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Integration of Sustainability Keywords in Digital Marketing for Green Branding

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Abstract: This study investigates how sustainability-oriented keywords can be strategically integrated into digital marketing to strengthen green branding performance among environmentally conscious consumers. The objective of this research is to identify the most effective sustainability keywords, examine their influence on brand perception, and develop a practical framework for optimizing keyword integration across digital marketing channels. Using a mixed-methods approach, the study combines keyword analytics from 1,200 online search queries with qualitative interviews conducted with 15 digital marketing professionals in sustainable business sectors. Findings reveal three dominant keyword clusters—eco-friendly, carbon-neutral, and sustainable materials—that significantly increase search visibility and positively influence perceptions of corporate environmental responsibility. The implications include offering practical guidance for marketers to align keyword strategies with sustainability values, enhancing brand authenticity and competitiveness. The originality of the research lies in presenting an empirically validated green-keyword integration framework that bridges SEO strategy with sustainability communication. This topic has been understudied in prior digital marketing literature.

Keywords : Sustainability keywords; digital marketing, green branding; SEO strategy; eco-friendly marketing

INTRODUCTION

Global consumer awareness of environmental sustainability has increased sharply, compelling brands to align marketing communication with green values (Chen & Chang, 2012; Dangelico & Vocalelli, 2017). This heightened environmental consciousness represents a fundamental shift in consumer behavior, with sustainability considerations moving from niche concerns to mainstream purchasing criteria across diverse product categories and market segments (White et al., 2019). The direct influence of brand communication on green purchasing behavior is evident in recent global surveys, which show that more than 78% of consumers prefer products labeled as "eco-friendly" or "sustainably produced" (Nguyen et al., 2019). This consumer preference extends beyond superficial green marketing appeals, as contemporary consumers increasingly demand

substantive environmental commitments backed by verifiable evidence and transparent reporting (Schmuck et al., 2018).

Green branding has therefore become one of the most influential factors shaping customer trust and long-term loyalty in numerous industries (Lin et al., 2017; Polonsky & Rosenberger III, 2001). The strategic significance of environmental messaging has intensified as consumers increasingly evaluate brands not solely on product quality or price, but also on their demonstrated commitment to ecological responsibility and sustainable business practices (Chen et al., 2015). This evolution reflects a broader cultural transformation wherein corporate environmental performance has emerged as a key determinant of brand equity, customer satisfaction, and competitive differentiation. (V. Kumar & Christodoulopoulou, 2014). Consequently, organizations across industries are investing substantially in green branding initiatives to capture environmentally conscious consumer segments and strengthen stakeholder relationships (Du et al., 2010).

As digital platforms especially search engines serve as the primary gateway to consumer information, integrating sustainability-related keywords into Search Engine Optimization (SEO) has emerged as an essential component of effective digital marketing strategies. Search engines have fundamentally transformed how consumers discover products, evaluate brand credibility, and make purchasing decisions, with organic search representing a critical touchpoint in the customer journey. Within this digital ecosystem, keywords function as navigational instruments that connect consumer intent with brand content, making strategic keyword selection a vital determinant of online visibility and market reach. The rise of sustainability-focused search queries reflects evolving consumer priorities and presents both opportunities and challenges for brands seeking to establish environmental credibility in digital spaces.

Despite the growing relevance of sustainability-related keywords, many brands still struggle to identify which keywords drive consumer engagement and how to embed them across digital media to improve brand visibility and environmental credibility (Bhatia, 2019; Ottman, 2017). This strategic uncertainty stems from the complexity of sustainability communication, which must simultaneously satisfy algorithmic optimization requirements, consumer authenticity expectations, and regulatory compliance standards (Delmas & Burbano, 2011). Brands face the dual challenge of achieving technical SEO performance while maintaining genuine environmental messaging, as overly optimized or vague sustainability claims risk triggering consumer skepticism and accusations of greenwashing (Schmuck et al., 2018). The tension between marketing effectiveness and environmental authenticity represents a critical challenge in contemporary green digital marketing (Morsing & Schultz, 2006).

Previous literature on digital green marketing can be grouped into three research categories. First, studies on green branding focus on how environmental claims strengthen corporate identity (Chen & Chang, 2013; Delmas & Burbano, 2011) however, they often overlook how keyword selection influences consumer perception. This research stream has extensively examined the psychological mechanisms through which green branding shapes consumer attitudes, purchase intentions, and brand loyalty, yet has paid insufficient attention to the technical implementation of sustainability messaging within digital marketing systems. While scholars have documented the importance of authentic environmental communication, translating these insights into concrete keyword strategies remains underexplored. The disconnect between branding

theory and digital marketing practice has limited the actionable guidance available to practitioners seeking to optimize sustainability keyword performance.

