

# Mapping Green Marketing Research: A Detailed Bibliometric Analysis from the Scopus Database

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## Abstract

This study presents a bibliometric analysis of green marketing research from 1990 to 2022, highlighting the field's growth in response to rising environmental concerns. Using the Scopus database, the research identifies significant themes, key authors, and trends within green marketing studies. Biblioshiny and VOS viewer tools were employed to visualize publication trends, author networks, keyword co-occurrences, and citation patterns, offering a comprehensive overview of the field's evolution. Findings show a notable rise in green marketing publications, with key contributing authors, influential journals, and major thematic areas emerging. Keyword analysis reveals a shift from general environmental themes to specific strategies, underscoring the field's maturation. This study emphasizes the need for continued exploration in green marketing, suggesting directions for future research and practical implications for sustainable business practices.

**Keywords:** Bibliometric Analysis, Ecological Marketing, Environmentally Friendly Marketing, Green Advertising, Marketing Sustainability, Scopus Database.

## 1. Introduction

Green marketing has gained substantial attention in the previous couple of decades as ecological issues have evolved into increasingly prominent in public discourse and corporate strategy. The concept centres on the promotion of products and services based on their ecological advantages, aiming to reduce the environmental footprint and enhance sustainable development. This approach not only addresses consumers' growing ecological concerns but also serves as a strategic tool for companies to differentiate themselves in a competitive market (Polonsky, 1994; Wang, Liu, & Pérez, 2023). The importance of green marketing extends beyond consumer satisfaction to include regulatory compliance and corporate social responsibility (CSR). Businesses adopting green marketing practices often see enhanced brand loyalty and improved

public perception, leading to long-term profitability and sustainability (Fosu, Fosu, Akyina, & Asiedu, 2024; Majeed, Aslam, Murtaza, Attila, & Molnár, 2022). As Kumar Kar & Harichandan (2022) point out, the role of green marketing in influencing consumer behaviour is crucial for advancing environmental objectives and fostering sustainable consumption patterns. The topic of bibliometric analysis has recently grown in prominence as a potent method for mapping the development and organization of academic disciplines. Bibliometric studies shed light on the evolution and change of scientific fields by examining trends in collaboration, citation networks, and publication patterns (Cobo, López-Herrera, Herrera-Viedma, & Herrera, 2011). This method enables researchers to identify influential works, key contributors, and emerging themes, thereby guiding future research directions and informing policy decisions (Fachada, Rebelo, Lourenço, Dimas, & Martins, 2022; Harzing & Alakangas, 2016). In the context of green marketing, bibliometric analysis is particularly useful for understanding how the field has evolved in response to changing environmental concerns and business practices. By examining the body of literature from 1990 to 2022, this study aims to highlight the major milestones and trends in research on environmentally friendly marketing, providing a comprehensive overview of its intellectual landscape (Saleem, Khattak, Ur Rehman, & Ashiq, 2021).

### 1.1 The Study's Objectives and Scope

This study aims to offer thorough research on environmentally conscious advertising, which is known as green marketing, from 1990 to 2022, shedding light on the field's development, influential figures, and new developments. By analysing the annual number of publications, the study identifies the growing interest and significance of green marketing over time (Naeem, Karim, Rabbani, Bashar, & Kumar, 2023; Wang et al., 2023). Utilizing three-field plots, the research maps the relationships between prominent authors, key research themes, and contributing countries, illustrating the interdisciplinary and international scope of the field (Chu et al., 2022). The study also examines the top 20 most cited and most impactful journals, providing insights into the primary sources of influential research. Furthermore, it identifies the most cited documents and authors, showcasing seminal contributions and leading figures in green marketing. An analysis of the author's impact by H-index and relevant affiliations underscores the productivity and institutional support within the field. Trend topics and keyword co-occurrence networks highlight the evolving themes and focus areas, while a co-authorship country map emphasizes the global collaboration in green marketing research. Lastly, the thematic map categorizes research themes based on their development and relevance, providing a strategic overview of the field's current state and future directions (Chu et al., 2022; Cobo et al., 2011; Wang et al., 2023).

## 2. Literature Review

The term "green marketing" describes an approach to advertising goods and services that highlight their positive impact on the environment. Modifying products, implementing sustainable production methods, using environmentally friendly packaging, and adjusting advertising strategies to emphasize items' positive impact on the environment are all part of this extensive list of things to do. Sustainability in consumer practices and the promotion of ecologically friendly products are the cornerstones of "green marketing," the overarching objective of which is to lessen humankind's destructive influence on the natural world (Javaid, Haleem, Singh, Suman, & Rab, 2021; Kumar Kar & Harichandan, 2022). With the growing awareness of environmental challenges and the significance of sustainability among both firms and consumers, green marketing has transitioned from a specialist strategy to a mainstream marketing technique.

