



Innovative Sustainable Processes in the Food and Beverage Sector: Driving Consumer Preferences and Building Brand Loyalty

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Abstract

As the green and ethical movement continues to expand, this study examines how innovative sustainability practices are transforming the landscape of the food and beverage (F&B) industry. Few academic studies have directly examined the impact of green practices on consumer preferences and brand loyalty. This study addresses that gap by exploring sustainable processes, including ethical sourcing, eco-friendly packaging, digital storytelling, and environmentally focused loyalty programs. It presents qualitative analyses of industry cases and academic literature that demonstrate the effectiveness of these approaches. The results indicate that transparency, storytelling, and green branding have strong effects on consumer trust and loyalty in the food and beverage sector. Emotional engagement, health alignment, and ethical positioning were identified as the key drivers. Additional considerations include cost minimization, environmentally sustainable practices, and the need to examine emerging regulations and compliance requirements. The study further explores conventional approaches to sustainability and their transformation into innovative, sustainability-driven processes. Additionally, it establishes a systematic connection between digital storytelling and eco-friendly production, forming a well-structured operational framework. The proposed paradigm presents a quantitative and holistic model of sustainability, integrating operational, social, and behavioral dimensions. In doing so, it offers significant improvements over conventional marketing-based models.

Keywords:

consumer behavior; brand loyalty; ethical branding; food and beverage sector; eco-innovation; process integration; sustainability framework

1. Introduction

The food and beverage industry focuses on sustainability and transformational themes driven by consumer values, environmental pressures, and regulatory drivers [1]. It incorporates globally recognized frameworks, such as the United Nations Sustainable Development Goals (SDGs) and Environmental, Social, and Governance (ESG) standards, which have redefined the paradigm of corporate responsibility. Sustainability is increasingly viewed not

merely as a symbolic initiative, but as a competitive necessity, encompassing environmental stewardship and responsible sourcing for the benefit of the community [2]. This study focuses on sustainability across three distinct dimensions—environmental, ethical, and social—applied throughout each stage of operations, from production to the end consumer [3]. The concept of sustainability is not merely a goal but a continuous process that drives ongoing improvement, enhances brand value, and strengthens resilience in the marketplace. In the food and beverage

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age industry, sustainability functions as an integrated system and process, encompassing the supply chain structure while ensuring high transparency and visibility for the consumer [4]. The adoption of advanced technologies, such as AI-driven sustainability analytics, plant-based innovations, and circular economy models, is driving transformative changes in both brand value and sustainability practices. Many companies are integrating these sustainable practices into their core operations to meet basic standards while addressing evolving consumer demands [5]. Most companies use sustainable practices, integrate their core strengths, comply with basic standards, and address consumer demands [6]. The implementation of sustainability practices encompasses initiatives such as biodegradable packaging, ethically sourced ingredients, and digital storytelling to communicate sustainability journeys. Additionally, it involves engaging customers through values-based campaigns that reinforce the brand's commitment to sustainability [7].

In the food and beverage industry, customers are increasingly focused on food quality, with the brand playing a pivotal role in shaping perceptions. Strong branding enhances customer loyalty, fostering an emotional attachment to the products [8]. Emerging trends, such as plant-based production, AI-driven sustainability analytics, and climate action initiatives, are reshaping the industry landscape and enhancing quality within the competitive arena [9]. Fair-trade, carbon-neutral, and organic labeling are increasingly being adopted as tools for building consumer trust and promoting sustainability awareness [10]. These initiatives also face significant implementation challenges. Brands encounter issues related to high costs, accusations of greenwashing, and consumer skepticism or mistrust [11]. However, with a strategically innovative approach to sustainability communication, these challenges can be more effectively addressed. As sustainability transitions from a trend to an imperative, both consumer expectations and corporate responsibilities within the food and beverage industry are evolving accordingly [12]. The study explores the dynamic nature of sustainability and proposes strategic frameworks for companies—encompassing ethical, environmental, and values-based approaches—to foster long-term consumer loyalty toward their brands [13]. The study emphasizes innovative concepts, including eco-friendly packaging, digital storytelling, plant-based innovation, and climate-conscious branding, as key strategies for brand differentiation and trust-building [14].

Finally, the threats of greenwashing, the costs of sustainability, and the ultimate significance of transparency are explored [15]. This study outlines several objectives focused on sustainability within the food and beverage in-

dustry. The study also examines the impact of sustainability-driven processes on consumer attitudes and behaviors, highlighting practices such as ethical sourcing, eco-friendly packaging, and digital storytelling. The research further demonstrates that transparency and value-based communication foster long-term relationships and strengthen brand loyalty among consumers. The study also analyzes existing challenges in implementing sustainability practices, including cost constraints, the need for enhanced consumer understanding, and the persistent risk of greenwashing. Finally, it examines future sustainability initiatives, focusing on emerging trends and innovations such as plant-based products and circular economy activities.

1.1. Hypotheses of the Study

H1: Transparency and authenticity in sustainability practices have a positive influence on consumer trust in food and beverage brands.

H2: Consumer trust significantly enhances brand loyalty in sustainability-oriented brands.

H3: Sustainability-driven factors such as eco-packaging, ethical sourcing, and digital storytelling positively affect consumers' willingness to pay a premium.

H4: Emotional engagement through sustainability mediates the relationship between sustainable practices and brand loyalty.

2. Comprehensive Understanding of Sustainability in the Food and Beverage Sector

2.1. Defining Sustainability in the Context of Food and Beverage

The study highlights aspects of sustainability practices in food business operations that ensure both environmental protection and the promotion of human health [16]. The study also emphasizes the intention to integrate economic viability with ecological protection and social well-being, reflecting sustainable practices that combine green innovation and ethical responsibility. Such integration not only benefits consumers but also drives business improvement and growth. The philosophy underpinning decision-making emphasizes resource efficiency, waste reduction, and support for local communities [17]. For example, firms can adopt sustainable sourcing practices that include

local or organic goods, which decreases travel emissions and pesticide usage. Selecting farms that implement practices such as crop rotation and other sustainable methods can also contribute to the conservation of biodiversity. Packaging is also a critical aspect of sustainability in this industry. Utilizing recyclable, biodegradable, or reusable materials can reduce waste and attract customers who are increasingly concerned about plastic pollution [18]. In this industry, sustainability refers to the production of foods and beverages that promote economic justice, are healthy for people, and are beneficial to the environment. Accordingly, in alignment with the values of many modern consumers, sustainability is no longer merely a moral obligation but has become a commercially strategic decision.

