

Review

# Sustainable Marketing and the Role of Social Media: An Experimental Study Using Natural Language Processing (NLP)

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**Abstract:** Marketing has changed fundamentally in the new millennium. At the same time, sustainable marketing strategies have evolved to meet the challenges of environmental issues. In this study, we examined the trends in sustainable marketing strategies and the role of social media in these. Based on specific keywords per the objective, this study collected 33 published articles from the Scopus database from 1991 to 2022 (2012–2022). The KNIME (Konstanz Information Miner) and VOSviewer tools were deployed to provide detailed classification and prediction of the various trends in sustainable marketing, with a particular focus on the role of social media. The study method applied text mining and latent semantic analysis to predict the latest trends. The top three trends were Green Marketing and Consumer Behavior, Sustainable Social Media Marketing, and Influencer Social Media Marketing Practices. This NLP-based review and the clustering of research directions provide immense value to marketers and policymakers.

**Keywords:** sustainable marketing; green marketing; social media; natural language processing (NLP); artificial intelligence (AI); latent semantic analysis (LSA); KNIME (Konstanz information miner)



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## 1. Introduction

As the world struggles with limited resources and environmental degradation, green and sustainable marketing practices have emerged. Sustainability in marketing practices was popularized by the concept of the triple bottom line (TBL) [1], which considered three dimensions: people, planet, and profit. Further research also addressed sustainable behaviors in marketing transactions [2]. Environmental concerns and resultant consumer behavior also significantly influenced marketing strategies [3]. Gordon et al. [4] proposed a holistic framework for integrating social marketing with environmental marketing and stakeholder engagement. Another dominant development has been green marketing.

Along with sustainable marketing, the use of green marketing has become widespread. Customers can be offered value additions while caring for the environment [5]. Many factors shape consumers' green consumption lifestyles and behaviors, e.g., environmental concerns and attitudes, societal influence, family and peer groups, brand dimensions, green marketing practices, and so on [6,7]. Natural food products have created a niche market, and the consumption behavior of environmentally concerned consumers has changed in the past decade [8]. Green marketing can work better with a mix of green products, and create a niche market for these [9]. Therefore, green and sustainable strategies are crucial to achieving the TBL in marketing.

Furthermore, in this digital age, where sustainable marketing strategies have been adopted, social media has played a massive role. The new millennium has transformed marketing strategies into digital and social media-based (DSMM) practices [10,11]. New technologies and strategies spread through the diffusion of innovation pathways [12], and for social media marketing, the stage is set for long-term growth. Social media plays a

massive role in influencing consumers. Brands use social media channels for consumer engagement and relationship development [13]. Social media campaigns with specific messages are able to affect consumer behavior in an emotion-filled atmosphere [14]. Sustainable, green, environmental marketing strategies using social media channels have been hugely successful [15].

Many studies have been conducted over the past decade relating to the role of social media within sustainable or green marketing strategies. However, those studies have been primarily empirical, bibliometric, or systematic literature works. Hence, in this study, we fill the gap with an experimental study utilizing Natural Language Processing (NLP). The study process applies text mining and latent semantic analysis to predict the latest trends. Based on the specific keywords per the objective, this study collected 33 published articles from the Scopus database from 1991 to 2022 (2012–2022). The KNIME (Konstanz Information Miner) tool provided detailed classification and prediction of the various trends in sustainable marketing, with a particular focus on the role of social media [16]. The primary objective was divided into several sub-objectives, provided below as five research questions related to sustainable or green marketing and the role of social media. The following research questions were addressed in this study:

RQ1: What strings should be selected for this study? (as per title and objectives)

RQ2: What are the general developments of publications in this field?

RQ3: What are the top author keywords in the selected strings?

RQ4: What are the significant literary works that have impacted this domain?

RQ5: What are the trends and hot topics in existing research?

Based on the above consideration, the study is divided into five further sections. Section 2 elaborates on the employed methodology, and is followed by the results (RQ1–RQ4). Section 4 discusses the clusters derived after the analysis (RQ5). Finally, the study concludes in Sections 5 and 6 with implications and future research directions.

## 2. Methods

A sustainable marketing strategy should satisfy current demands without jeopardizing future resources. To achieve this objective, sustainable marketing involves economic growth, social responsibility, and environmental conservation. In addition, sustainable marketing places a premium on the triple bottom line, customer requirements, and long-term shareholder value. Based on an analysis of the SCOPUS database, it was determined that there remained a need to study the relationship between sustainable marketing (and green marketing) and social media [17]. The research period spanned from 1991 to 2022, utilizing press and archival sources. We began the procedure with the string selection; initially, two strings were chosen according to the necessity for investigation. There were 1801 documents identified, of which 1459 were on “Green Marketing” and the remaining 342 were on “Sustainable Marketing”, indicating the need for further study in this area. Therefore, the researchers investigated the concept of sustainable marketing in greater depth. Subsequent analysis revealed that combining sustainable marketing with social media provided a more realistic image of the research. On additional investigation, a third string was produced, for “Green Marketing” or “Sustainable Marketing” and “Social Media”, yielding more than 35 hits. Articles, conference papers, book chapters, review papers, books, conference reviews, editorials, and data papers accounted for 1836 documents. Figure 1 depicts the entire study scenario and research breadth on this topic. The study topic “Green Marketing” accounted for the highest proportion, at 79.5%, while the research topic “Sustainable Marketing” contributed 18.6%.

The “Green Marketing” publication data show that journal articles dominate the publication pattern, and most were published in 2019–2022. Meanwhile, numbers of conference papers and book chapters followed the research trends in this domain, and most of these were published from 2016 to 2022. Figure 1 describes the annual analysis of publications on the selected topics. For the present research on the role of social media in sustainable marketing, the selected string resulted in 35 publications, of which 30 are journal

articles and 5 are conference papers that report the scope of research in this domain. Finally, 33 studies were considered for this experiment as the relevant articles were published in English.