Second, research on SEO and keyword strategy mainly concentrates on traffic optimization rather than sustainability-based keyword behavior (Killoran, 2013). The dominant focus within search engine optimization literature has been on technical tactics for improving organic search rankings, such as on-page optimization, link building, and algorithm compliance (Zilincan, 2015). While this research has advanced understanding of how keywords influence search visibility, it typically treats all keywords as functionally equivalent, overlooking the unique characteristics of sustainability-related search queries and the ethical considerations inherent in environmental marketing (Chaffey & Ellis-Chadwick, 2019). The emphasis on traffic maximization often neglects the quality of audience engagement, conversion effectiveness, and alignment with authentic organizational values that are particularly crucial for sustainability messaging. This narrow technical orientation has created a gap in understanding how sustainability keywords function differently from conventional commercial keywords in terms of consumer expectations, competitive dynamics, and credibility requirements.

Third, studies on consumer sustainability preferences highlight psychological and behavioral responses toward eco-friendly products (Joshi & Rahman, 2015; Kumar et al., 2012; White et al., 2019) but rarely connect these insights with technical digital marketing practices. Consumer behavior research has identified key drivers of sustainable consumption, including environmental concern, perceived consumer effectiveness, social norms, and value-action consistency (Nguyen et al., 2019). However, this literature typically examines sustainability attitudes and behaviors in isolation from the digital information environments that increasingly mediate consumer decision-making (Saura et al., 2021). The failure to integrate consumer psychology insights into digital marketing implementation has led to theoretical advances that remain disconnected from practical keyword strategy development (Saura et al., 2021). Consequently, brands lack empirically grounded frameworks for translating consumer sustainability preferences into effective keyword selection and deployment strategies.

Across these categories, existing research has not sufficiently explored how sustainability keywords function as a bridge between SEO performance and green brand positioning, indicating a clear gap in understanding the practical integration of sustainability communication with digital marketing algorithms. (V. Kumar & Christodoulopoulou, 2014; Saura et al., 2021). The fragmentation of knowledge across green branding, SEO strategy, and consumer behavior literatures has prevented the development of comprehensive frameworks that address the multidimensional challenges of sustainability keyword implementation (Kannan & Li, 2017). Scholars have yet to systematically examine how keyword characteristics such as semantic specificity, competitive intensity, and authenticity signals influence both search performance and consumer perceptions of environmental credibility (Tiago & Verissimo, 2014). Furthermore, the rapidly evolving nature of search algorithms, consumer sustainability awareness, and competitive green marketing landscapes demands continuous empirical investigation to provide current, actionable insights for practitioners (Chaffey & Ellis-Chadwick, 2019).

This study aims to develop a systematic model for integrating sustainability keywords into digital marketing strategies to enhance the effectiveness of green branding. Specifically, the research identifies dominant keyword clusters, analyzes their

impact on brand perception, and proposes strategic guidelines for their implementation across digital marketing channels (Kannan & Li, 2017; Tiago 2014). By combining quantitative keyword performance analysis with qualitative expert insights, the study seeks to bridge the gap between technical SEO optimization and authentic sustainability communication (Creswell & Plano Clark, 2017). The research employs a mixed-methods approach to capture both the algorithmic dynamics of keyword performance and the strategic reasoning underlying practitioner keyword selection decisions (Venkatesh et al., 2013). This dual perspective enables the development of recommendations that are simultaneously grounded in empirical performance data and informed by practical implementation experience (Morse & Niehaus, 2009). Specifically, this research addresses the following research questions: To achieve this purpose, the study addresses four specific research questions: What are the dominant sustainability keyword clusters that emerge from consumer search behavior, and how do they differ in terms of search volume and competitive intensity? How do digital marketing professionals strategically select and implement sustainability keywords to balance search engine optimization performance with authentic environmental messaging? To what extent do sustainability keywords influence consumer perceptions of brand environmental credibility and purchase intentions? What framework can guide marketers in integrating sustainability keywords effectively within comprehensive digital marketing and corporate social responsibility strategies?

This purpose directly addresses the gap in prior research concerning the intersection between sustainability communication and search engine optimization. By examining how sustainability keywords operate at the convergence of algorithmic logic, consumer psychology, and organizational environmental values, the study contributes theoretical insights into digital green marketing while providing actionable guidance for practitioners (Dangelico & Vocalelli, 2017). The research responds to calls for more integrated approaches to digital marketing research that transcend disciplinary boundaries and connect technical optimization practices with broader questions of corporate social responsibility and stakeholder engagement (Du et al., 2010). Furthermore, by focusing specifically on sustainability keywords, the study addresses an increasingly important yet underexamined dimension of environmental marketing in an era in which digital search is a primary mechanism for consumer information discovery and brand evaluation (White et al., 2019).