2.2. Consumer Demand for Sustainable Products

Consumer interest in eco-friendly products is increasing rapidly. Consumers are rapidly becoming aware of the impacts their choices create for communities, wildlife, and the environment at large. Consumers' attention to the origin of food, its production processes, and alignment with their personal values has reached unprecedented levels [19]. Today, consumers no longer seek brands that use sustainability merely as a marketing strategy. Instead, they prefer companies that transparently communicate their business practices and demonstrate genuine environmental responsibility. Informed and connected, Generation Z and Millennials prioritize authenticity and environmental commitment above all else. The majority of these consumers prioritize ethics, health, and environmental considerations above all else in their purchasing decisions. This notable shift in the consumer market is driven by their willingness to pay a modest premium for products that reflect their values, whether through organic farming, fair labor practices, or reduced carbon impact [20].

Another major motivator for the growing demand for sustainable products is health. Most consumers choose sustainably produced food because they perceive it to be healthier and of superior quality. Consumers engage more consciously in their purchasing decisions because they feel a heightened sense of responsibility toward socially and environmentally ethical practices when aware that their choices contribute to these outcomes [21]. These concerns have intensified during the pandemic, as many consumers have become more health-conscious, vigilant about their well-being, and mindful of the environmental impact of their choices.

2.3. The Role of Corporate Responsibility

Corporate responsibility reflects a firm's commitment to ethical conduct. It entails not only generating profit but also creating a positive impact on society and the environment. Within the food and beverage sector, corporate responsibility is often synonymous with sustainability [22]. A firm can participate in fair trade by ensuring that farmers receive adequate compensation while also maintaining safe working conditions. Additionally, they emphasize strategies to reduce carbon footprints, promote the use of renewable energy, and implement sustainable packaging. Consumers who support companies demonstrating corporate responsibility tend to increase their purchases of such companies' products, while also exhibiting greater confidence and loyalty in their buying decisions. It can be stated that, due to their involvement, consumers have developed an emotional relationship with brands that support social causes, moving beyond the horizon of profit maximization [23].

Rather than relying on promises, a brand should demonstrate its commitment to sustainability through concrete action, which makes it more credible in the eyes of its customers. Such trust is built upon a foundation of transparency. The disclosure of good, bad, or any sustainability practice found in products helps a brand acquire a more positive reputation [24]. On their websites, many companies dedicate considerable amounts of space to explaining their suppliers, environmental impacts, and community initiatives. Such openness reassures customers that the company genuinely upholds its sustainability commitments and is not merely offering empty statements [25]. The other side of corporate responsibility is societal issues like equal remuneration, workplace diversity, and inclusion. In today's business environment, most companies recognize that treating employees fairly is as essential as responsibly managing environmental resources. Modern consumers expect corporations to take a stance on societal issues, and those that do are generally supported by loyal stakeholders [26].

3. Reviewed literature: Summary of Prior Work

Table 1 below summarizes key studies that contribute to the understanding of the impact of sustainable marketing on consumer behavior and brand performance within the food and beverage industry. The studies shed light on topics ranging from ethical sourcing to plant-based innovations, digital storytelling, and eco-packaging to data-backed decision making. Altogether, these studies clearly

indicate that a paradigm shift toward values-based marketing exists in both academia and industry, where environmental and social responsibility are contributing factors for consumers' preferences. Among the various findings, a prominent emphasis remains on establishing trust, transparency, and authenticity as essential prerequisites for genuine brand loyalty. Authenticity is particularly important to many young consumers and is often judged by whether a brand tangibly upholds its sustainability commitments. For example, a brand may demonstrate sus-

tainability through the use of recyclable packaging or by sourcing fair-trade ingredients. Digital capabilities and analytics are also proving to be an effective way to increase engagement through personalization and more targeted communication channels. Such findings are particularly important in terms of reinforcing the urgent need for F&B companies to integrate sustainability into their core, rather than just satisfying the ethical demands of their consumers.

Table 1: Key studies addressing sustainability marketing in the F&B sector.

S. No.	Author(s) & Year	Focus Area	Methodology
1	Babatunde et al. (2024) [9]	Brand marketing and economic development	Case study
2	Cheng et al. (2024) [11]	Operational performance in the F&B industry	Survey-based quantitative study
3	Suvattanadilok (2024) [17]	Consumer behavior toward coffee sustainability	Survey
4	Gunawan et al. (2024) [14]	Sustainability-labeled packaging preferences	Interview and survey
5	Magdy (2024) [15]	Creative Food Experiences and Brand Equity	Tourism case analysis

4. Theoretical Framework

4.1. Core Elements of Sustainability Marketing in Food and Beverages

4.1.1. Sustainable Product Development

Sustainability and ethical considerations in product development lead not only to ethically and environmentally sustainable food and beverage products but also to the production of healthy, organic crops. This approach reduces the use of synthetic pesticides and chemicals in crop production. Some companies choose local sourcing and plant-based products to reduce transportation-related emissions and animal agriculture. It encompasses all stages, from reducing energy consumption during manufacturing to optimizing water usage [27]. This is appreciated by customers who care about environmental responsibility and want companies to minimize their green footprint. By integrating upstream inputs with product innovation and downstream engagement, the Integrative Sustainable Process Model (Figure 1) positions sustainable product development within a continuous flow system encompassing sourcing, eco-design, energy and water efficiency, as well as transparent traceability, consumer communication, and loyalty mechanisms. The model explains how these operational choices function by engaging with the vital mediators—authenticity, transparency, belief, and value congruence—which would then generate tangible results—such as trust, satisfaction, and loyalty—which

would be measured by KPIs of NPS, repeat purchase rate, and willingness to pay a premium.

Framework of Innovative Sustainable Processes in the Food and Beverage Sector

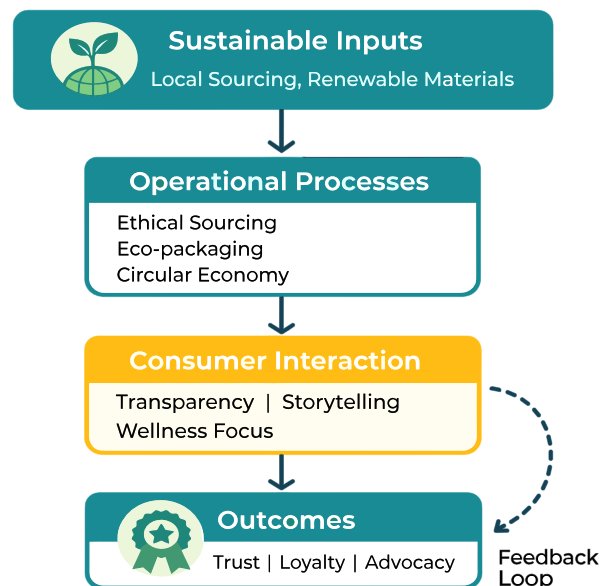


Figure 1: Framework of innovative sustainable processes.

Table 2 operationalizes the integrative sustainable process by linking concrete practices (e.g., ethical sourcing, eco-packaging, transparency, storytelling, partner-

ships, influencers, AI, climate action) to psychological mediators (authenticity, transparency belief, value congruence) and measurable outcomes (trust, satisfaction, loyalty), specifying practical KPIs for empirical testing and managerial evaluation.