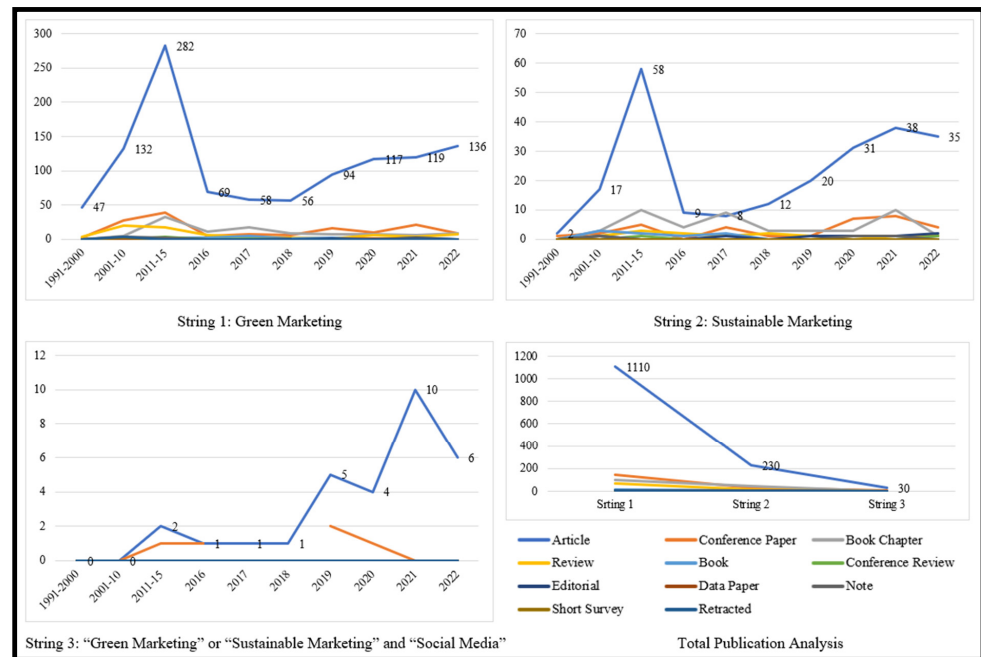


Figure 1. Year-wise publication analysis of selected strings.

Keywords and String Selection

Firstly, the initial keywords like “sustainable marketing”, “green marketing”, and “social media” were selected for the experiment. String selection for running the query in the Scopus database was influenced by the guidelines given by Kitchenham and Charters [18]. Selecting a topic, developing research questions, and consulting with subject matter experts all inform the final set of keywords. While there are several possible sources for obtaining white papers, Scopus is widely recognized as the most comprehensive and valuable database [19]. For this reason, the Scopus database was accessed to obtain a large sample of authors. Finally, the graphic displays the corpus collection procedure using many Scopus strings (Figure 2).

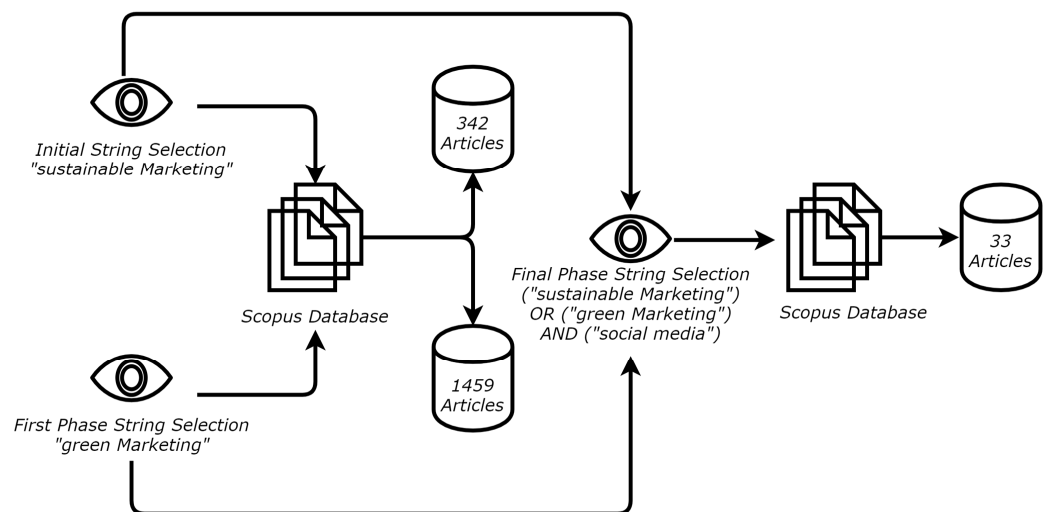
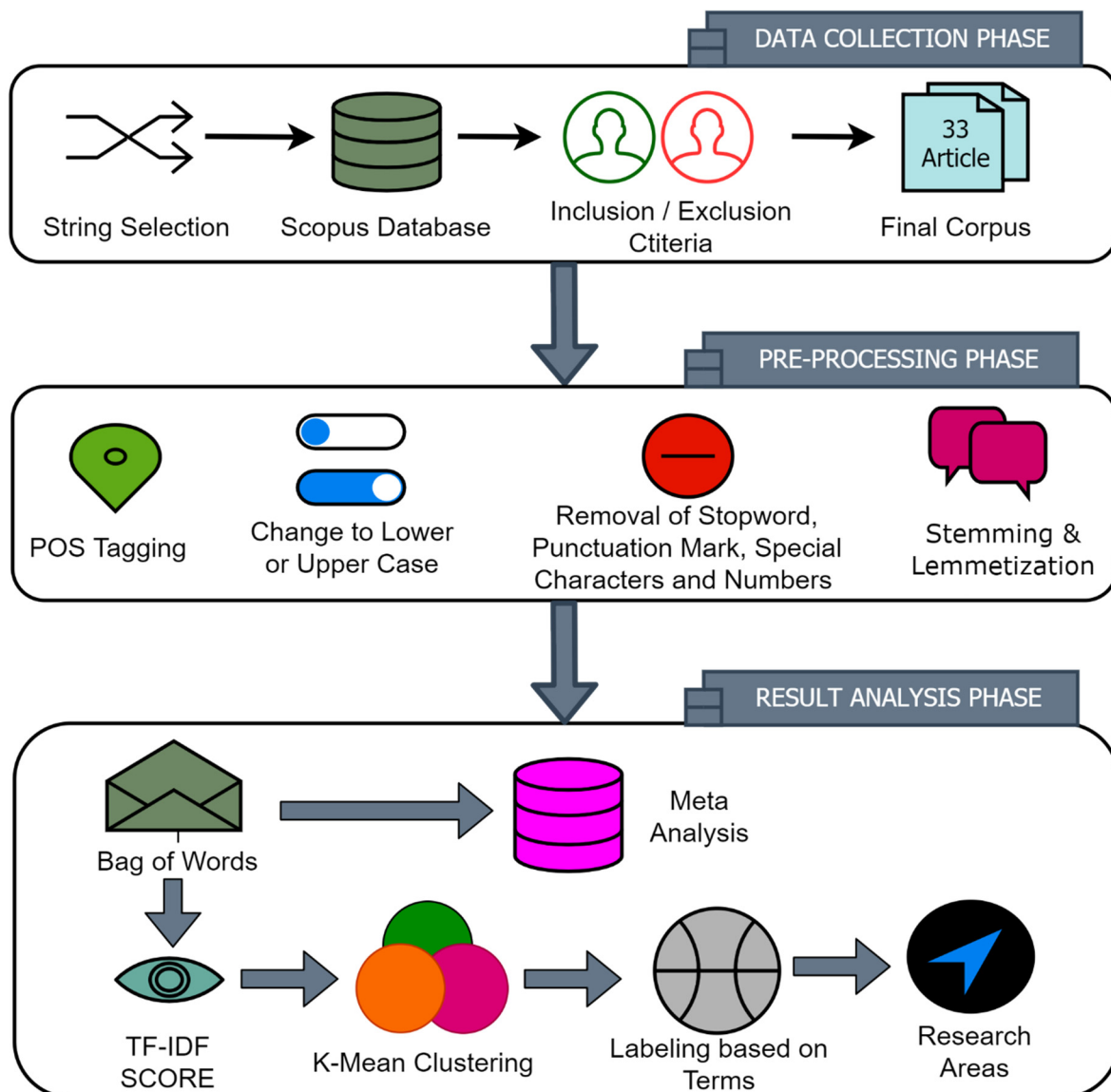