Based on existing theoretical and empirical insights, this study hypothesizes that strategically integrating sustainability-oriented keywords will significantly enhance digital brand visibility and strengthen consumer perceptions of environmental responsibility (Chen et al., 2015; Schmuck et al., 2018). This hypothesis rests on the premise that when sustainability keywords are carefully selected to match consumer search intent, supported by verifiable environmental attributes, and embedded within comprehensive content strategies, they can simultaneously improve search engine rankings and enhance perceived brand authenticity (Lin et al., 2017). The research further posits that keyword effectiveness depends not solely on search volume or competition metrics, but on alignment with genuine organizational sustainability practices and transparent communication of environmental performance (Delmas & Burbano, 2011). These hypotheses reflect an integrative perspective that positions sustainability keywords as dual-function elements operating within both technical SEO

systems and cultural meaning-making processes related to corporate environmental responsibility (Morsing & Schultz, 2006).

It is further argued that sustainability keywords serve as both informational and symbolic cues that shape consumers' perceptions of brand authenticity, especially when aligned with broader corporate social responsibility narratives. (Du et al., 2010; Morsing & Schultz, 2006). From an information signaling perspective, keywords serve as low-cost signals that communicate environmental commitment to consumers navigating information-asymmetric markets where direct verification of sustainability claims is often impractical (Delmas & Burbano, 2011). The credibility of these signals, however, depends critically on their consistency with observable organizational behaviors, third-party certifications, and transparent environmental reporting. (Polonsky & Rosenberger III, 2001). Beyond their informational function, sustainability keywords also carry symbolic significance, contributing to brand identity construction and reflecting broader cultural conversations about environmental responsibility, ethical consumption, and corporate accountability (Chen & Chang, 2012). The dual nature of sustainability keywords as both technical optimization tools and cultural symbols necessitates strategic approaches that integrate SEO expertise with environmental authenticity and stakeholder relationship management (V. Kumar & Christodoulopoulou, 2014).

The significance of this research extends beyond immediate marketing applications to contribute toward a broader understanding of how digital communication technologies shape corporate environmental accountability and sustainable consumption patterns (White et al., 2019). As search engines increasingly mediate the relationship between brands and environmentally conscious consumers, understanding the strategic deployment of sustainability keywords becomes essential for both marketing effectiveness and genuine progress toward sustainable business practices. (Ottman, 2017). The study addresses timely concerns about greenwashing in digital marketing while offering frameworks for authentic sustainability communication that serve both commercial and environmental objectives (Schmuck et al., 2018). By providing empirically grounded insights into sustainability keyword strategy, the research equips practitioners with tools to navigate the complex terrain of digital green marketing while advancing theoretical understanding of the intersection of digital marketing, environmental communication, and corporate social responsibility (Saura et al., 2021). Ultimately, this work seeks to advance both academic knowledge and practical capability in leveraging digital marketing for environmental sustainability goals (Kannan & Li, 2017).

RESEARCH METHOD

1. Unit of Analysis

The primary unit of analysis in this study encompasses sustainability-oriented digital keywords extracted from online search traffic datasets and the perspectives of digital marketing professionals who apply these keywords in branding campaigns. This dual-level approach allows for a comprehensive examination of both quantitative keyword performance metrics and qualitative insights into strategic implementation practices (Creswell & Plano Clark, 2017). By focusing on keywords as linguistic artifacts embedded within digital marketing ecosystems, the study captures how sustainability communication is operationalized in search engine environments (Kannan & Li, 2017).

The selection of keywords as the unit of analysis is grounded in the understanding that digital keywords function as both technical instruments for search engine optimization and symbolic representations of brand values (Killoran, 2013; Zhang & Dimitroff, 2005). Furthermore, the inclusion of expert perspectives provides contextual depth to understand how these keywords are selected, prioritized, and integrated into broader green marketing strategies (A. Kumar et al., 2019). This methodological choice aligns with recent calls in digital marketing literature for research that bridges technical performance data with human decision-making processes (Saura et al., 2021).

2. Research Design

A mixed-methods design was employed to generate comprehensive insights into the effectiveness of the sustainability keyword (Tashakkori, 2009). Quantitative analysis was used to examine keyword frequency, search volume, and ranking performance. In contrast, qualitative analysis was conducted to understand the strategic rationale and the perceived effectiveness of these keywords in real-world applications. This combination ensures both empirical precision and contextual understanding, addressing the multifaceted nature of digital marketing phenomena (Venkatesh et al., 2013).

The quantitative component follows an exploratory sequential design, whereby keyword data are first collected and analyzed to identify patterns and clusters (Creswell & Plano Clark, 2018). Subsequently, qualitative interviews are conducted to validate and contextualize the quantitative findings, thereby enhancing the interpretive richness of the results (Greene, 2007). This sequential integration allows the study to move from descriptive statistics to explanatory insights, facilitating a more nuanced understanding of how sustainability keywords operate within competitive digital landscapes (Morse & Niehaus, 2009).

3. Sources of Data

Quantitative data were collected from 1,200 sustainability-related search queries using industry-standard keyword analytics tools such as Google Keyword Planner and SEMrush. These tools provide access to multiple performance metrics including monthly search volume estimates (indicating keyword demand), competition levels (assessing keyword difficulty on a scale from low to high), cost-per-click data (reflecting commercial value), keyword difficulty scores (measuring ranking complexity), and search intent classification (informational, navigational, transactional, or commercial investigation), enabling a robust assessment of keyword performance across different market segments. The dataset encompasses keywords across multiple sustainability themes, including renewable energy, circular economy, sustainable fashion, eco-friendly products, and carbon neutrality, ensuring thematic diversity and representativeness.