Table 2: Practices-to-outcomes process map for F&B sustainability.

Practice (F&B)	Example Implementation	Primary Mediator(s)	Expected Outcome(s)	Core KPIs
Ethical sourcing and fair trade	Certified supplier share; farmer premium policies	Authenticity; value congruence	Higher trust; repeat purchase	Trust index; repurchase rate
Eco-friendly packaging	Recycled content; refill/return programs	Perceived quality/health; environmental belief	WTP premium; advocacy	WTP %; referral rate
Supply-chain transparency	Traceability coverage; blockchain disclosures	Transparency belief; authenticity	Lower scepticisms; brand equity	Transparency score; brand equity index
Digital storytelling	Process narratives across web/social	Emotional engagement; authenticity	Satisfaction; loyalty	Dwell time; NPS
NGO/community partnerships	Co-branded initiatives; local sourcing	Value congruence; social proof	Trust; advocacy	Partnership count; UGC volume
Influencer marketing (sustainable)	Expert advocates; lifestyle alignment	Social proof; emotional engagement	Trial; repeat purchase	Influencer ER; conversion rate
AI-enabled personalization	Green recommendations; waste-aware offers	Relevance; perceived value	Satisfaction; retention	CTR; retention rate
Climate/energy actions	RE share; emissions disclosure	Authenticity; value congruence	Brand equity; loyalty	RE %; emission intensity

4.1.2. Ethical Sourcing and Fair Trade

The aim is to source ingredients from locations that support workers, strengthen communities, and promote fair labor practices. The company partners with suppliers who uphold employees' rights, provide fair wages, maintain workplace safety, and employ environmentally responsible practices in farming and food production. Most food and beverage companies can switch suppliers certified by Fair Trade or equivalent organizations to assure customers that raw materials are sourced sustainably [28]. Some of the ethical considerations include respect for local communities and the natural environment. Ethical sourcing in the food and beverage industry may be considered a process that enables firms to become socially acceptable, and customers who wish to acquire their products may do so with a certain amount of sensibility.

4.1.3. Transparent Supply Chain Practices

Today, consumers in the food and beverage industry increasingly demand greater transparency from companies. Customers seek to understand how food is processed and the journey it takes from farm to fork. Transparency,

as a key aspect of supply chain practices, is defined by openly disclosing information about sourcing, manufacturing processes, working conditions, and environmental standards [29]. For instance, certain companies utilize technological solutions such as blockchain, which ensures accurate and verifiable tracking records, thereby providing customers with transparent and detailed information regarding the origin of their purchases. In general, customers have more faith and confidence in companies that are transparent and honest about their supplier networks. Therefore, this factor is crucial in developing trust and eliminating greenwashing, by which firms pretend to implement more extensive sustainability measures than they do with no noticeable change in their operations.

4.1.4. Eco-Friendly Packaging and Waste Reduction

The primary challenge confronting the food and beverage sector is waste generated by packaging, particularly as single-use plastics contribute significantly to environmental litter. Alternative solutions, including biodegradable, compostable, or recyclable materials, are essential to minimize the sector's impact on environmental degradation.

The company may encourage certain customers to return containers for refilling as it transitions toward reusable or minimal packaging solutions [30]. Additional strategies for reducing food waste include the utilization of “imperfect” vegetables and the distribution of surplus food items. Brands can appeal to environmentally conscious consumers concerned about plastic pollution by actively reducing waste through the adoption of eco-friendly packaging. This approach may lower packaging costs while aligning more closely with the values of their customer base.

4.1.5. Health and Wellness in Sustainable Marketing

Health and wellness are closely aligned with sustainable marketing. Based on their knowledge, customers associate sustainable products with better health, fresher ingredients, and better quality. Hence, health-conscious consumers might be attracted to organic, non-GMO, and additive-free products. Organizations sell gluten-free, vegan, and plant-based products as healthier and greener [31]. Companies appeal to environmentally conscious and health-sensitive consumers by integrating health and wellness into sustainable marketing. This is an element that could increase a brand’s reach and enhance its wellness image.

4.1.6. Community Engagement and Social Responsibility

Community involvement and corporate social responsibility address social issues by contributing to local communities. This may include supporting local farmers, generating employment in underprivileged areas, or funding community development initiatives. Socially responsible companies take on charitable causes, sponsor local events, and contribute a percentage of their profits to environmental or social causes [32]. Brands build credibility and foster customer loyalty when they demonstrate genuine care for people and their communities. In the approach of sustainable marketing, community involvement is one of the strongest tools as it reveals the brand’s concern for more than just selling products.

4.2. Research Methodology and Data Collection

To validate the Integrative Sustainable Process Model, this study utilized a primary survey involving 90 participants, ensuring a balanced gender distribution of 50% male and 50% female. The methodology employed a convenience sampling approach focused on digitally native and environmentally conscious demographics, specifically target-

ing Gen Z (40%), Millennials (33.3%), and Gen X (26.7%) consumers. Data was gathered through a structured questionnaire designed to evaluate trust, loyalty, and perceptions of sustainability practices. Participation was entirely voluntary, and informed consent was obtained from all participants to ensure ethical compliance in this non-clinical academic survey. The resulting data were analyzed using descriptive statistics and Pearson’s correlation to quantify the relationship between brand trust and consumer loyalty.

5. Results

A total of 90 respondents participated in the survey, with 50% male and 50% female respondents. The age distribution was skewed toward younger consumers, with 40% identifying as Gen Z (ages 18–24), 33.3% as Millennials (ages 25–40), and 26.7% as Gen X (ages 41–56). Therefore, this survey provides substantial coverage of the younger demographic, particularly environmentally conscious and digitally native generations, with a focus on Millennials and Gen Z. This helps create the necessary context to understand behavioral trends in trust, loyalty, and engagement with sustainable branding initiatives.

Table 3 presents the distribution of the sample ($N = 90$), indicating a strong orientation toward younger consumers, as Generation Z (40%) and Millennials (33.3%) constitute the majority of respondents. In contrast, Gen X accounts for 26.7% of respondents, with perspectives that differ from those of younger consumers. The gender distribution is balanced, with 50% male and 50% female respondents, providing comprehensive insights across both segments. These demographic characteristics further support the study’s findings, as they represent the primary target market for sustainability strategies within the food and beverage sector. Age and gender are effective variables for ensuring that the findings are balanced and representative of current consumer behavior trends.