## 2.1 Previous Studies on Green Marketing Evolution

Green marketing research has significantly evolved over the years, reflecting broader societal shifts toward environmental sustainability. Early research primarily focused on understanding consumer behaviour and the initial responses to green marketing strategies (Kumar Kar & Harichandan, 2022). Over time, the scope of research expanded to include more complex analyses of marketing strategies, consumer attitudes, and the impact of regulatory frameworks (Javaid et al., 2021). Naeem et al. (2023) carried out an extensive bibliometric study of sustainable and green finance, which sheds light on the present and future of environmentally conscious advertising. Their study highlights the increasing integration of sustainability in financial markets and the evolving role of green marketing in promoting sustainable investment practices (Naeem et al., 2023). A rising focus on sustainability in the financial industry is indicated by the examination of important trends and patterns in green marketing research. Liu, Wang, and Pérez (2023) analysed green marketing research papers published between 1991 and 2021 using bibliometric methods. Their study identified key trends, influential articles, and prominent authors in the field, demonstrating the growing importance of green marketing in academic and practical contexts. They found that green marketing research has become more sophisticated, with a greater focus on empirical studies and theoretical development. This study also emphasized the role of green marketing in driving consumer behaviour towards more sustainable choices. Saleem et al. (2021) conducted an extensive bibliometric review of ecological marketing studies spanning 1977–2020. Their analysis shows that there has been a marked uptick in green marketing papers, with an emphasis on multidisciplinary studies that include aspects of ecology, economics, and management. The study also highlighted the geographic distribution of research, showing that green marketing has gained prominence worldwide. This comprehensive analysis underscores the importance of green marketing in addressing global environmental challenges (Saleem et al., 2021). Chu et al., (2022) discuss current tendencies in studies examining the relationship between CSR and ecological sustainability. Their bibliometric analysis reveals the interconnectedness of CSR and green marketing, emphasizing how businesses integrate environmental sustainability into their core strategies to enhance their competitive advantage and corporate reputation. This study provides insights into the synergies between green marketing and CSR, highlighting the importance of a holistic approach to sustainability.

## 2.2 Methodological Approaches in Bibliometric Analysis

The goal of bibliometric analysis is to find associations, trends, and patterns in a particular field of study by quantitatively examining the scholarly literature. The goal of this method is to trace the development of themes, evaluate the influence of publications and writers, and create a mental map of the intellectual architecture of research domains. The authors Cobo et al. (2011) came up with a way to use bibliometric tools to track the development of a subject of study and show how it has changed over time. Their research showed how bibliometric methods could give a holistic picture of a field's growth and trends by applying this approach to fuzzy sets theory. As part of their strategy, they employ science mapping techniques to chart the evolution of different fields of study. A bibliometric study of the Journal of Business Research spanning 45 years was carried out by Donthu, Kumar, & Pattnaik (2020). Their research demonstrated how business research has developed and what this means for environmentally conscious advertising by using a number of bibliometric characteristics to single out seminal papers, writers, and topics. Longitudinal analyses, as this study shows, are crucial for tracking changes and trends in a certain area of study. An analysis of bibliometric methods used in the field of

management and organizational science was conducted by Zupic & Čater (2015). In order to better comprehend the intellectual landscape and direct future research, their study offered a comprehensive review of the various bibliometric methodologies and their uses. Methods for mapping the structure and dynamics of research fields that were important to their review included bibliographic coupling, citation analysis, and co-citation analysis.

### 2.3 Technological Tools and Databases

The use of technological tools and databases is crucial for conducting comprehensive bibliometric analyses. By streamlining the collection, processing, and analysis of massive amounts of scholarly literature, these tools have allowed academics to gain invaluable insights into the evolution and current trends in the field. Harzing and Alakanga (2016) compared Google Scholar, Scopus, and the Web of Science, focusing on their coverage, ease of use, and citation analysis capabilities. They compared these databases across disciplines and, over time, drew attention to their advantages and disadvantages. The findings suggest that while all three databases have their advantages, researchers should consider the specific needs of their study when choosing a database for bibliometric analysis. As an alternative to the Web of Science, Norris & Oppenheim (2007) examined other resources that cover literature in the social sciences. Their study evaluated various databases, including Google Scholar and Scopus, in terms of their coverage, citation analysis features, and overall utility for bibliometric research. The results indicate that while the Web of Science remains a valuable resource, other databases offer complementary benefits that can enhance the comprehensiveness and accuracy of bibliometric analyses. Moreover, the evolution of green marketing research reflects broader societal and academic trends toward sustainability and environmental responsibility. As consumer awareness and regulatory pressures increase, businesses are increasingly adopting green marketing strategies to meet these demands and differentiate themselves in the marketplace (Mehraj et al., 2023). The integration of green marketing with CSR and sustainable finance further highlights the interconnectedness of these fields and their collective impact on promoting sustainability (Chu et al., 2022; Saleem et al., 2021). The literature on green marketing has evolved from early explorations of consumer behaviour to more complex analyses of marketing strategies, regulatory impacts, and interdisciplinary research. Bibliometric analyses provide valuable insights into the trends and development of this field, highlighting the increasing importance of sustainability in marketing and business practices. As green marketing continues to grow, future research should focus on addressing emerging challenges, exploring new opportunities, and further integrating sustainability into marketing strategies and business models. By understanding the evolution of green marketing through bibliometric analysis, researchers and practitioners can better navigate the complexities of this field and contribute to the advancement of sustainable marketing practices.