Figure 2. Proposed methodology for collecting corpus.

The selected string was inputted to the Scopus database, and as a result 35 articles were extracted. Only articles written in English were included under the inclusion/exclusion criteria. After removing the non-English articles, 33 papers were finally selected for the experiment. Data were stored in an Excel file which contained the article titles, publisher, abstract, and other information. LSA was applied on the collected information.

This experiment used an open-source tool named KNIME, which contains text processing as one of its significant features [20]. This tool includes different modules of text mining and is easy to understand. Moreover, it allows users to share their workflow among peer groups [21]. Furthermore, the current study used an open-source tool, Vosviewer, to gather statistical information such as top authors, top countries, etc. [22] (Figure 3).



**Figure 3.** The methodology used for the experiment.

Preprocessing is a crucial stage in latent semantic analysis (LSA), helping to prepare text input for analysis by decreasing noise and improving the algorithm's efficiency and efficacy. Techniques such as and tokenization and the removal of stop words can assist in reducing this noise and generating a more meaningful and focused dataset. Preprocessing can also increase the performance of LSA by minimizing the influence of common terms that are not beneficial for differentiating between documents or themes. The detailed preprocessing processes utilized in this study are listed in Table 1.

**Table 1.** Pre-processing Steps.

| Stages                   | Description  | Result  |
|--------------------------|--|---|
| POS Tagging              | Part-of-speech (POS) tagging labels each word in a text corpus as a noun, verb, adjective, adverb, etc. This approach helps machines grasp the grammatical structure of the text and can be utilized for NLP tasks, including text classification, information extraction, and text-to-speech conversion [23].   | ["Document", ":", "Social", "Media", "is", "an", "essential", "tool", "for", "product", "marketing", "."] |
| Case Converter           | Case conversion is a preprocessing step intended to maintain the text document's consistency and refers to modifying the case of text characters. This technique can standardize text or perform text categorization, information retrieval, and sentiment analysis tasks. The standard case conversion in the current study is lowercase [24].                      | ["document", ":", "social", "media", "is", "an", "essential", "tool", "for", "product", "marketing", "."] |
| Punctuation Mark Removal | All the punctuation marks, special characters such as semicolons, commas, @ characters, etc., are removed from the corpus [25].  | ["document", "social", "media", "is", "an", "essential", "tool", "for", "product", "marketing"]           |
| Removal of Numbers       | Single digits individually do not provide any information, so all the numbers are removed from the corpus [25].  | ["document", "social", "media", "is", "an", "essential", "tool", "for", "product", "marketing"]           |
| Stop Word Removal        | Removal of stop words is a common preprocessing procedural step. It is effective for decreasing noise, lowering dimensionality, enhancing precision, and enhancing the quality and efficiency of the subsequent analysis. Stop words, such as "the," "and," and "of," are widespread in the English language but have little significance when used standalone [26]. | ["document", "social", "media", "essential", "tool", "product", "marketing"]                              |
| Stemming                 | Stemming is the process of reducing words to their root form. For example, words like "running" and "runner" might potentially be shortened to "run" by stemming. The dimensionality of the data can be decreased, and synonyms can be clustered using this method [27].   | ["document", "social", "media", "essenti", "tool", "product", "market"]                                   |

### 3. Results

In the results analysis, the researchers first performed a meta-analysis of the collected data, providing information regarding top authors, journals, annual analysis, and other analyses, reported in the following section. Tables 2 and 3 show the leading countries, authors, and journals extracted from the collected corpus.