Table 4 is the cross-tabulation, showing the association between key sustainability marketing variables and consumer responses. Another key finding is that consumers aware of the Eco-label exhibit significantly higher trust, loyalty, and authenticity scores compared to those unfamiliar with the Eco-label. The results clearly demonstrate the effectiveness of storytelling; individuals with high levels of engagement exhibit increased trust (4.7) and a stronger sense of authenticity (4.8), confirming the impact of narrative-driven marketing. The most receptive group across all dimensions is, unsurprisingly, Gen Z, which exhibits consistently higher scores, whereas Gen X demonstrates minimal receptiveness. Consumers conscious of ethics, health, and eco-friendly packaging appear

to be the most loyal, while price-sensitive shoppers exhibit the least emotional engagement with sustainable brands. Stronger evidence is provided by the correlation between trust and loyalty: consumers with high trust levels report an average loyalty score of 4.7, indicating that cultivating trust through sustainability initiatives is crucial for achieving long-term brand commitment.

Table 3: Demographic distribution of survey respondents (N = 90).

Demographic Variable	Category	Frequency (n)	Percentage (%)
Age Group	Gen Z	36	40.00%
	Millennial	30	33.30%
	Gen X	24	26.70%
	Total	90	100.00%
Gender	Female	45	50.00%
	Male	45	50.00%
	Total	90	100.00%

Table 4: Sustainability factors and consumer response analysis (N = 90).

Variable	Category/Range	No. of Consumers	Avg. Trust Score (1–5)	Avg. Loyalty Score (1–5)	Avg. Authenticity Score (1–5)	Avg. Storytelling Engagement (1–5)	Key Insight
Eco-Label Awareness	Yes	72	4.6	4.6	4.7	4.5	Strong driver of trust and loyalty
	No	18	2.1	2.2	2.1	1.9	Lack of awareness weakens brand connection
Storytelling Engagement	High (4–5)	65	4.7	4.6	4.8	4.9	High storytelling boosts authenticity & trust
	Low (1–2)	15	2	2.2	2.1	1.8	Low engagement yields poor perception
Age Group	Gen Z	36	4.8	4.7	4.8	4.9	Most loyal and sustainability-aware demographic
	Millennial	30	4.4	4.5	4.5	4.3	Strong support for ethical and wellness values
	Gen X	24	1.9	2.1	2	1.8	Least responsive to sustainability marketing
Purchases Sustainable Brands	Yes	75	4.6	4.6	4.7	4.6	Indicates alignment between values and loyalty
	No	15	1.8	2	1.9	1.7	Reflects the trust gap and perception issues

Table 4: *Cont.*

Variable	Category/Range	No. of Consumers	Avg. Trust Score (1–5)	Avg. Loyalty Score (1–5)	Avg. Authenticity Score (1–5)	Avg. Storytelling Engagement (1–5)	Key Insight
Top Purchase Driver Mentioned	Ethics/Values	49	4.8	4.7	4.8	4.7	Most influential purchase motivation
	Health/Wellness	40	4.6	4.5	4.6	4.4	Strong association with sustainable product loyalty
	Eco-Friendly Packaging	38	4.5	4.4	4.5	4.3	Strong packaging impact on loyalty
	Price-Driven	25	2.1	2.2	2.1	2	Price-sensitive group less influenced by values
	Peer Influence	20	4.3	4.4	4.3	4.5	Strong effect in Gen Z; amplifies sustainability
Brand Loyalty by Trust Level	High Trust (4–5)	68	—	4.7	—	—	High trust leads to high loyalty
	Low Trust (1–2)	22	—	2.1	—	—	Trust is crucial for repeat purchase

In **Table 5**, the correlation analysis shows a strong positive correlation between brand trust and brand loyalty with a Pearson correlation coefficient of ($r = 0.918$). It implies that the more consumers tend to trust a brand, the more their loyalty will increase. The high value, approaching one, indicates an almost perfect linear relationship. The results obtained were statistically significant, yielding a p -value of less than ($p < 0.001$), implying that the correlation is unlikely to have occurred by chance. The degrees of freedom ($df = 88$) correspond to the sample size of 90

respondents used in the analysis ($df = N - 2$). Overall, it suggests that trust-building in a brand is probably a key determinant of customer loyalty. Companies aiming to enhance loyalty should prioritize strategies that strengthen trust, as these two factors are closely related and demonstrate a significant correlation within the studied sample. This strong interdependence further underscores the importance of trust-building efforts for long-term customer retention.

Table 5: Correlation analysis of brand trust and brand loyalty.

Correlation Matrix			
		Brand Trust	Brand Loyalty
Brand Trust	Pearson's r	—	
	df	—	
	p -value	—	
Brand Loyalty	Pearson's r	0.918	—
	df	88	—
	p -value	<0.001	—

6. Discussion

6.1. Implications for Sustainable Process Design

Food and beverage companies are developing innovative methods to communicate social and environmental responsibility in order to maintain consumers' commitment to sustainability. Consumers in today's market require real stories, evidence of moral actions, and interactive ways to engage with the business. Businesses have now begun employing these innovative strategies to introduce variations in their sustainability programs, as illustrated in [Figure 1](#).

6.1.1. Digital Storytelling and Transparency

Digital storytelling allows organizations to present their sustainability story in an engaging way. Organizations can tell the stories of their products through social networks, blogs, videos, and brand websites, explaining the process of sourcing materials, manufacturing, and how their operations effect the environment and societies [\[33\]](#). A brand can develop a documentary series that takes its audience to farmers, production sites, and sustainability work. These stories educate consumers and emotionally connect them to a company that shares their values. Consumers want to see the real people behind a company, and digital storytelling can highlight their perspectives.

Transparent reporting on both sustainability achievements and challenges enhances consumer confidence [\[34\]](#). Companies should establish brand relevance and demonstrate their commitment to environmental responsibility through sustainability narratives conveyed via digital storytelling.

6.1.2. Leveraging Certifications and Eco-Labeling

Certifications and eco-labels such as Fair Trade, USDA Organic, and Rainforest Alliance allow customers to identify products that meet established environmental or ethical standards, increasing trust and reducing greenwashing [\[35\]](#). It helps customers make decisions about sustainable products by simply showing them, and it does not require any comprehensive investigation. Additionally, many companies develop their own sustainability labels or collaborate with national certification bodies, disclosing adherence to existing standards while also establishing new ones. Publicly displaying eco-labels enables firms to attract environmentally conscious consumers seeking clear indicators of sustainable practices.

6.1.3. Collaboration with Environmental Organizations

Organizations such as the World Wildlife Fund and Ocean Conservancy serve as environmental partners, enhancing the credibility of a brand's sustainability initiatives. Collaborations demonstrate that, beyond profitability, companies contribute financial support and implement environmental programs such as waste removal and tree planting [\[36\]](#). Consumers who believe that companies should engage in environmental issues tend to support these initiatives, reflecting the authenticity of corporate sustainability messages beyond conventional marketing.