## 3. Research Gap

Despite the significant growth in the field of green marketing, there remain several notable research gaps that require further exploration. Saleem et al. (2021) draw attention to the fact that further comprehensive research on the effects of environmentally conscious marketing tactics on customer actions and devotion to brands is required. Similarly, Liu, Wang, and Pérez (2023) call for research that examines the effectiveness of green marketing initiatives across different cultural contexts, as existing studies predominantly focus on Western markets. Naem, Karim, and Rabbani (2023) emphasize the scarcity of research on the integration of technological advancements, like AI and large-scale data sets analytics, in enhancing green

marketing practices. Chu et al. (2022) criticize the absence of all-encompassing models that evaluate the total effect of green marketing on the long-term viability and bottom line of businesses. Methodologically, there is a need for more sophisticated bibliometric analyses, as suggested by Cobo et al. (2011) and Zupic & Čater (2015), to better understand the evolution and intellectual structure of green marketing research. Additionally, Harzing & Alakangas (2016) and Norris & Oppenheim (2007) note the underutilization of advanced bibliometric tools and databases, which can provide deeper insights into research trends and collaborations in this field. In addition to enhancing the scholarly discourse, addressing these gaps will also give businesses insights that can be put into practice in order to adopt more environmentally responsible marketing methods.

## 4. Methodology

The present investigation makes use of bibliometric analysis, which is a quantitative and statistical instrument employed for the purpose of identifying patterns and trends within the green marketing literature that can be found in the Scopus database. This technique is commonly applied to analyse publication trends across a range of publications of a scholarly nature, such as journal articles, book chapters, and papers presented at conferences. The objective is to deliver an in-depth analysis of the present state and evolution of green marketing from 1990 onwards. Bibliometric analysis, part of library science, is highly effective for document assessment, allowing for qualitative evaluations of previously published materials (Alsmadi et al., 2023; Donthu, Kumar, Mukherjee, Pandey, & Lim, 2021). This method facilitates easy access to study summaries over specific periods. The approach is beneficial as it visually represents past studies with the use of quantitative techniques and reliable databases derived from esteemed databases (Zemigala, 2019), aiding in understanding pre-existing knowledge. For the academic community, bibliometric analysis is invaluable as it explores the internal connections within the existing literature (Liu, Cui, & Nie, 2023).

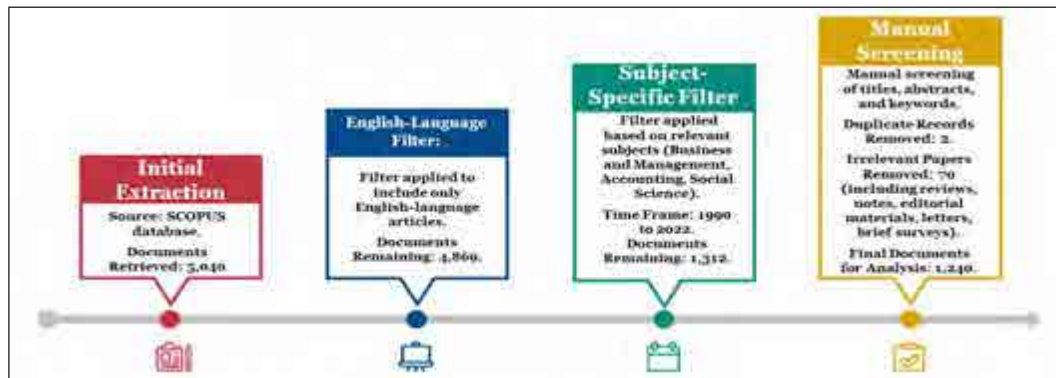
In the past, conducting bibliometric analyses was not feasible. However, advances in information technology and the widespread availability of online data have now made such studies possible. Various applications are now available to perform bibliometric analyses. This research sought to investigate the growth of green marketing within the current literature by employing bibliometric analysis. Our goals were to (1) determine which research is the most credible, (2) analyse different study themes, and (3) provide possible avenues for future research in this field.

### 4.1 The Sources of Data Collection and Their Screening

It is obvious that not all reliable databases can be included in the selection process. This is due to the fact that it would be impractical to conduct bibliometric analysis on a large number of databases at the same time. Any variety of databases can yield relevant documents for study. Subject-specific databases include AGRICOLA, ERIC, PubMed, and MEDLINE, while Scopus and WOS are multidisciplinary (Thomas, 2021). Our study used SCOPUS because of its extensive journal history, accurate indexing, and high-quality articles (Pranckutė, 2021). The choice to utilize SCOPUS was made due to its extensive coverage from 1969 to the present, encompassing a wide range of high-quality publications on various subjects. As of July 26, 2023, SCOPUS boasts an impressive collection of over 90.6 million content items. Authors' names, publication dates, abstracts, citations, and publishers' information are all part of the SCOPUS database, which is essential for bibliographic research (Alsmadi et al., 2023). Even if WOS is popular and reliable, bibliometric software like Bibliometric R packages and VOSviewer can

only evaluate one data file from a database, making SCOPUS the better choice for this research. Moreover, how you choose your keywords has a significant impact on the accuracy of your search. The study's focus—"green marketing," "sustainable marketing," "ecological marketing," and "environmental marketing" was the only set of search phrases allowed to assure data integrity and acquire real publications. Based on Fahimnia, Sarkis, & Davarzani (2015), every SCOPUS article with search phrases in the "title," "abstract," and "keywords" sections without any restrictions on the order of appearance was included in this research.