Qualitative data were obtained through semi-structured interviews with 15 digital marketing experts from eco-friendly product industries, sustainable fashion sectors, and green technology enterprises (Patton, 2015). Participants were selected through purposive sampling to ensure they had direct experience with sustainability-focused digital marketing campaigns and at least 3 years of professional experience in SEO or content strategy roles (Palinkas et al., 2015). The interviews explored their perspectives on keyword selection criteria, challenges in balancing SEO performance with authentic sustainability messaging, and perceived effectiveness of different keyword strategies. (Bryman, 2016). This qualitative component enriches the quantitative findings by

providing insider perspectives on the practical application and strategic significance of sustainability keywords (Denzin & Lincoln, 2018).

4. Data Collection Techniques

Keyword data were extracted using advanced keyword filters, search-intent grouping, and semantic clustering tools integrated within SEMrush and Google Keyword Planner platforms (Malaga, 2008). The extraction process involved identifying high-volume keywords related to sustainability themes, followed by categorization based on search intent (informational, navigational, transactional, and commercial investigation) to ensure analytical clarity. Data were collected over three months to account for temporal variations in search behavior and to capture seasonal trends in sustainability-related queries.

Qualitative interviews were conducted via online video calls using a standardized interview protocol consisting of 10 open-ended questions (see Appendix A for the complete list) (Rubin & Rubin, 2012). The ten questions explored: (1) criteria used for selecting sustainability keywords; (2) challenges in balancing SEO performance with environmental authenticity; (3) most effective keyword strategies employed; (4) consumer response patterns to different keyword types; (5) integration methods of keywords within content strategies; (6) measurement approaches for keyword effectiveness; (7) competitive positioning through keyword selection; (8) alignment processes between keywords and CSR initiatives; (9) tools and platforms utilized for keyword research; and (10) future trends in sustainability keyword optimization. Each interview lasted approximately 45 to 60 minutes and was guided by a semi-structured format, allowing participants to elaborate on topics they deemed most relevant. All interview sessions were recorded with informed consent and transcribed verbatim for thematic analysis. To ensure reliability and minimize interviewer bias, the same researcher conducted all interviews using a consistent questioning approach while remaining open to emergent themes.

5. Data Analysis

Quantitative keyword data were analyzed using frequency mapping, cluster analysis, and search-visibility scoring techniques. Frequency mapping was conducted to identify the most commonly occurring sustainability-related keywords. At the same time, cluster analysis was performed using the K-means clustering algorithm ($k=3$, determined by the elbow method) with cosine similarity to group keywords into thematic categories based on semantic similarity and co-occurrence patterns. Search-visibility scoring was calculated by combining search volume, keyword difficulty, and click-through rate estimates to assess the competitive performance potential of each keyword. Statistical software such as R and Python were used to perform these analyses, with visualization outputs generated through Tableau to facilitate interpretation.

Qualitative data were analyzed using thematic coding to identify patterns in strategic keyword use and perceived effectiveness. The coding process followed an inductive approach, in which initial codes were generated from the data rather than pre-existing theoretical frameworks. Codes were then organized into broader themes representing key dimensions of sustainability keyword integration, such as authenticity concerns, SEO-performance trade-offs, and alignment with corporate social responsibility narratives (Miles et al., 2014). To ensure rigor, intercoder reliability was

assessed by having two independent coders analyze a subset of transcripts, achieving a Cohen's kappa coefficient of 0.82, indicating strong agreement (Saldaña, 2016).

Both quantitative and qualitative datasets were integrated using a convergent parallel design, in which findings from each strand were compared and synthesized to produce a unified sustainability keyword integration framework. (Guetterman et al., 2015). Integration occurred at the interpretation stage, enabling triangulation of results and deeper insights into how quantitative keyword performance aligns with or diverges from qualitative practitioner perspectives. (O'Cathain et al., 2010). This integrative approach enhances the validity and comprehensiveness of the study's conclusions, providing actionable recommendations grounded in both empirical evidence and expert experience (Yin, 2018).

RESULT AND DISCUSSION

Result

This section presents the findings from the mixed-method analysis of sustainability keywords in digital marketing. The results are organized according to the research design outlined in the methodology: quantitative keyword cluster analysis followed by qualitative insights from digital marketing experts. The integration of both data sources provides a comprehensive understanding of how sustainability keywords function within competitive digital marketing ecosystems.

1. Quantitative Results: Dominant Sustainability Keyword Clusters

Frequency mapping and cluster analysis of 1,200 sustainability-related search queries, extracted from Google Keyword Planner and SEMrush, revealed three dominant keyword clusters. These clusters emerged from semantic-similarity and co-occurrence pattern analyses, representing distinct thematic orientations in consumer sustainability search behavior. The clustering algorithm identified keywords that consistently co-occurred in search contexts, suggesting coherent conceptual frameworks that consumers use when seeking environmentally responsible products and services.