6.1.4. Sustainable Influencer Marketing

Today, the food and beverage industry uses the influencer marketing platform to promote sustainability. Here, brands partner with influential personalities who are environmental caretakers. The sustainable practice of brands will then be communicated to their followers, hence gaining confidence and trust [\[37\]](#). To do this effectively, one should consider finding influencers who believe in sustainability. This approach ensures that the audience aligns with and believes in the brand's values. For example, an organic snack manufacturer may collaborate with a dietitian or environmental activist to demonstrate how the product supports an eco-friendly lifestyle, encouraging consumers to make sustainable choices. This allows companies to reach new demographics and increase their dedication to sustainability.

6.1.5. Interactive Content Can Engage Consumers

Interactive content such as virtual tours, online quizzes, and social media contests can be used effectively by a brand to engage customers and educate them about sustainability initiatives. This approach is argued to make sustainability both memorable and personal by fostering a closer connection with consumers [\[38\]](#). For example, a coffee company may offer a quiz illustrating how environmentally conscious coffee choices impact the surrounding ecosystem or provide virtual field tours to showcase specific sustainable farming practices. By creating immersive experiences, brands can communicate sustainability commitments while identifying ways to strengthen their relationships with customers.

6.1.6. Sustainability-Focused Loyalty Programs

Pro-environmental behavior and brand loyalty can be fostered through loyalty programs that incentivize sustainable actions. Brands use reward systems that encourage

consumers to recycle packaging, choose green delivery options, or purchase sustainable products [39]. Customers can redeem their loyalty points by returning packaging or purchasing eco-friendly products, receiving rewards such as discounts, contributions to environmental programs, or participation in agricultural experiences. This is a tactical approach that, while boosting sales, also reinforces the brand's commitment to the environment and strengthens the relationship with the customers by making a value-based distinction.

As illustrated in the figure above, food and beverage brands have recognized that the continuous integration of ethical sourcing, eco-friendly packaging, digital transparency, and consumer engagement contributes to the development of brand loyalty.

The fifteen elements referred to in Table 6 above are the core pillars of sustainability marketing that are steadily gaining traction in the food and beverage industry. These factors necessitate a shift from traditional product advertising toward value-based strategies that emphasize critical concerns, including ethical practices, environmental awareness, health consciousness, and consumer empowerment. Additionally, the impacts on consumers—such as enhanced trust, perceived authenticity, and loyalty, which form the foundation of marketing efforts—can be legitimately regarded as behaviorally sustainable practices. Collectively, these strategies provide a flexible yet powerful toolkit for brands to adapt to evolving consumer expectations while simultaneously reinforcing their position as responsible, forward-looking leaders in the marketplace.

Table 6: Comprehensive sustainability marketing components in the food and beverage sector.

No.	Sustainability Marketing Component	Description	Examples/Practices	Expected Consumer Impact
1	Ethical Sourcing	Fair labor, humane practices, and environmentally responsible procurement.	Partnering with Fair Trade or Rainforest Alliance certified suppliers.	Builds ethical trust; appeals to socially responsible buyers.
2	Eco-Friendly Packaging	Use of biodegradable, recyclable, or reusable packaging.	Compostable cups, reusable jars, minimalist labeling.	Reduces environmental guilt; improves brand perception.
3	Digital Storytelling	Sharing the sustainability journey through narrative-driven content.	Instagram videos and blogs showing supply chain transparency.	Creates emotional resonance; increases brand authenticity.
4	Transparency in Supply Chain	Clear disclosure of sourcing, labor, and production methods.	Blockchain traceability, origin labeling.	Increase consumer confidence; combats greenwashing.
5	Sustainability-Focused Loyalty Programs	Rewarding environmentally friendly customer behaviors.	Points for recycling, discounts for green purchases.	Drives loyalty; promotes repeating sustainable actions.
6	Health and Wellness Alignment	Positioning sustainable products as healthier choices.	Organic, gluten-free, non-GMO, additive-free foods.	Attracts health-conscious consumers; increases product desirability.
7	Community Engagement	Support local producers and social causes.	Donations, farmer partnerships, and local hiring.	Build emotional connection; promote brand loyalty.
8	Influencer and Social Media Campaigns	Partnering with sustainability advocates to promote values.	Collaborations with eco-bloggers and chefs.	Expands brand reach; enhances credibility through social proof.
9	Green Certifications and Eco-Labeling	Third-party validation of sustainable efforts.	USDA Organic, Carbon Neutral, Fair Trade Certified labels.	Build trust; helps consumers make informed choices.
10	Circular Economy Practices	Resource reuse, recycling, and waste minimization.	Returnable bottles, upcycled ingredients, and zero-waste policies.	Strengthens brand responsibility image; attracts eco-aware consumers.

Table 6: *Cont.*

No.	Sustainability Marketing Component	Description	Examples/Practices	Expected Consumer Impact
11	Plant-Based Product Innovation	Developing environmentally low-impact, animal-free alternatives.	Vegan snacks, dairy-free beverages, and plant protein-based meals.	It aligns with environmental and ethical food choices.
12	AI and Data-Driven Sustainability	Using data analytics to optimize sustainable operations.	Demand forecasting, waste reduction, and personalized green marketing.	Enhances operational efficiency and personalization.
13	Climate Action Commitments	Public commitment to carbon neutrality or reduction.	Carbon offset programs, renewable energy sourcing.	Differentiates the brand as environmentally responsible.
14	Sustainable Innovation and R&D	Investment in eco-products and process innovations.	New biodegradable materials and water-saving processes.	Establishes leadership; appeals to early adopters.
15	Customer Education Campaigns	Information to consumers about the sustainability impacts of their choices.	Infographics, social media tips, and product footprint disclosures.	Empowers conscious consumption; strengthens customer-brand alignment.

6.2. Influence of Sustainability Marketing on Buying Behavior

Sustainability marketing is directly connected to the customer's preference via the merger of brand value and those that are sustainable. It enhances the company's perceived image by assuring consumers that the brand is attentive to its ethical and environmental responsibilities. Equally significant, it appeals to environmentally conscious consumers and fosters enduring relationships among them. To empirically evaluate the influence of sustainability marketing on consumer preferences, the proposed measurement blueprint identifies constructs, validated scales/operational proxies, exemplar items, and potential data sources. It operationalizes the proposed mechanisms—namely authenticity, belief in transparency, value congruence, perceived quality, and emotional engagement—by converting them into measurable variables and linking them to behavioral outcomes such as trust, satisfaction, loyalty, advocacy, repeat purchase, and willingness to pay a premium. This structure enables comparable studies and managerial dashboards aligned with the model.

Table 7 defines each construct, recommends validated scales or operational metrics, and lists example items and data sources. It enables rigorous, replicable measurement of mediators (e.g., authenticity, transparency belief), outcomes (trust, satisfaction, loyalty),

and operational indicators (traceability, recycled content, emissions), supporting hypothesis testing and managerial performance tracking.

