are not synonymous. This paper has suggested a conceptual framework "AI-enabled behaviour-closing loop" that highlights two key, currently under-explored aspects that need to be addressed for the transition of AI-personalised sustainability engagement to sustainable behaviour change: contextual enablement and ethical transparency, especially in developing economies like India. With the increasing power of generative AI and LLM's integration into marketing practice, the potential for advanced yet unchecked greenwashing stories

grows alongside, and the ethical protections outlined in this framework become more impactful. The propositions presented herein provide a foundation for further empirical testing and for actionable design insights to be used by both marketers and policy makers to responsibly apply AI for global climate action.

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APPENDIX

Appendix A: Summary of the AI-Enabled Behavior-Closing Loop Framework

Component 1 — Message Relevance and Personalization Depth: AI-tailored content matched to individual values, context, and prior behavior (predictive and generative AI).

Component 2 — Perceived Trust and Algorithmic Transparency: Disclosure of AI involvement; credible, verifiable sustainability claims.

Component 3 — Perceived Behavioral Control and Contextual Enablement: Localized availability, price, and logistical information paired with persuasive content.

Component 4 — Ethical Safeguards Against Greenwashing and Privacy Erosion: Human oversight of generative content; verified claims; privacy-protective data practices.