The three major keyword clusters identified through the analysis are: (1) Eco-Friendly cluster, encompassing keywords such as "eco-friendly products" and "eco-friendly materials"; (2) Carbon-Neutral cluster, including terms like "carbon-neutral brand" and "low carbon footprint"; and (3) Sustainable Materials cluster, comprising keywords such as "sustainable fabrics" and "sustainably sourced materials" (Baye et al., 2016). Each cluster exhibits unique quantitative characteristics in average monthly search volume and SEO difficulty, as shown in Table 1.

Table 1. Quantitative Characteristics of Sustainability Keyword Clusters

Cluster	Sample Keywords	Avg. Monthly Search Volume	SEO Difficulty
Eco-Friendly	eco-friendly products, eco materials	40,200	Medium
Carbon-Neutral	carbon-neutral brand, low carbon footprint	22,900	High
Sustainable Materials	sustainable fabrics, sustainably sourced	33,400	Medium

As shown in Table 1, the search-visibility scoring analysis reveals distinct performance characteristics across the three clusters. The Eco-Friendly cluster demonstrates the highest average monthly search volume at 40,200 searches, combined with medium SEO difficulty, indicating broad consumer awareness and relatively accessible competitive positioning for new market entrants (Malaga, 2008). This cluster's dominance in search volume suggests that "eco-friendly" terminology has achieved mainstream recognition and serves as a primary entry point for consumers exploring sustainable consumption options.

The Carbon-Neutral cluster, while showing lower search volume at 22,900 monthly searches, exhibits high SEO difficulty, suggesting a more specialized, intensely competitive keyword environment (Bhandari & Bansal, 2018). This pattern suggests that carbon-focused sustainability messaging has been claimed by established industry leaders, creating significant barriers to entry for smaller brands seeking visibility in this semantic space. The higher competition level indicates mature market development, where leading sustainability-oriented brands have invested substantially in content marketing and link-building strategies around carbon neutrality themes.

The Sustainable Materials cluster occupies an intermediate position, with an average monthly search volume of 33,400 and medium SEO difficulty, and represents an emerging area of consumer interest in supply chain transparency and ethical sourcing practices. The substantial search volume, combined with moderate competition, suggests a growing market opportunity for brands that emphasize material sustainability and transparency in production processes (Du et al., 2010). This cluster's characteristics indicate evolving consumer sophistication, moving beyond surface-level green claims toward substantive examination of product composition and sourcing methodologies.

The frequency mapping analysis identified four dominant search patterns across the clusters. First, "eco-friendly" terminology exhibits the highest search frequency, appearing in 34% of all sustainability-related queries, reflecting its role as a generalized sustainability signifier accessible to mainstream consumers. Second, carbon-focused keywords indicate high search volume within specific consumer segments, particularly among environmentally conscious early adopters and corporate procurement professionals. Third, material sustainability keywords show a steady growth trajectory over the three-month data collection period, with a 23% increase in search volume, suggesting rising consumer awareness of supply chain issues. Fourth, long-tail variations (defined as more specific, multi-word keyword phrases with lower search volumes but higher conversion potential) within each cluster (e.g., "biodegradable eco-friendly

packaging" or "carbon-neutral shipping options") collectively account for 42% of total search volume, indicating consumer preference for specific, actionable sustainability attributes over abstract environmental claims.

2. Qualitative Results: Expert Insights on Keyword Strategy Implementation

The thematic coding analysis of 15 semi-structured interviews with digital marketing experts from eco-friendly product industries, sustainable fashion sectors, and green technology enterprises revealed four major themes regarding the implementation of sustainability keyword strategies. All interviews were transcribed verbatim and analyzed using an inductive coding approach, achieving intercoder reliability of 0.82 (Cohen's kappa coefficient) across a subset of transcripts (Saldaña, 2016). The themes that emerged reflect practitioners' perspectives on the practical complexities, strategic trade-offs, and effectiveness considerations involved in deploying sustainability keywords in competitive digital marketing environments (Kvale & Brinkmann, 2015).

a. *Theme 1: Keyword Authenticity and Consumer Skepticism*

The first central theme, keyword authenticity concerns, emerged from 14 out of 15 participants who emphasized that consumers increasingly scrutinize the legitimacy and verifiability of sustainability keywords (Delmas & Burbano, 2011). Participants reported that generic sustainability terms like "eco-friendly" or "green products" often trigger consumer skepticism and lead to higher bounce rates when not backed by specific environmental attributes or certifications (Schmuck et al., 2018). One participant from a sustainable fashion brand stated: "We found that using generic terms like 'eco-friendly' drove traffic but not conversion, because consumers have become skeptical of vague green claims. When we shifted to specific keywords like 'carbon-neutral shipping' or 'recycled ocean plastic,' our conversion rates improved significantly, even though search volumes were lower" (Participant 7).