6.2.1. Factors Influencing Consumer Purchase Behavior

Sustainability has been identified as a key factor influencing consumer choices in the food and beverage market. Its impact on consumer purchasing behavior is significant, with consumers increasingly prioritizing ethical alignment, transparency, and environmental responsibility when selecting food and beverage brands. Sustainability-driven marketing approaches—including digital storytelling, eco-labeling, AI-based personalization, and climate-action branding—offer several advantages. These techniques improve perceived authenticity, enhance emotional engagement, and foster long-term loyalty among consumers. These new directions and integrations incorporate real-time tracking, the advancement of AI-enabled technologies, hyper-personalized sustainability initiatives, and circular economy practices, including reusable packaging systems and product take-back programs [40].

Several factors are driving up demand for sustainable products. These include individual values, social effects, and increasing awareness of global challenges such as waste pollution and climate change.

Table 7: Measurement blueprint for validating the sustainable process model.

Construct	Definition	Recommended Scale/Metric	Example Item or Metric	Suggested Data Source
Transparency belief	The degree to which disclosures are perceived as clear and credible	5- or 7-point Likert multi-item	“This brand is open about its sourcing.”	Consumer survey; website audit
Perceived authenticity	Perception that sustainability is genuine and embedded	Validated brand authenticity items	“This brand’s sustainability is sincere.”	Consumer survey
Value congruence	Alignment between brand values and consumer values	Value congruence scale	“This brand reflects my environmental values.”	Consumer survey
Emotional engagement	Affective connection prompted by storytelling	Narrative engagement scale	“I felt connected to the brand’s sustainability story.”	Consumer survey; social analytics
Trust	Willingness to rely on the brand’s integrity	Brand trust scale	“I trust this brand to do what is right.”	Consumer survey
Satisfaction	Overall evaluation of brand experiences	CSAT index	“Overall, I am satisfied with this brand.”	Consumer survey; CRM
Loyalty	Intention and behavior to repurchase/recommend	Behavioral + attitudinal	Repeat rate; “I intend to buy again.”	Sales/CRM; survey
Advocacy	Willingness to recommend and defend	NPS; referral rate; UGC	NPS score; referral conversions	CRM; social analytics
WTP premium	Price premium attributable to sustainability	% premium vs. baseline	“Max price willing to pay with eco-packaging”	Conjoint/A/B test
Transparency coverage	Scope of traceable suppliers/products	% SKUs traceable	Share of SKUs with traceability codes	Internal audit
Eco-packaging intensity	Extent of sustainable packaging adoption	% recycled/compostable content	Average recycled content per SKU	Packaging specs
Emission intensity	Operational climate impact	tCO ₂ e per unit revenue/volume	Scope 1–2 intensity; RE %	Sustainability reports

6.2.1.1. Personal Values and Ethics

Most consumers consider that the various things they buy hold their values, such as animal welfare, fair labor, or environmental protection. These considerations influence purchasing decisions when consumers buy from businesses that share their values [41]. Environmental activists, for instance, may seek out companies that employ sustainable packaging or actively reduce waste. When the values of customers and companies align, stronger bonds are formed through this shared ethical commitment.

6.2.1.2. Social Influence and Community Norms

Friends, family, and information shared through online networks play a significant role in shaping consumers’ purchasing decisions. The purchase of sustainable products by others motivates consumers to participate in socially and environmentally responsible initiatives. Users

on social media often promote the adoption of environmentally friendly products, thus increasing demand for green products [42]. Over time, there is pressure to embrace sustainable practice and make what are regarded as ‘reasonable choices’, as others do.

6.2.1.3. Perceived Quality and Health Benefits

Consumers typically associate sustainable products with high quality and health benefits. For the consumer, “organic” and “plant-based” are a guarantee of quality and safety. People believe that plant-based or eco-friendly products do not harm nature or humans, and they believe that sustainable products are chemical-free and pesticide-free [43]. From this perspective, consumers may choose sustainable products because they perceive them as offering better value.

6.2.1.4. Trust in Brand Transparency

Transparency is very important in the marketing of sustainability. Customers are likely to trust firms that are transparent about manufacturing, sourcing, and third-party certifications. When organizations are transparent about their progress and challenges, they reassure customers that they prioritize authenticity rather than mere marketing [44]. Conversely, vague or misleading claims, often referred to as “greenwashing,” undermine consumer trust and prompt consumers to seek out organizations perceived as genuinely sustainable.

6.2.1.5. Convenience and Accessibility

Consumers also care more about the convenience they need or want, regardless of the value system. Therefore, products that are sustainable, readily available in retail stores, clearly and prominently labeled, and reasonably priced tend to be significantly more attractive to consumers. Manufacturers who offer green goods with less concern and effort to consumers prompt responsible customers with convenience [45]. As a result, a larger segment of the population is engaged in sustainable practices, with several factors influencing sustainable consumer behavior, as illustrated in Figure 2.

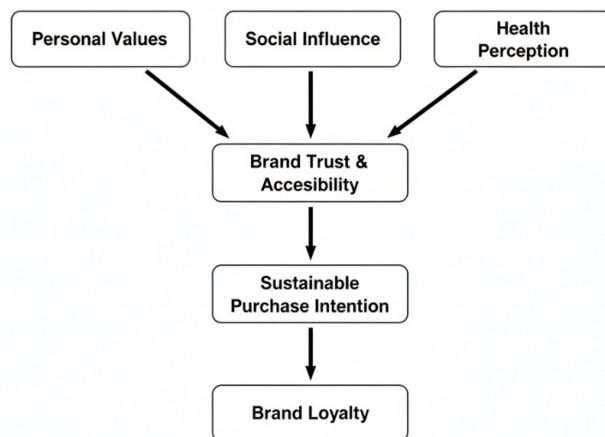


Figure 2: Conceptual model of factors influencing sustainable consumer behavior.

Conceptual model illustrating how personal, social, and perception factors influence sustainable purchase intention and ultimately lead to brand loyalty in the food and beverage sectors.

6.2.2. Case Studies of Successful Brands

Several food and beverage companies have implemented sustainable marketing strategies to influence their tar-

get markets. Such companies market themselves among value-conscious customers based on their environmental and social issues. For example, a coffee brand may build its identity on fairly sourced beans and ethical employment practices. The brand’s transparency and direct engagement with farmers have established it as a preferred choice among consumers who prioritize fair trade and sustainability [46]. This makes the brand appealing by strengthening customers’ connection to its narrative and its commitment to ethical sourcing.

6.2.3. Consumer Perceptions of Authenticity in Sustainability Claims

Authenticity is crucial in sustainable marketing because consumers can typically distinguish between companies genuinely committed to the cause and those engaging in greenwashing, making prominent claims without taking meaningful action [47].

6.2.4. The Role of Brand Loyalty in the Food and Beverage Sector

The food and beverage industry emphasizes consumer brand loyalty and repeat purchases, leveraging word-of-mouth communication [48]. Today, consumers are increasingly aware of brands guided by principles such as environmental and social responsibility [49]. Sustainability marketing informs consumer purchasing decisions, encouraging choices that create a positive societal impact while effectively engaging target customers [50].