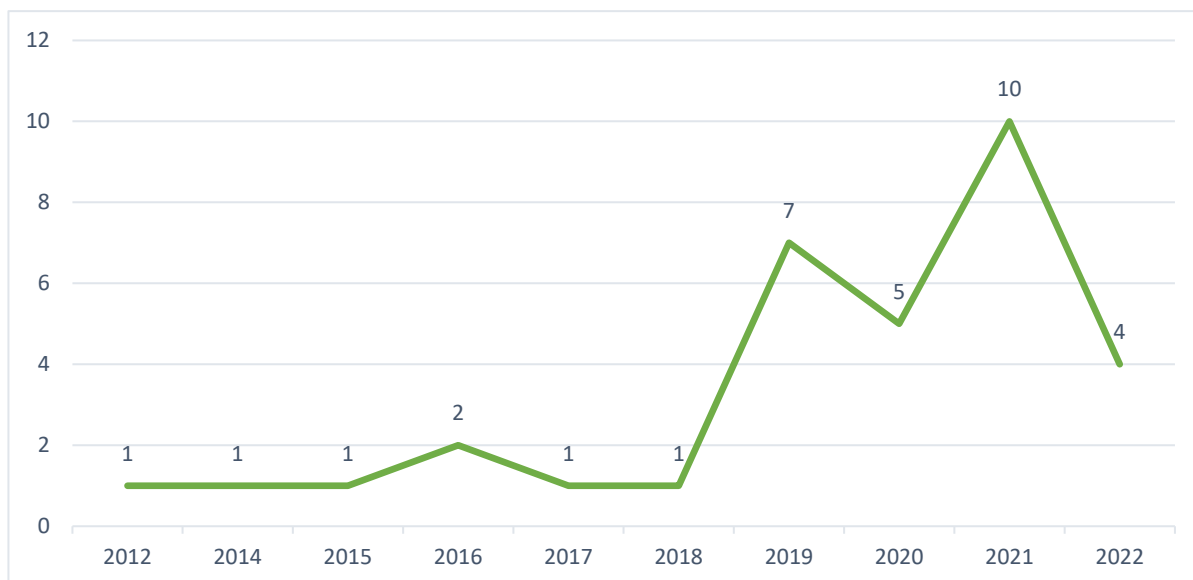
After assessing the general trends of publications and citations, a detailed analysis of the selected publications was conducted. Two tables (Tables 2 and 3) were created to provide the top 5 publications and citations across three parameters: countries, authors, and journals. The USA leads the field in numbers of publications (six) and citations (135). *Sustainability* (Switzerland) leads the list of journals, with nine publications. The *Journal of Advertising* is the clear winner for the number of citations (117). Among the authors surveyed in the study, Minton E., Lee C., Orth U., Kim C.-H., and Kahle L. (117 each) lead the citations (all having co-authored the top-cited paper). Katsonis N., Szymoniuk B., and Tsekouropoulos G. have the most publications, with two each. Figure 4 shows the annual numbers of publications in this area since 2012. It can be observed that the annual output of contributed papers has been trending upward, and 2021 was the most productive year, with 10 publications.

**Table 2.** Total publications (TP) of the top five countries, authors, and journals.

| Rank | Country       | TP | Rank | Author            | TP | Rank | Journal                                | TP |
|------|---------------|----|------|-------------------|----|------|--|----|
| 1    | United States | 6  | 1    | Katsonis N.       | 2  | 1    | <i>Sustainability (Switzerland)</i>    | 9  |
| 2    | China         | 5  | 1    | Szymoniuk B.      | 2  | 2    | <i>Proceedings of the ECIE</i>         | 2  |
| 3    | Greece        | 3  | 1    | Tsekouropoulos G. | 2  | 3    | <i>British Food Journal</i>            | 1  |
| 3    | India         | 3  | 2    | Adeshola I.       | 1  | 3    | <i>Journal of Marketing Management</i> | 1  |
| 3    | Pakistan      | 3  | 2    | Ambrose G.J.      | 1  | 3    | <i>Journal of Public Affairs</i>       | 1  |

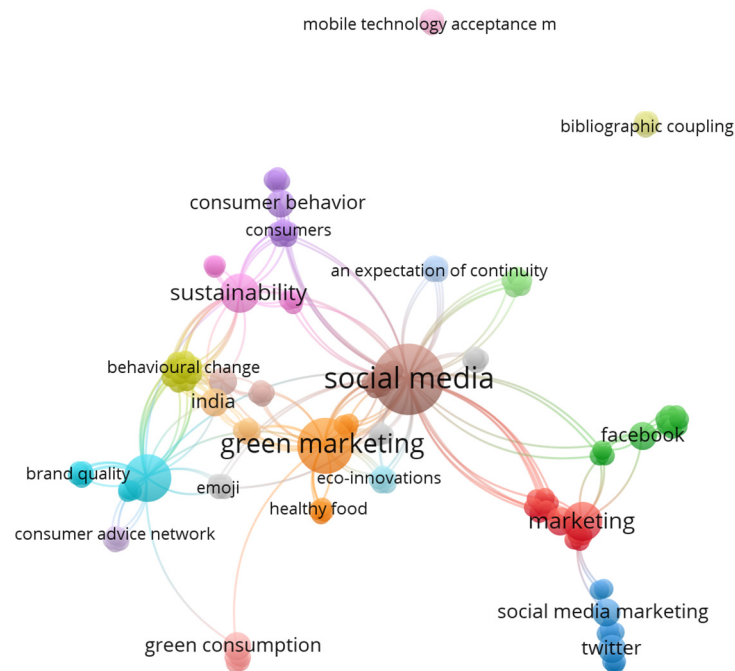
**Table 3.** Total Citations (TC) of the top 5 countries, authors, and journals.