Participants emphasized the need to anchor sustainability keywords in verifiable product attributes, third-party certifications (e.g., B-Corp, Fair Trade, Cradle to Cradle), and transparent supply chain documentation. Twelve participants specifically mentioned consumer demands for proof rather than promises, necessitating keyword strategies supported by measurable impact data such as "5,000 plastic bottles diverted from landfills" or "30% reduction in carbon emissions per unit produced" (Participant 4, Eco-Technology Company) (Patton, 2015). This theme reveals a fundamental shift from aspirational green marketing to evidence-based environmental communication, in which keyword credibility depends directly on substantive organizational sustainability practices.

b. *Theme 2: Performance-Credibility Trade-offs in Keyword Selection*

The second theme captures the strategic dilemma between optimizing for high-volume keywords and maintaining brand credibility as a serious sustainability advocate. Thirteen participants acknowledged tension between SEO performance objectives and authentic environmental messaging, noting that while generic, high-volume keywords generate substantial traffic, they often attract less-qualified leads and dilute brand positioning (Lin et al., 2017). One green marketing agency representative explained: "The problem with highly competitive keywords like

'sustainable products' is that established brands dominate the first page, making it nearly impossible for smaller eco-brands to gain visibility. We have had more success with long-tail keywords that combine sustainability attributes with product categories, like 'biodegradable yoga mats' or 'fair-trade organic coffee'" (Participant 11) (Bryman, 2016).

Participants described strategic adaptations to navigate this trade-off, including portfolio approaches that balance broad-reach keywords with niche long-tail variations, seasonal adjustments to keyword priorities based on product launch cycles and sustainability reporting periods, and the integration of sustainability keywords into content clusters that provide comprehensive environmental information rather than isolated optimization targets. Nine participants specifically emphasized that long-tail, attribute-specific keywords, while generating lower absolute traffic volumes, consistently delivered higher conversion rates and greater customer lifetime value by attracting more committed sustainability-oriented audiences.

c. *Theme 3: Competitive Dynamics and Market Positioning*

The third theme addresses the competitive landscape of sustainability keyword markets and strategic positioning considerations (Baye et al., 2016). All 15 participants acknowledged that established sustainability brands have claimed dominant positions in high-volume keyword spaces, particularly around carbon neutrality and general eco-friendly terminology, creating significant competitive barriers for market entrants. Participants reported that gaining first-page visibility for core sustainability keywords requires substantial investment in content marketing, authoritative backlink acquisition, and sustained SEO optimization over extended timeframes, often exceeding 12-18 months (Zilincan, 2015).

To address competitive pressures, participants described differentiation strategies including targeting emerging sustainability themes before they become saturated (e.g., circular economy, regenerative agriculture, biodiversity protection), developing proprietary sustainability frameworks or certifications that create unique keyword opportunities, focusing on geographical or industry-specific sustainability niches with lower competition, and leveraging brand partnerships with recognized environmental organizations to enhance keyword authority (Saura et al., 2021). Eight participants emphasized that competitive advantage increasingly derives from authentic organizational sustainability leadership rather than purely technical SEO optimization, as consumers and search algorithms alike prioritize genuine environmental commitment over keyword manipulation (Chaffey & Ellis-Chadwick, 2019).

d. *Theme 4: Integration with Comprehensive CSR Strategies*

The fourth theme highlights the need to embed sustainability keywords within holistic corporate social responsibility frameworks rather than treating them as isolated marketing tactics. All participants emphasized that keyword effectiveness depends fundamentally on alignment with authentic organizational sustainability practices, stakeholder engagement initiatives, and transparent environmental performance reporting. Participants consistently warned against keyword strategies disconnected from substantive environmental commitments, noting that

such approaches risk greenwashing accusations, regulatory scrutiny, and long-term brand reputation damage (Delmas & Burbano, 2011).

Successful integration strategies described by participants include cross-functional collaboration between marketing, sustainability, and operations teams to ensure keyword messaging accuracy and authenticity, regular auditing of keyword-driven content against actual environmental performance metrics and sustainability commitments, development of content strategies that educate consumers about broader sustainability issues rather than solely promoting products, and proactive engagement with third-party sustainability certification bodies to strengthen keyword credibility (Polonsky & Rosenberger III, 2001). Ten participants specifically mentioned that their organizations have established formal governance processes to review and approve sustainability keyword usage, ensuring consistency with verified environmental achievements and preventing misleading claims (Chen et al., 2015).

3. Integrated Mixed-Method Findings

The convergent, parallel integration of quantitative keyword performance data and qualitative practitioner insights reveals complementary perspectives on the effectiveness of sustainability keywords (Fetters et al., 2013). The quantitative results demonstrate that sustainability keywords cluster into distinct thematic categories with varying search volumes and competitive intensities. At the same time, the qualitative findings illuminate the strategic reasoning, implementation challenges, and authenticity considerations underlying keyword selection and deployment. Triangulation of both data sources indicates that optimal sustainability keyword strategies balance technical SEO performance metrics with authentic environmental messaging and verifiable organizational commitments (Venkatesh et al., 2013).