6.2.5. Strategies to Foster Loyalty Through Sustainability

Companies utilize various sustainability-focused strategies to offer culturally appealing options while maintaining strong customer relationships. As shown in Figure 3, here are a few effective strategies to consider:

- **Sustainable loyalty programs:** Many businesses have established loyalty schemes to incentivize customers to adopt sustainable practices. Customers can redeem accumulated points for discounts, rewards that support environmental causes, or donations to environmental groups. Such programs reinforce sustainable practices and give customers an extra reason to continue patronizing the business [51].
- **Emotional Connections through Purpose:** Strong brand loyalty has been realized whenever customers perceive their purchase as assisting a larger cause [52]. For example, a company that plants a tree with each purchase allows customers to perceive a direct contribution to the environment. This sense

of purpose thus deepens relationships and converts consumers into brand ambassadors.

- **Exclusive access to eco-friendly products:** Several companies create brand loyalty by offering limited-edition eco-friendly products or exclusive access to the company's own sustainable product lines. For example, members could be offered exclusive discounts on green goods through a loyalty program or even early access to newly developed and added sustainable products. This approach fosters sustainable solutions while cultivating loyal customers by making them feel valued and part of an exclusive community.

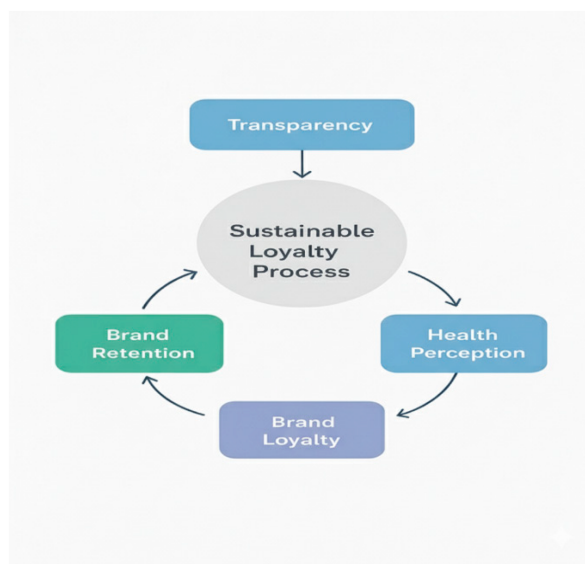


Figure 3: Circular feedback model of strategies for sustainable customer loyalty.

6.2.6. Emotional Connection and Brand Advocacy

Sustainability marketing can turn loyal customers into brand champions, those who are not only loyal to the brand but also advocate for it to others. If consumers are emotionally connected to a brand, they are likely to express its purpose to their friends and family [53]. Brand advocacy is therefore more effective than traditional marketing, as word-of-mouth recommendations are often more persuasive and impactful than advertising or other marketing activities. Brand advocacy has further expanded through social media, as dedicated consumers can publicly express their support for a company [54]. The brand will attract more customers when a consumer, for instance, shares a nice experience with an eco-friendly product or blogs about what the company is doing to be sustainable.

Brands can promote this advocacy and give consumers the opportunity to share the message with others by using easy hashtags or social media challenges that publicize their sustainability efforts.

6.2.7. Measurement of Brand Loyalty in Sustainability Initiatives

In this context, brands should utilize appropriate metrics to assess customer interactions and satisfaction levels in order to reflect the impact of sustainability marketing on reputation and loyalty. The following are key metrics to measure brand loyalty:

- **Repeat Purchase Rate**

If repeat sales from eco-conscious clients increase, firms should experience higher repeat-purchase rates. Metrics that track the frequency of repeat purchases indicate a firm's effectiveness in maintaining customer loyalty.

- **Customer Feedback and Surveys**

Companies usually collect information from consumers about what they value the most in the company. This includes feedback on sustainability projects that the company is running. In this regard, brands can assess customer satisfaction by surveying consumers on the significance of the company's sustainability initiatives in influencing their loyalty.

- **Social Media Engagement**

Activities such as social media shares, comments, and mentions can reveal the extent to which customers will be advocates for their brand. Frequent customer engagement with sustainability-related content may indicate satisfaction with the company's environmental initiatives.

- **Net Promoter Score (NPS)**

The Net Promoter Score (NPS) measures the likelihood of a customer recommending a brand. Customers are more likely to promote and speak positively about a brand if they perceive it as environmentally responsible, thereby enhancing the brand's NPS.

7. Challenges in Implementing Sustainability Marketing

Although sustainable marketing offers the benefits outlined above, food and beverage companies still face the challenge of making such strategies believable and effective. Brands face the challenge of balancing cost management with maintaining transparent communication, requiring careful planning and innovative thinking.

7.1. Balance of Profitability with Sustainable Practices

The primary tension between profitability and sustainable practices arises in areas such as sustainable sourcing, eco-friendly packaging, and energy-efficient production, where associated costs are higher. These costs can be difficult for small brands to absorb or recover through pricing, making their products less competitive in the marketplace [55]. Cost efficiency aligned with sustainability goals is key to long-term success.

Sustainable practices often emphasize upfront costs and eco-friendly materials, as well as renewable energy systems and ethical sourcing initiatives. Conversely, the industry faces challenges such as reducing costs, achieving short-term profitability, and avoiding pricing disadvantages in competitive markets. Financial performance may improve when sustainability initiatives foster customer trust and brand loyalty, ultimately increasing consumers' willingness to pay premium prices (Sharma et al., 2024) [54].

7.2. Overcoming Greenwashing Accusations

Consumer Trust: Greenwashing, the practice of exaggerating sustainability efforts to mislead consumers, has a corrosive effect on consumer trust [56]. Successful communication fosters consumer trust and commitment. In sustainability marketing, consumers are becoming increasingly discerning. Therefore, consistent disclosure of progress, challenges, and factual metrics is essential for overcoming skepticism and strengthening brand integrity.

7.3. Educating and Engaging Consumers

Customers are increasingly familiar with concepts such as carbon footprint and ethical sourcing. This awareness makes it easier to educate consumers about sustainability and best practices within the food service industry [57]. Brands play a significant role in consumers' lives and communicate their importance in an accessible manner through real-world examples. The use of short video clips and graphic content on social media can engage customers and enhance their understanding of their choices and their broader implications. Consumers' comprehension of concepts such as carbon footprint, circular economy, and supply chain ethics improves their ability to evaluate sustainability claims. Nowadays, consumers increasingly use QR-based traceability tools to access product information and facilitate online payments [58].

7.4. Adapting to Changing Regulations

Governments and regulatory bodies have established various rules and regulations focused on sustainability, including limits on carbon emissions and bans on plastics. Brands, meanwhile, must react quickly to changing laws, and operational changes can often be quite costly [59]. Regulatory changes impose financial and administrative pressures on companies, requiring them to redesign operations, modify packaging, and update compliance protocols.