| Rank | Country       | TC  | Rank | Author    | TC  | Rank | Journal  | TC  |
|------|---------------|-----|------|-----------|-----|------|--|-----|
| 1    | United States | 135 | 1    | Minton E  | 117 | 1    | <i>Journal of Advertising</i>                                      | 117 |
| 2    | South Korea   | 119 | 1    | Lee C.    | 117 | 2    | <i>Sustainability (Switzerland)</i>                                | 42  |
| 3    | Germany       | 117 | 1    | Orth U.   | 117 | 3    | <i>International Journal of Retail and Distribution Management</i> | 29  |
| 4    | China         | 32  | 1    | Kim C.-H. | 117 | 4    | <i>Journal of Promotion Management</i>                             | 24  |
| 5    | Greece        | 32  | 1    | Kahle L.  | 117 | 5    | <i>Environmental Communication</i>                                 | 10  |



**Figure 4.** Publications by years.

After the general analysis of the shortlisted publications, VOS viewer was used to visualize the co-occurrence of author keywords within studies. This was carried out to assess the specific focus areas of the authors, who used a total of 145 keywords in the publications. The top keywords were: social media (13), followed by green marketing (8), sustainable marketing (6), sustainability (5), and marketing (4). Figure 5 visualizes the keywords along with the co-occurrences. The 145 author keywords were grouped into 21 clusters.



**Figure 5.** Top author keywords used.

### 3.1. Term Frequency–Inverse Document Frequency (TF-IDF)

TF-IDF stands for “Term Frequency–Inverse Document Frequency”, a technique used in information retrieval and text mining to evaluate the importance of a word within a document. TF-IDF consists of the term frequency (TF) and inverse document frequency (IDF). The term frequency measures how frequently a word appears in a document, while the inverse document frequency measures how important a word is across all documents [28–30]. The formula for calculating the TF-IDF score of a word in a document is as follows:

$$\text{TF-IDF}(\text{word, document}) = \text{TF}(\text{word, document}) * \text{IDF}(\text{word}) \quad (1)$$

where:

$\text{TF}(\text{word, document}) = (\text{Number of times the word appears in the document}) / (\text{Total number of words in the document})$

$\text{IDF}(\text{word}) = \log_e(\text{Total number of documents} / \text{Number of documents containing the word})$

The TF-IDF score is high when the term frequently appears in a document but rarely in others [31]. It indicates that the term is essential to the document’s content and helps distinguish it from other documents. It is used in text classification and clustering to identify the most important words or features that characterize each class or cluster. In this study, the BOW, i.e., the dictionary of words, was created after pre-processing [32,33]. For each word from BOW, authors calculated the TF-IDF score using Equation (1).

The corpus consisted of 33 Scopus-extracted articles, and 1151 unique tokens were available for use in creating the BOW dictionary. Figure 6 is a visual representation of the 20 most frequent of the 1151 tokens.

As mentioned, this experiment comprised 33 documents, and BOW included 1151 unique terms. To represent these 1151 terms against the 33 documents, a matrix of 1151 terms  $\times$  33 columns was constructed. It is difficult to represent 1151 terms and 33 documents in the table, so the top 20 terms  $\times$  33 columns are illustrated in Table 4.

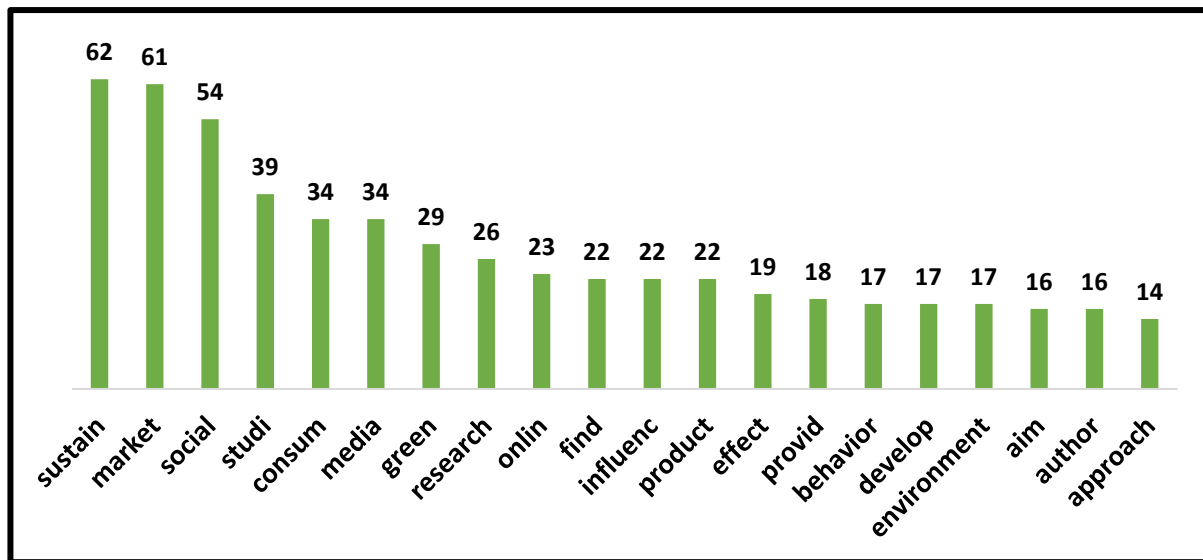


Figure 6. Top 20 frequent terms.

Table 4. TF-IDF values representation of 33 documents.