**Figure 1: Step in Data Selection and Filtering Process**



Source: Author's Compilation

## 4.2 Search Criteria and Keywords

To find relevant data, Scopus was searched using certain keywords and parameters. The keywords used included "green marketing," "sustainable marketing," "environmental marketing," and "eco-friendly marketing." To ensure that only relevant literature within the designated timeframe was included, the search was limited to publications published between 1990 and 2022. The search criteria also included filtering for research articles, reviews, and conference papers, ensuring a comprehensive dataset.

## 4.3 Analytical Tools and Techniques

The analysis was conducted using bibliometric tools and techniques to ensure a rigorous examination of the collected data. Two primary tools were used: Biblioshiny for Bibliometrix in R version 4.2.2 and VOSviewer version 1.6.18. Biblioshiny is a free and open-source program that serves as an online interface for the extensive bibliometric analysis suite Bibliometrics. It allows for an interactive and flexible analysis of the bibliometric data, facilitating the creation of various metrics and visualizations. One program that can help in building and viewing bibliometric networks is VOSviewer. It is particularly useful for visualizing co-authorship, co-citation, and keyword co-occurrence networks, providing an intuitive understanding of the relationships and trends in the research data.

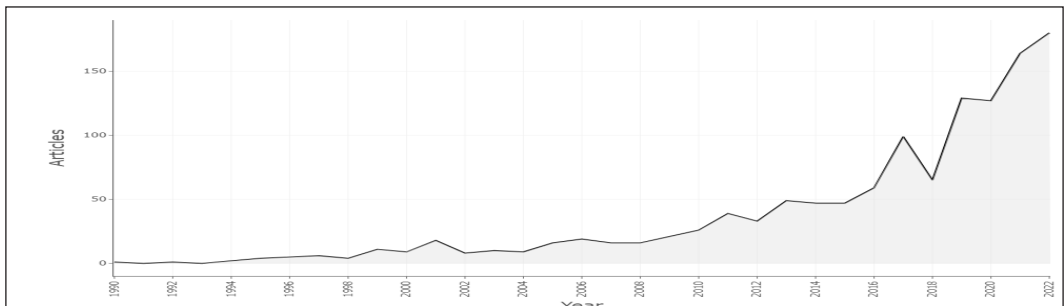
## 5. Data Analysis and Findings

### 5.1. Quantity of articles published

The yearly number of publications pertaining to green marketing from 1990 to 2022, as generated using Biblioshiny for Bibliometrix in R software, is shown in Figure 2. The graph

reveals a notable trend in the volume of research over this period. Initially, from 1990 to around 2005, the number of publications remained relatively low and stable, indicating limited scholarly attention to green marketing. However, a gradual increase can be observed from 2006 onwards, reflecting growing awareness and interest in environmental sustainability within the marketing field. The trend shows a significant rise in publications starting from 2012, with a marked acceleration after 2015. This surge suggests a substantial increase in research activity and academic interest in green marketing, aligning with global trends emphasizing sustainability. The peak in recent years highlights the integration of green marketing practices in various industries and the importance of sustainability in contemporary marketing strategies.

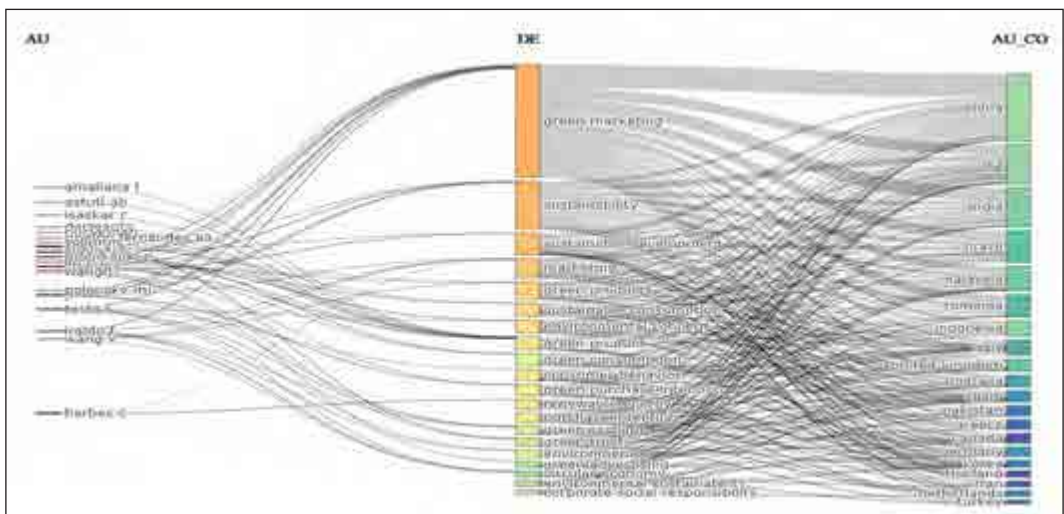
**Figure 2: Number of Scientific Publications Annually**