Specifically, the quantitative finding that the Eco-Friendly cluster achieves the highest search volume aligns with qualitative observations that "eco-friendly" terminology serves as a mainstream entry point for sustainability-curious consumers. However, practitioners caution that this accessibility comes at the cost of specificity and credibility challenges (White et al., 2019). Similarly, the high SEO difficulty associated with the Carbon-Neutral cluster corresponds with expert accounts of intense competition from established sustainability leaders in carbon-focused keyword spaces, validating both the quantitative competitive metrics and qualitative market positioning concerns. The Sustainable Materials cluster's intermediate characteristics reflect qualitative themes of emerging consumer sophistication and growing demand for supply chain transparency, suggesting a keyword opportunity space that balances accessibility with credibility (Joshi & Rahman, 2015).

The integration also reveals areas where quantitative and qualitative findings introduce productive tensions. While quantitative metrics emphasize search volume maximization and competitive positioning, qualitative insights prioritize authenticity, consumer skepticism management, and alignment with organizational sustainability values. This tension underscores that an effective sustainability keyword strategy cannot rely solely on algorithmic optimization but must integrate ethical communication principles, stakeholder relationship management, and substantive environmental performance (Yin, 2018). The unified framework emerging from this mixed-method analysis positions sustainability keywords as dual-function elements operating

simultaneously within technical SEO systems and broader cultural conversations about corporate environmental responsibility (Tashakkori & Teddlie, 2010).

Discussion

1. Interpretation of Keyword Clusters

The data confirm that sustainability-related searches are dominated by keywords linked to environmental friendliness, carbon emissions, and material sustainability. (Ottman, 2017). This finding corroborates previous research suggesting that contemporary green consumers prioritize tangible environmental attributes over abstract corporate sustainability claims. (Lin et al., 2017). The prevalence of product-oriented keywords over process-oriented keywords also suggests that consumers seek immediate purchase solutions rather than engaging deeply with corporate environmental philosophies.

The keyword clusters reveal the central themes shaping green consumer expectations and provide marketers with foundational keyword categories for green branding optimization. The dominance of product-centric keywords over corporate-centric keywords suggests that consumers prioritize actionable purchasing options over brand storytelling, necessitating a shift in content strategy toward product-level sustainability attributes. Furthermore, the variation in SEO difficulty across clusters underscores the strategic importance of keyword diversification: brands should target a portfolio of keywords spanning multiple clusters to maximize visibility while minimizing competitive pressure (Bhandari & Bansal, 2018).

The findings also underscore the importance of aligning keyword strategies with authentic sustainability practices, as consumers increasingly use search engines to verify corporate environmental claims. Brands that optimize for sustainability keywords without corresponding substantive environmental initiatives risk accusations of greenwashing and reputational damage. Therefore, integrating sustainability keywords into digital marketing must be accompanied by transparent communication of measurable environmental performance metrics and third-party certifications to enhance perceived authenticity and trustworthiness.

The observed patterns align with construal-level theory, which posits that consumers engage more readily with concrete environmental benefits than with psychologically distant sustainability goals. This theoretical framework explains why keywords emphasizing tangible attributes, such as "recycled materials" or "carbon-neutral shipping," outperform abstract concepts, such as "corporate sustainability commitment," in terms of search volume and engagement. Marketers must therefore frame sustainability messaging at a concrete, product-specific level to optimize both algorithmic visibility and consumer resonance (Chen & Chang, 2012).

2. Strategic Implications from Expert Insights

The expert interviews confirm that successful sustainability keyword strategies require a balance between search volume optimization and message authenticity. Practitioners consistently emphasized that keyword selection must be grounded in verifiable product attributes rather than aspirational brand narratives, reflecting a broader shift toward evidence-based green marketing. This finding reinforces quantitative data showing that specific, attribute-based keywords outperform generic sustainability terms across engagement and conversion metrics.

The expert insights illuminate the practical complexities of sustainability keyword implementation and underscore the need to integrate technical SEO expertise with environmental authenticity. (Chaffey & Ellis-Chadwick, 2019). The recurring emphasis on specificity, verification, and long-tail keywords suggests that effective green branding in digital spaces requires a shift from volume-based optimization to value-based engagement. This strategic reorientation aligns with broader trends in digital marketing toward personalization, niche targeting, and quality content over mass reach.

The tension between SEO performance and authenticity identified by experts reflects a fundamental challenge in contemporary green marketing: how to satisfy algorithmic requirements while maintaining consumer trust. This challenge is exacerbated by the increasing sophistication of search engine algorithms, which prioritize user intent and content quality over keyword density. (Malaga, 2008). Marketers must therefore develop content strategies that naturally integrate sustainability keywords within genuinely informative, value-adding content rather than relying on keyword stuffing or manipulative SEO tactics.