| Term        | Doc 1 | Doc 2 | Doc 3 | Doc 4 | Doc 5 | Doc 6 | Doc 7 |   | Doc 33 |
|-------------|-------|-------|-------|-------|-------|-------|-------|---|--------|
| social      | 0.003 | 0.005 | 0.014 | 0.006 | 0.003 | 0.005 | 0.006 | — | 0.002  |
| media       | 0.011 | 0.008 | 0.014 | 0.012 | 0.005 | 0.004 | 0.006 | — | 0.004  |
| market      | 0.004 | 0.004 | 0.007 | 0.002 | 0.007 | 0.010 | 0.012 | — | 0.006  |
| approach    | 0.005 | 0.006 | 0.010 | 0.000 | 0.000 | 0.000 | 0.000 | — | 0.005  |
| consum      | 0.008 | 0.008 | 0.000 | 0.008 | 0.008 | 0.000 | 0.000 | — | 0.003  |
| product     | 0.005 | 0.005 | 0.000 | 0.005 | 0.000 | 0.000 | 0.012 | — | 0.000  |
| onlin       | 0.009 | 0.000 | 0.000 | 0.000 | 0.006 | 0.000 | 0.000 | — | 0.000  |
| Sustain     | 0.005 | 0.002 | 0.007 | 0.003 | 0.002 | 0.004 | 0.019 | — | 0.006  |
| develop     | 0.008 | 0.000 | 0.019 | 0.000 | 0.000 | 0.000 | 0.030 | — | 0.000  |
| behavior    | 0.009 | 0.000 | 0.000 | 0.005 | 0.000 | 0.000 | 0.000 | — | 0.000  |
| research    | 0.013 | 0.004 | 0.000 | 0.003 | 0.007 | 0.006 | 0.000 | — | 0.005  |
| studi       | 0.001 | 0.003 | 0.000 | 0.006 | 0.004 | 0.000 | 0.000 | — | 0.009  |
| find        | 0.005 | 0.000 | 0.000 | 0.006 | 0.004 | 0.000 | 0.000 | — | 0.000  |
| effect      | 0.007 | 0.022 | 0.000 | 0.000 | 0.006 | 0.000 | 0.000 | — | 0.008  |
| provid      | 0.000 | 0.007 | 0.000 | 0.000 | 0.006 | 0.018 | 0.014 | — | 0.005  |
| author      | 0.000 | 0.005 | 0.000 | 0.000 | 0.004 | 0.000 | 0.000 | — | 0.003  |
| aim         | 0.000 | 0.000 | 0.000 | 0.010 | 0.000 | 0.000 | 0.000 | — | 0.000  |
| green       | 0.000 | 0.000 | 0.000 | 0.004 | 0.000 | 0.000 | 0.000 | — | 0.000  |
| influen     | 0.000 | 0.000 | 0.000 | 0.000 | 0.006 | 0.000 | 0.000 | — | 0.000  |
| environment | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | — | 0.007  |

A TF-IDF score was given to each word from the corpus and considered as its relevant weight, applied to each term based upon its relevancy in the document.

### 3.2. Recent Trends Identification Using K-Means Clustering

Clustering is vital to represent the latest trends predicted from the set of terms extracted from the corpus. The K-means clustering algorithm was used in this experiment, providing several clusters in advance. Hence, according to the corpus size, five clusters are the optimal solution inspired by Deerwester's [34] study. Table 5 represents cluster value, high-loading terms, and the name of each cluster based on the terms. Authors and field experts labelled the topic to the best of their knowledge. The high-loading terms were converted to their root words during the pre-processing of the corpus, as mentioned in Table 1.



**Table 5.** Topic Labeling based on Terms.

| Cluster Value | Topic Label                                 | High-Loading Terms  |
|---------------|---|---|
| Cluster 1     | Green Marketing and Consumer Behavior       | Green, industry, commun, product, consumpt, purchas, perceive, brand, food, internet, corpor, respons, india, sme, manag, active, mec   |
| Cluster 2     | Sustainable Social Media Marketing          | Media, studi, social, research, market, consum, sustain, environment, commun, analysi, technologus, reveal, technologi  |
| Cluster 3     | Influencer Social Media Marketing Practices | Market, author, social, media, facebook, analysi, product, consum, environ, busi, field, adopt, valu, influenc, digit, effect, paper, busus, world, practice \                              |
| Cluster 4     | Consumers and Social Media Communications   | Consum, market, social, media, research, studi, green, influenc, Sustain, companus, Green, question, analysi, result, paper, commun, product, inform, purchas, model, technologus, advertis |
| Cluster 5     | Creative Social Media Advertising           | Fashion, custom, student, behavior, organ, sme, influenc, psi, veget, Instagram, consumpt, intent, destin, relationship, natur, mobil, green, process, promot                               |

#### 4. Discussion

These topics, identified within the corpus, are considered the recent trends or topics that need increased attention from future researchers. Table 6 provides some relevant studies, the relevant labels, and the contributions of these articles to the topics.

**Table 6.** High-Loading Article based on Cluster.

| Cluster Value | Label                                       | High-Loading Article | Score  |
|---------------|---|----------------------|--------|
| Cluster 1     | Green Marketing and Consumer Behavior       | [35]                 | 0.4728 |
|               |   | [36]                 | 0.4670 |
| Cluster 2     | Sustainable Social Media Marketing          | [37]                 | 0.3173 |
|               |   | [38]                 | 0.3168 |
| Cluster 3     | Influencer Social Media Marketing Practices | [38]                 | 0.2250 |
|               |   | [39]                 | 0.2244 |
| Cluster 4     | Consumers and Social Media Communications   | [40]                 | 0.2243 |
|               |   | [41]                 | 0.0107 |
| Cluster 5     | Creative Social Media Advertising           | [42]                 | 0.1521 |
|               |   | [43]                 | 0.1520 |

##### 4.1. Cluster I: Green Marketing and Consumer Behavior

Most countries and communities are now aware of the challenges associated with conventional marketing techniques and elevating environmental issues to a significant level. “Green” represents sincerity and objectivity. Production, consumption, disposal, decreased energy use and material waste, and reusable and recyclable items are green marketing tactics that will benefit industry [44]. Customers increasingly prefer eco-friendly products, but their purchasing decisions are influenced by their experience of green marketing issues and their understanding of the value of eco-friendly labeling [45]. Green marketing promotes products and services that are eco-friendly. It includes eco-friendly products, packaging, sustainable business practices, and product-focused marketing. The foundation of green marketing was the offer of environmentally friendly products to customers. Customer satisfaction is dependent on the quality and performance of the product, as satisfied customers repurchase the product and share good word of mouth. Satisfied customers are likelier to recommend a product [46]. Customers are particularly concerned about environmental protection; thus, the green marketing movement has garnered many

adherents. Eco-marketing has been beneficial for customers, businesses, and the environment. As a result, much has been done to conserve the natural resources of the globe. Contemporary companies pay close attention to quality control to ensure their products are authentically eco-friendly.