Source: Compiled by the author by Biblioshiny

### 5.2. Three Field Plots

**Figure 3: The Sankey Plot**



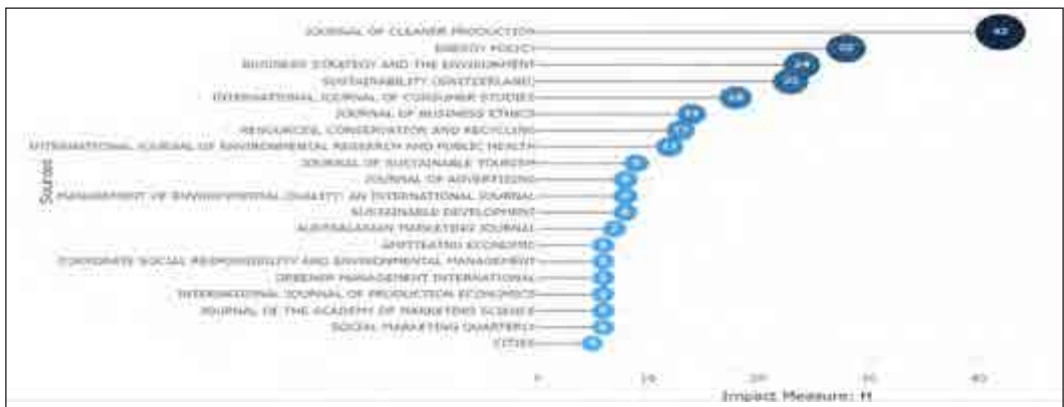
Source: Compiled by the author by Biblioshiny

The three-field plot in figure 3 visualizes the intricate connections between authors (AU), keywords or research themes (DE), and countries (AU\_CO) within the green marketing research domain. The left column lists influential authors such as Herbes C, Polonsky MJ, Wang X, and Iraldo F, each connected via lines to the central column that represents the primary research themes they have addressed, including “green marketing,” “sustainability,” “sustainable



the highest H-index of 42, indicating its significant influence in the field. Following it, “Energy Policy” has an H-index of 28, and “Business Strategy and the Environment” has an H-index of 24. Other notable journals include “Sustainability (Switzerland)” with an H-index of 23, the “International Journal of Consumer Studies” with 18, and the “Journal of Business Ethics” with 14. Journals such as “Resources, Conservation and Recycling,” “International Journal of Environmental Research and Public Health,” and “Journal of Sustainable Tourism” have H-index values of 13, 12, and 9, respectively. The figure also includes sources like “The Journal of Advertising,” “Management of Environmental Quality: An International Journal,” “Sustainable Development,” and “Australasian Marketing Journal,” each contributing significantly to the field with H-index values ranging from 6 to 8. The chart effectively highlights the journals that have made substantial contributions to green marketing research through impactful and widely cited publications.

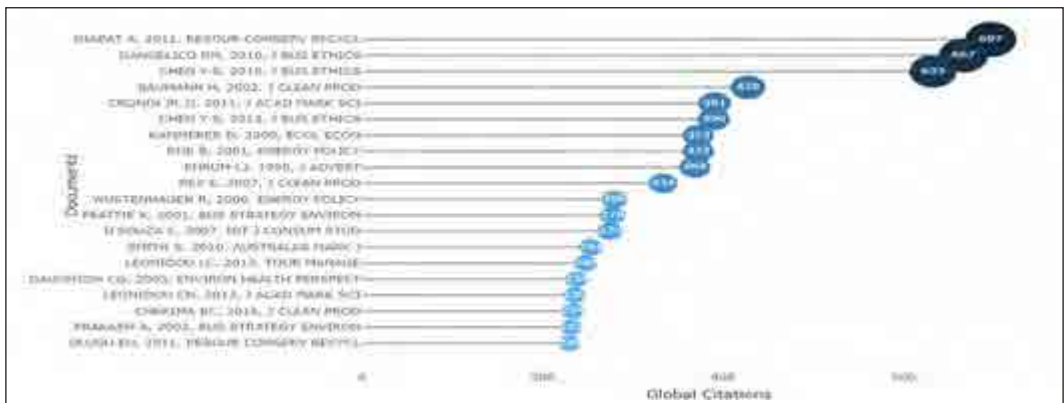
**Figure 5: Leading 20 Impactful Publications**