8. Future Trends in Sustainable Marketing in the Food and Beverage Sector

This paper examines consumer expectations, technological advancements, and the growing emphasis on ethical considerations in the marketing of sustainable food and beverage products. The following are the most significant trends driving this shift.

8.1. Advances in Sustainable Food Technology

Recent advancements in food production, including emerging technologies such as lab-grown meat, plant-based proteins, and precision fermentation, are gaining significant momentum. Such new alternatives provide sustainable solutions with lower resource requirements and emissions [60]. Lab-grown meat requires significantly less water and land compared to traditional cattle farming, while plant-based diets offer nutritional alternatives with a reduced environmental impact. Therefore, companies can highlight these advances in their sustainable marketing efforts as alternatives gain momentum.

8.2. AI and Data Analytics for Sustainable Optimization

Companies can enhance sustainability by streamlining supply chain processes, minimizing waste, and personalizing customer experiences through AI and data analytics. AI-driven demand forecasting enables companies to reduce overproduction and minimize food waste. Additionally, data analytics allows firms to maintain transparency regarding environmental impacts [61]. By leveraging AI and data, marketers can personalize messages and communicate to customers how each purchase affects the environment, thereby fostering trust and engagement.

8.3. Climate Action and Carbon Neutrality

As more companies adopt ambitious carbon-neutral or carbon-negative goals, climate action is emerging as a highly sought-after focus in sustainability marketing. Carbon neutrality, as defined by [62], refers to activities aimed at eliminating emissions through investments in renewable energy or reforestation. Carbon negativity, on the other hand, seeks to remove more carbon than is emitted. Consumers are strongly drawn to brands that use tangible means to achieve these goals. Explicit labeling, such as “carbon neutral product,” allows customers to make informed choices; therefore, it increases brand loyalty.

8.4. Circular Economy Initiatives

The circular economy, which emphasizes the recovery, reuse, and regeneration of resources and products, is increasingly being adopted. Common circular strategies employed by firms include lightweight packaging, returnable containers, and recycling take-back programs. Businesses demonstrate long-term commitment to sustainable resource management and waste reduction by operating within circular economy systems. These initiatives appeal to consumers who value companies employing closed-loop manufacturing and those seeking to minimize waste.

8.5. Local Sourcing and Shorter Supply Chains

Customers increasingly prefer firms that source locally produced products, supporting the development of local economies. Local sourcing ensures fresh food, reduces transportation-related emissions, and helps the local economy. Furthermore, local supply chains offer greater transparency, which customers value when tracking the origins of their products [63]. By highlighting local sourcing in their marketing, brands can attract consumers concerned with sustainable, community-driven initiatives and enhance their legitimacy.

8.6. Social Responsibility and Fair Labor Practices

Besides environmental concerns, consumers care about social responsibility, such as fair wages and healthy working conditions for workers. Branding campaigns today are more focused on ethical sourcing, fair trade, and support for small-scale producers [64].

9. Novelty of the Study

Although previous studies have examined aspects of green branding or ethical sourcing, this study is distinctive in its attempt to consolidate diverse sustainable marketing activities, including digital storytelling, eco-packaging, AI analytics, and climate action, under a single strategic framework. In contrast to previous studies that focused primarily on consumer behavior or corporate responsibility in general, this study emphasizes the connection between emerging sustainability practices and long-term brand loyalty and consumer trust. The paper also highlights sustainability-oriented loyalty programs, an underexplored area within the food and beverage marketing literature.

In addition to combining theoretical discourse with real case studies and examples, performance mapping, and implementable frameworks, this article can serve as a practical guide for scholars and practitioners. Whereas tables and figures provide visual representations of sustainability strategies and their impact pathways, this mapping approach is unconventional and has not been employed in previous reviews. This innovative presentation adds distinctiveness to this section of the review. Overall, the novelty lies in the integrative, multidisciplinary, and forward-looking perspective on how sustainability marketing may evolve in emerging technologies and influence consumer perceptions in a pandemic-affected world.

10. Future Research Directions

Future studies could empirically validate the Integrative Sustainable Process Model using quantitative methods, such as Structural Equation Modeling (SEM), to test the proposed hypotheses regarding sustainability-driven consumer behavior. Future studies could also examine the impact of AI-driven traceability, circular economy practices, and plant-based innovations on consumer loyalty, offering deeper insights into emerging sustainability strategies in the food and beverage industry.

11. Conclusions

This research paper illustrates how organizations can implement sustainable practices in product design, ethical sourcing, eco-friendly packaging, and transparent customer engagement to strengthen brand loyalty. Firms can engage customers more deeply using techniques such as digital storytelling, eco-labeling, partnerships with environmental groups, influencer marketing, and sustainability-oriented loyalty programs. The key challenges a firm faces in implementing sustainable market-

ing include strategic planning, managing complex supply chains, controlling costs, and avoiding greenwashing. However, brands can address these challenges by communicating their efforts through creative strategies. The sector is also evolving in response to emerging sustainability themes, including food technology, artificial intelligence and data-driven insights, climate action, circular economy principles, and local sourcing. As these trends signal a strong move toward ethically transparent business practices, sustainability will be vital for businesses that need to remain competitive. In fact, sustainability has become an integral aspect of modern business rather than an optional consideration in the food and beverage industry. Sustainability marketing plays a critical role in shaping a healthier and more sustainable future and will continue to serve as a valuable tool in the market evolution of businesses.

List of Abbreviations

AI	Artificial Intelligence
F&B	Food and Beverage
FMCG	Fast-Moving Consumer Goods
GMO	Genetically Modified Organism
USDA	United States Department of Agriculture

Author Contributions

Conceptualization, methodology, software, investigation, data curation, draft writing: R.K.S; Supervision, project administration, validation: G.M; Validation, formal analysis, resources, visualization: S.K; Formatting, references, review editing: A.K.H. All authors have read and agreed to the published version of the manuscript.

Availability of Data and Materials

The data for the research were obtained from the authors via a questionnaire. All summarized data that support the conclusion of this work are presented in the article (Tables 3 and 4). The additional dataset file can be obtained from the corresponding author upon reasonable request.

Ethics Approval and Informed Consent

This study was conducted in accordance with ethical principles for research involving human participants. As it was a non-clinical, academic survey involving adult participants, formal ethical approval was not required under the guidelines of SR University, Ananthasagar, Hasanparthy, Warangal-506371, Telangana, India. A formal ethics approval protocol code was not applicable under institutional policy for non-clinical academic surveys. Participation in the study was entirely voluntary, and Informed

consent was obtained from all participants prior to data collection. Respondents were assured of anonymity, and their responses were used solely for academic purposes.

Conflicts of Interest

The authors declare no conflicts of interest.

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AI Declaration

Figures 1--3 were created using the NAPKIN AI tool. The authors confirm that no portion of the manuscript text was generated using any AI tool.

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