Additionally, consumers desire more organic and non-toxic products. Plastics and plastic items are far less prevalent than they were [47]. Many researchers have recently studied the topic of green marketing and its impact on customer purchase trends. A recent study concluded that customers' decisions to purchase products depend upon certain factors, and they research a product or service before buying. They look for indications that it was made, marketed, and can be disposed of in an environmentally responsible manner. Likewise, the consumer considers the credibility and standing of the company producing the products [48]. According to a 2015 survey of 30,000 people from 60 countries, 62% of global consumers said that ethical considerations influence their purchasing decisions. In addition, customers in developing countries are more likely to deliberately seek out and pay a premium for ecologically friendly products [49]. Another recent study claimed that people's purchasing habits shifted significantly during the pandemic. The researchers studied a group of people and concluded that 89% of participants wanted businesses to be ecologically conscious in their marketing and communication, while 69% said they were taking all appropriate measures to reduce their carbon footprint [50]. Marketers and customers recognize that we must respect elements of nature, in order to sustain life. Manufacturers and marketers must take responsibility and find answers to support positive environmental growth. Businesses aiming to make genuine brands that last will start to ask the many questions on the research-based checklists. Researchers will use these questions to improve their products and boost the credibility and usefulness of different green marketing techniques.

#### *4.2. Cluster II: Sustainable Social Media Marketing*

In the last decade, two hitherto obscure aspects of business practice have risen to prominence: sustainability and social media. Both have altered the ways that organizations measure performance and have simplified the process through which they and their customers communicate. Soon, social commerce, also known as selling things through social media platforms, will replace e-commerce as the predominant online business method [51]. In 2020, it was expected that 80 million purchasers would engage in social commerce; by 2022, this figure reached 96.1 million. This transformation is driven by the current generation's tastes, as its members mature and acquire purchasing power. 97% of the younger generation look to social media for purchasing inspiration, and 62% choose to patronize environmentally responsible firms [52]. More research is needed, especially in understudied areas including social media and cross-cultural research, to determine how to promote sustainable thinking and behavior in response to the growing advertising budget and demand. The past decade has been devoted to sustainable technologies, which have garnered interest from nearly every industry; thus, sustainable social media is one of the industries where researchers are concentrating their attention [53].

Usage of social networking sites is growing too intense to be classified as a hobby. It has supplanted all other modes of communication as the preferred way for disseminating information, media, and other content [54]. We no longer live in an era where the internet's sole purpose is to facilitate communication; instead, it has provided us with a vast new arena in which to broaden our horizons and build relationships with people on the other side of the globe, all from the comfort of our own homes and with the ease of our laptops, smartphones, and tablets. Previously, the internet's sole function has been communication, but in recent years, it has acquired significant popularity as a tool for education and research.

#### 4.3. Cluster III: Influencer Social Media Marketing Practices

A subset of social media advertising, “influencer marketing”, uses endorsements and product mentions from influential people in a particular field or on a social media platform [55]. The origin of influencer marketing was celebrity endorsements. In the current digital era, social content creators specializing in this area may provide businesses with added value [56]. Even the most minor social media accounts may have a committed fan following. For example, YouTube is the most popular mobile video platform, despite the rise of Snapchat, Instagram, Facebook, and Twitter, allowing users to watch and share videos [57]. Mobile video uses more than half of all data transferred via mobile networks. Although in-stream and pre-roll advertising generate many profits for businesses, influencer marketing is the most effective method of reaching consumers. Influencers often make videos without commercial breaks [58]. As mobile video and YouTube continue to grow in popularity, marketers must find the right creators. Some platforms help users to find influencers and create and disseminate the right content; popular examples include Grin, Creator.co, Aspire, Influency, Tagger Media, CreatorIQ, and many more.

A recent study in 2021 presented a systematic literature review on social media influencer marketing [59]. The researcher claimed that social media influencers (SMIs) have become increasingly popular in recent years, making influencer marketing (IM) a crucial business tactic. Despite increasing interest from researchers and practitioners, sufficient and diverse scholarly work remains to be completed. Therefore, there is a need to research various aspects of influencer social media marketing practices and techniques. In another study in 2021, researchers claimed that the strategic use of social media influencers is essential for any business. The researchers also suggested three streams in the research segment [60]. The first stage of the study endeavor focused on contacting influencers and communication experts. The second area of focus was on the tactics that influencers used in the sponsored social media postings for which they were responsible. The third line of inquiry looked at the dependability and efficiency of the suggestions made by influencers. In a previous study, researchers stated that children in today’s society spend significant amounts of time online watching videos on platforms such as YouTube. These videos may feature their favorite vloggers cracking jokes, playing games, unwrapping goods, reviewing items, or simply going about their regular lives [61]. Various practices are used in contemporary media to engage with the audience and spread the business message. Examples of such sustainable strategies include: using the same social media platform as the targeted audience; testing and using new functions or features released by social media platforms; continuous communication with the targeted audience; maximizing the presence of the audience by segregating them from different sources; and cross promotion.

#### 4.4. Cluster IV: Consumers and Social Media Communications

Social media has risen to prominence as an effective means of communication. Social media has become integral to worldwide communication and collaboration [62]. The management of social media platforms, as well as the relationships cultivated with customers resulting from their use, are essential to the business growth. It is possible that a company’s use of social media will have a significant impact on income as well as the loyalty of its customers. Facebook, Twitter, Instagram, and LinkedIn are becoming places where people worldwide can share their lives [63,64]. Customers can give feedback on everything from how a business is performing to where to eat and how to stay healthy. Social media users share and read information via multiple “connections.” This information could affect purchase behavior [65]. Studies have shown that many consumers use social media to read reviews and obtain information. One research study into recommendation systems on social media for tourist attractions reported that recommendation systems to individualize the information retrieval process are becoming increasingly popular.

On the other hand, social media technologies have quickly become ingrained in everyday life [66]. Therefore, recommender systems can use data collected from social networks to provide helpful information [67]. In the year 2018, researchers reported that industry

professionals were working on ways to improve social media recommendation systems. All of the significant works in this sector aid scholars in gaining a deeper understanding of current solutions to the most pressing problems [68].