Source: Compiled by the author by Biblioshiny

### 5.5 Highest-cited documents

**Figure 6: Highest-cited documents**



Source: Compiled by the author by Biblioshiny

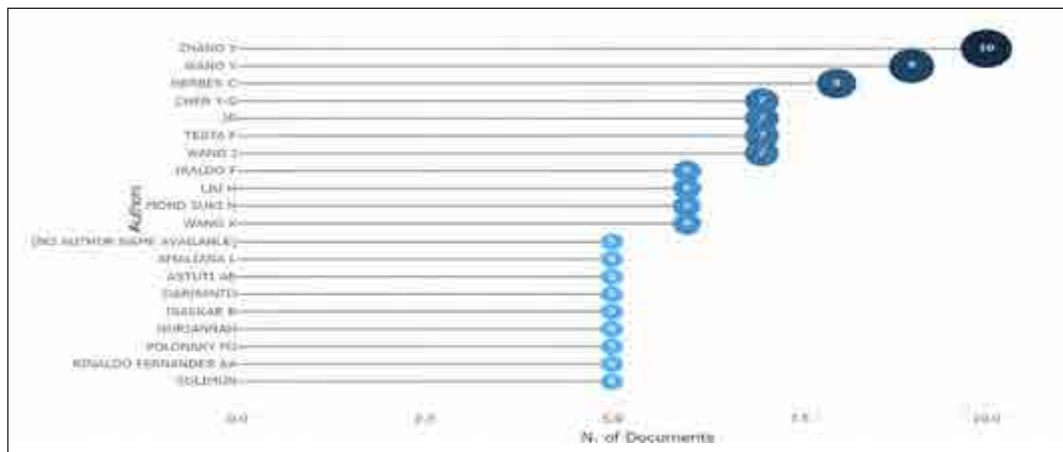
Figure 6 shows the total amount of citations that important papers in green marketing have gotten worldwide. On one side, we have the total number of citations worldwide; on the other,

we have a list of all the papers, with their first authors, publication years, and journals listed on the y-axis. This chart highlights the most influential publications based on their citation counts. The document by Diabat A. (2011) published in “Resources Conservation and Recycling” leads with the highest number of citations, totalling 697. It is followed by Dangelico RM. (2010) and Chen Y-S. (2010), both published in “Journal of Business Ethics,” with 667 and 633 citations, respectively. Another highly cited document by Baumann H. (2002) in the “Journal of Cleaner Production” has received 428 citations. Notable contributions include Cronin JR. (2011) in “Journal of the Academy of Marketing Science” with 391 citations, Chen Y-S. (2013) again in “Journal of Business Ethics” with 390 citations, and Kammerer D. (2009) in “Ecological Economics” with 373 citations. The figure also lists significant works by Roe B. (2001) in “Energy Policy,” Shrum LJ. (1995) in “Journal of Advertising,” and Rex E. (2007) in “Journal of Cleaner Production,” each with citations ranging from 373 to 369.

The chart demonstrates the prominence and impact of specific publications within the green marketing research community, showcasing how these key documents have influenced subsequent research and contributed to the development of the field. The high citation counts indicate the relevance and importance of these studies in advancing the understanding of green marketing practices and their implications.

### 5.6 Highest-cited authors

Figure 7: Highest-cited authors

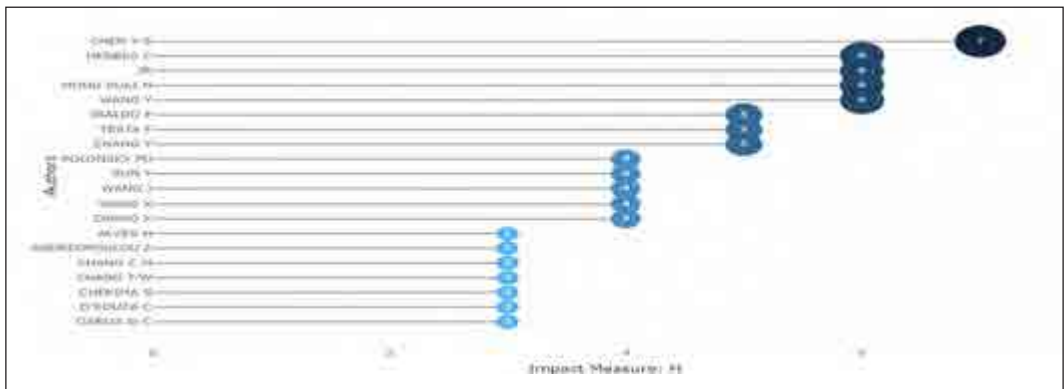


Source: Compiled by the author by Biblioshiny

The x-axis in Figure 7 shows the total number of publications by the most prolific authors in the area of green marketing, while the y-axis lists the authors’ names. Zhang Y leads with 10 published documents, followed by Wang Y with 9 and Herbes C with 8, indicating their significant contributions to green marketing research. Other notable authors include Chen Y-S, JR, and Testa F, each with 7 documents, and Wang J, Iraldo F, Liu H, Mohd Suki N, and Wang X, each with 6 documents, reflecting their active involvement in the field. Additionally, several authors, including those listed as Amaliana L, Astuti AB, Darmanto, Isaskar R, Nurjannah, Polonsky MJ, Rinaldo Fernandes AA, and Solimun, have each published 5 documents, contributing to the breadth of research in this area. This distribution highlights the collaborative and expansive nature of green marketing research with a robust and active research community.