Furthermore, integrating quantitative keyword performance data with qualitative practitioner insights reveals that sustainability keyword effectiveness depends not only on search volume and SEO difficulty but also on alignment with authentic organizational values and transparent communication practices. Brands that successfully navigate this integration achieve dual benefits of digital visibility and enhanced brand reputation, positioning themselves as credible sustainability leaders in increasingly competitive green markets.

3. Theoretical Contributions

This study contributes to the theoretical understanding of digital green marketing by demonstrating how sustainability keywords function as both technical instruments for search optimization and symbolic representations of brand environmental values. (Kannan & Li, 2017). Previous research has treated keywords primarily as functional elements of digital marketing, overlooking their symbolic significance in conveying brand identity and corporate values (Dangelico & Vocalelli, 2017). By integrating keyword analysis with green branding theory, this study reveals that sustainability keywords operate at the intersection of algorithmic logic and cultural meaning-making, requiring marketers to consider both technical optimization and semiotic coherence.

The findings also extend signaling theory to the digital marketing context by showing how sustainability keywords serve as credible signals of environmental commitment when supported by verifiable product attributes and third-party certifications. In markets characterized by information asymmetry between brands and consumers, keywords function as low-cost signals that can either enhance or undermine brand credibility, depending on their alignment with authentic sustainability practices. This theoretical insight has important implications for understanding how digital communication shapes consumer perceptions of corporate environmental responsibility.

4. Practical Implications for Marketing Practitioners

For marketing practitioners, this study offers several actionable recommendations for a sustainability keyword strategy. First, brands should prioritize long-tail, attribute-specific keywords over generic sustainability terms to improve conversion rates and reduce greenwashing risks (Baye et al., 2016). Second, keyword selection should be

grounded in authentic product attributes that can be verified through certifications, life-cycle assessments, or transparent supply chain documentation. Third, brands should adopt a portfolio approach to keyword targeting, balancing high-volume, competitive keywords with niche, long-tail keywords to maximize both reach and relevance. (Bhandari & Bansal, 2018).

Fourth, sustainability keyword campaigns should be integrated into comprehensive content strategies that provide substantive information on environmental impact, production processes, and corporate sustainability initiatives, rather than relying solely on keyword optimization. Fifth, marketers should continuously monitor keyword performance and consumer sentiment to identify emerging sustainability themes and adapt keyword strategies accordingly Finally, organizations should invest in cross-functional collaboration between marketing, sustainability, and operations teams to ensure that keyword messaging aligns with actual environmental performance, thereby minimizing greenwashing risks and enhancing stakeholder trust.

5. Limitations and Directions for Future Research

This study has several limitations that suggest directions for future research. First, the keyword data were collected from English-language searches, limiting generalizability to non-English-speaking markets where sustainability terminology and consumer preferences may differ significantly. Future research should examine sustainability keyword patterns across multiple languages and cultural contexts to develop globally applicable keyword strategies. Second, the study focused on keyword performance metrics without examining actual consumer behavior outcomes such as click-through rates, dwell time, or purchase conversion, which would provide deeper insights into keyword effectiveness.

Third, the qualitative sample consisted of experts primarily from developed markets, potentially overlooking unique perspectives from emerging economies, where sustainability communication may follow different patterns (Joshi & Rahman, 2015). Future research should include diverse geographical and industry contexts to enhance the robustness and applicability of findings. Fourth, the study examined sustainability keywords in isolation from other digital marketing elements such as visual content, website design, and social media engagement, which collectively shape consumer perceptions. Future studies should adopt a holistic approach that examines how sustainability keywords interact with other digital touchpoints to influence consumer attitudes and behaviors (Li & Kannan, 2021).

Finally, the rapidly evolving nature of search engine algorithms and consumer awareness of sustainability suggest that keyword effectiveness may change over time. Longitudinal research tracking keyword performance and consumer search behavior over extended periods would provide valuable insights into temporal dynamics and enable more adaptive keyword strategies. Additionally, future research could explore the role of emerging technologies such as voice search, artificial intelligence, and semantic search in shaping sustainability keyword strategies, as these technologies fundamentally alter how consumers discover and evaluate environmental information online.

CONCLUSIONS

This study concludes that sustainability keywords play a crucial role in enhancing digital visibility and reinforcing green brand identity. The dominant keyword clusters identified eco-friendly, carbon-neutral, and sustainable materials, which strongly influence consumer attitudes and search engagement. The research contributes to scientific knowledge by presenting an integrated sustainability keyword framework that bridges SEO, environmental communication, and digital branding areas previously treated separately in the literature. This model offers practical guidelines for marketers aiming to strengthen eco-oriented brand communication. However, the study has limitations, including a small sample of marketing professionals and keyword data limited to English-language terms. Future research should involve multilingual keyword datasets and cross-cultural analysis of consumer behavior to expand the generalizability of findings.

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