We can see social media communications integrating with every aspect of human life. Reels, Youtube Shorts, and other platforms such as TikTok will become new edutainment sources. Augmented reality and virtual reality will be used on social media platforms. Augmented reality (AR) in social media platforms extends beyond hilarious messages and picture filters. Augmented reality can enhance consumers' purchasing experiences [69]. The use of social media will fundamentally alter the structure of future forms of communication. The availability of data and the ability to form judgments will be two of the most crucial aspects to undergo the most significant changes [70]. Whether using a projector watch or contact lenses, individuals can acquire the knowledge they require from sources and at times of their choice. The expansion of mobile devices, the proliferation of online marketing platforms, and the development of holographic and virtual reality technology will all contribute to increased integration of social media into our everyday lives. Platforms will ban fake news, and social videos will be customized to users' preferences.

#### *4.5. Cluster V: Creative Social Media Advertising*

The use of social media has transformed traditional advertising by pushing, defining, and testing advertising companies' creativity management. It represents one of the most transformational effects of information technology on advertising companies' business and management [71]. Social media has revolutionized how organizations interact with markets and society, offering new possibilities and posing new problems for many aspects of an advertising agency, including innovation and creativity management, agency structure, and operations [72]. Advertisements on social media platforms are customized to each user according to their activities and browsing history in the network [73]. Social advertising can result in significant gains in conversions and sales at cheaper cost per acquisition when the demographics of a target market match those of the users of a social media site. Given the meteoric rise of social media, it is abundantly clear that building digital relationships with customers is the path that will lead to success in the future. The "how" of interacting with different forms of material will continue to evolve as more types of material enter the mainstream. The methods used in advertising in the past were different from those used today, and the transition has made it necessary for marketers to embrace new practices, such as establishing brands from the bottom up and producing content more agilely. The most successful marketers of the future will be those that develop novel approaches to producing content [74]. Creativity is an essential feature of the advertising industry and a significant contributor to competitive advantage, advertising efficiency, and the development of successful brands [75]. Social advertising is a subset of the advertising industry, focused on spreading charitable organizations' messages to the public, and in this context creativity becomes more essential in social media marketing campaigns. In addition to prioritizing creativity over content, social media advertisements also need to be aligned according to certain factors including speed of creation of content, continuous online presence, and democratization of creativity [76]. There was a correlation between increased inventiveness in social media advertising and improved ad attitude, word-of-mouth, and intent to purchase. Where there was a lack of innovation in advertising, customers exhibited unwanted behaviors, such as blocking advertisements, reflecting increased consumer dissatisfaction [77]. The traditional marketing methods were dependent on a segmented audience.

In contrast, social media has a broad reach among all audience segments, and advertisements may range from simple textual messages to video advertisements. Moreover, social media has given new opportunity for creativity by adding multimedia to its advertisements. Nowadays, many businesses use technology to help their customers select products best suited to them without travelling to shops or stores. Businesses that are prepared to attempt new ideas and reflect continuing societal debates will succeed in today's world of perpetual content production. However, social media communications frequently fail to

resonate with their target audiences, due to the scattered and less concentrated character of social media compared with advertisements' focused and concise nature.

## 5. Implications

This study suggests several implications based on the above findings and the five clusters. First, the role of social media in developing sustainable marketing strategies is proven beyond doubt. All marketers must develop digital and social media-based marketing mechanisms (DSMM) to address modern marketing needs. Second, applying NLP and other derived methods should be encouraged for the exploration specific objective-based studies in this domain. Third, the study results imply that consumers are becoming conscious of environmental issues, and this affects their consumption behavior. Hence, marketing strategies must address TBL in their decision nodes in order to remain relevant in this VUCAD (volatile, uncertain, complex, ambiguous, and disruptive) world. User satisfaction always leads to user intention. Fourth, social commerce, i.e., selling things through social media platforms, will replace e-commerce as the predominant online business method [51]. This model represents the future of online sales. Hence, social media strategies must be merged into marketing decisions to enhance social commerce rather than m-commerce or e-commerce. Fifth, systems of recommendation, review, and feedback are becoming increasingly popular to individualize the information retrieval process. Green or sustainable practices are even more successful, as these are seen as social causes. Marketers should develop or sponsor teams of influencers to communicate with the target audience on social media platforms. Finally, existing advertising strategies must be reassessed. Creativity should be promoted, and mass-customization tools using AI should be deployed. Because of a lack of creativity and innovation, customers exhibit unwanted behaviors, e.g., skipping or blocking. The first few seconds (to be specific, 5 s or less) are crucial to keeping the customers hooked. Sustainable marketing and social media are conjoined twins in this new millennium.

## 6. Conclusions and Future Research

Numerous aspects of eco-friendly marketing strategies have shaped the latest trends, and the role of social media has been instrumental in these. This study has focused on sustainable and green marketing strategies, in particular, the role of social media. Out of various types of methods, we adopted NLP and shortlisted 33 research works. After a brief bibliometric analysis, clustering was carried out, and five significant trends were ascertained.

While this study is unique in its approach and identification of specific trends, it provides a few research directions that future researchers can explore. First, the string selection was minimal for the scope of the study. The data can be broadened by the inclusion of more terms, such as environmental and digital marketing, to obtain wider labeling and more clusters. Second, although in this study we focused only on the LSA approach and clustering, other methods can be mixed with this approach. Mixed-method studies should be conducted integrating bibliometric, SLR, and empirical studies with experimental designs. Third, future practitioners will need to integrate advanced digital tools such as artificial intelligence (AI), machine learning (ML), augmented reality (AR), and virtual reality (VR) into social media marketing strategies. Finally, the negative role of social media in sustainable marketing strategies should be explored. Social media has many negative implications and can influence consumers incorrectly with negative trends or word-of-mouth. However, social media has massive potential to improve the world, influencing consumers and marketers to go green and sustainable.

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