### 5.7 Leading Author Influence by H

Figure 8: Leading Author Influence by H

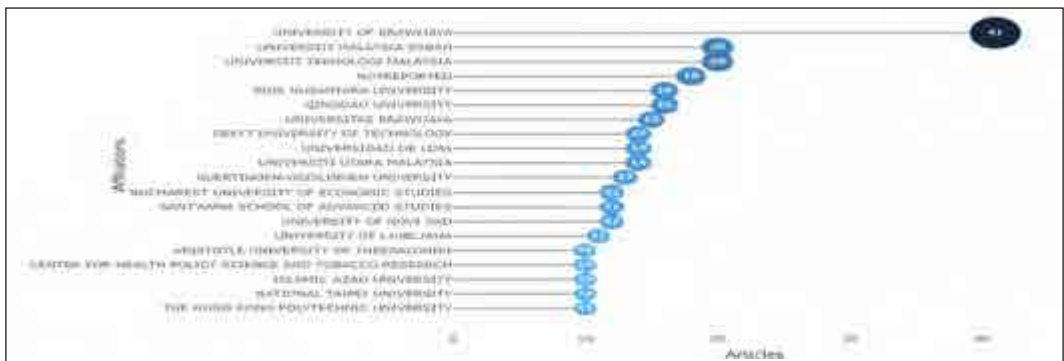


Source: Compiled by the author by Biblioshiny

Figure 8 shows the H-index as a measure of the influence of different writers on green marketing. The y-axis shows the authors, while the x-axis shows the H-index. A high H-index of 7 for Chen Y-S indicates that their work is very influential and frequently cited. Following closely are Herbes C, JR, Mohd Suki N, and Wang Y, each with an H-index of 6, reflecting their considerable contributions to the field. Authors like Iraldo F, Testa F, and Zhang Y have an H-index of 5, highlighting their influential research. Polonsky MJ, Sun Y, Wang J, Wang X, and Zhang X each have an H-index of 4, demonstrating their impactful work. Other notable contributors include Andreopoulou Z, Chang C-H, Chang T-W, Chekima S, D’Souza C, and Dabija D-C, each with an H-index of 3, indicating their significant yet relatively lower influence compared to the top contributors. This chart underscores the varying levels of impact among key researchers in green marketing, showcasing a range of influential scholars who have shaped the field.

### 5.8 Ranks of Most Important Affiliates

Figure 9: Ranks of Most Important Affiliates



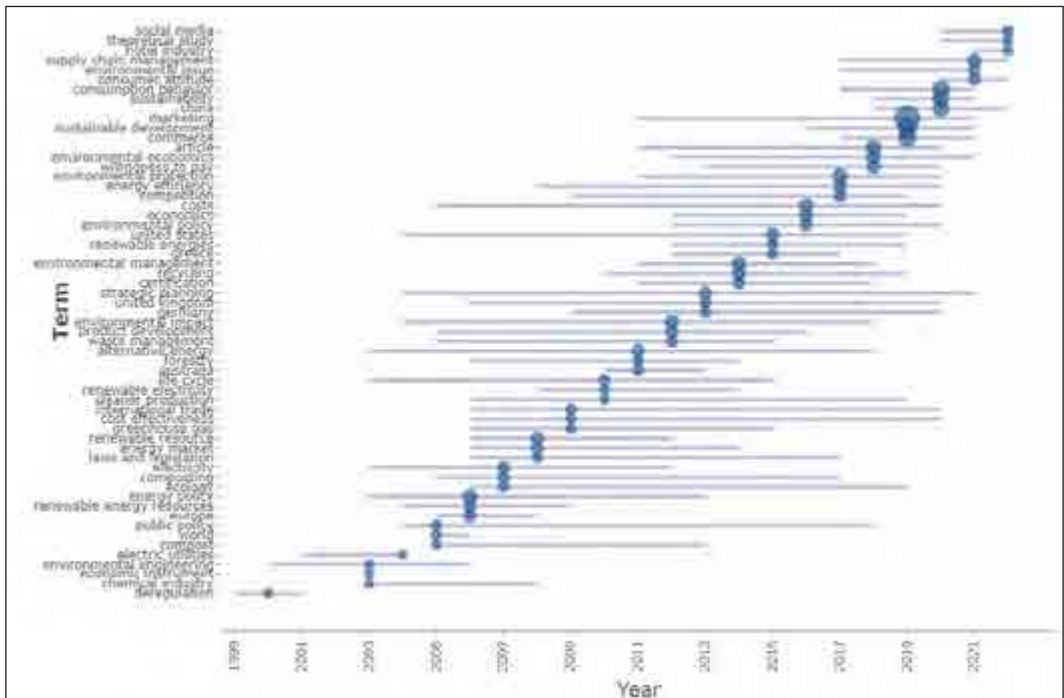
Source: Compiled by the author by Biblioshiny

Figure 9 depicts the number of articles published on green marketing by various academic affiliations. The x-axis represents the number of articles, while the y-axis lists the institutions. The “University of Brawijaya” leads with 41 articles, indicating its significant contribution

to green marketing research. Both “Universiti Malaysia Sabah” and “Universiti Teknologi Malaysia” follow with 20 articles each, showing their active involvement in this field. Other notable institutions include “Northeastern University” with 18 articles, “Bina Nusantara University” and “Qingdao University” with 16 articles each, and “Universitas Brawijaya” with 15 articles. Institutions such as “Delft University of Technology,” “Universidad de Lima,” and “Universiti Utara Malaysia” have each published 14 articles highlighting their contributions. Further down the list, “Nuertingen-Geislingen University” has 13 articles, while “Bucharest University of Economic Studies” and “Sant’Anna School of Advanced Studies” have 12 articles each. “University of Novi Sad” has 11 articles, and institutions like “University of Ljubljana,” “Aristotle University of Thessaloniki,” and others, including “Center for Health Policy Science and Tobacco Research,” “Islamic Azad University,” “National Taipei University,” and “The Hong Kong Polytechnic University,” each have 10 articles. This chart underscores the diverse and widespread academic interest in green marketing research across various global institutions.

**5.9 Attractive topics**

**Figure 10: Most Popular and Attractive Topics**



Source: Compiled by the author by Biblioshiny

Figure 10 illustrates the evolution and emergence of various terms related to green marketing research from 1999 to 2022. The x-axis represents the years, while the y-axis lists the terms. The presence and prominence of each term over time are depicted by horizontal lines, with larger dots indicating periods of higher relevance or citation frequency. Key terms like “sustainability,” “renewable energy,” and “environmental management” have shown continuous relevance over the years. Earlier in the timeline, terms such as “environmental policy,” “chemical industry,” and “deregulation” were more prominent, reflecting the initial focus areas in green marketing research. As time progresses, newer terms like “social media,” “theoretical study,” and “supply

chain management” emerge, highlighting the expanding scope and interdisciplinary nature of the field. The increasing density and variety of terms in the later years indicate a growing and diversifying interest in green marketing topics, driven by evolving environmental concerns and technological advancements. This chart effectively visualizes the dynamic trends and shifts in research focus within the green marketing domain over more than two decades.

### 5.10 Relevant Terms

**Figure 11: Interconnected network of author-keyword pairs**



Source: Compiled by the author by Vos viewer

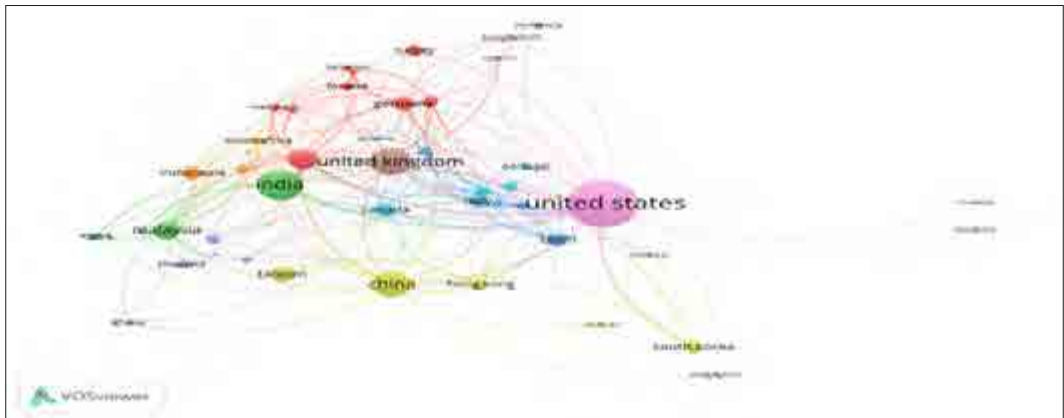
Figure 11 is a network visualization created using VOSviewer, depicting the co-occurrence of keywords in green marketing research. The central and most prominent term is “green marketing,” connected to a wide array of related terms such as “sustainable development,” “green product,” “consumer behaviour,” “environmental concern,” and “green advertising.” This network illustrates the interdisciplinary nature of green marketing, linking it to various domains, including “social marketing,” “renewable energy,” “environmental performance,” and “greenwashing.” The size and proximity of the nodes indicate the frequency and strength of co-occurrence, with larger nodes and thicker lines representing more significant relationships. This visualization highlights the breadth of green marketing research, emphasizing key areas of focus and emerging trends such as “sustainable consumption,” “green consumerism,” and “corporate social responsibility” (Chu et al., 2022; Naeem et al., 2023; Wang et al., 2023). The interconnectedness of these terms underscores the multifaceted approach required to address environmental sustainability through marketing strategies, reflecting the diverse research efforts in this field (Cobo et al., 2011; Saleem et al., 2021).

### 5.11 Geographical Map of Co-Authorship

Figure 12 is a network visualization generated using VOSviewer, illustrating the international collaboration in green marketing research based on country co-authorship. The nodes represent countries, and the size of each node indicates the volume of publications, while the lines connecting the nodes signify co-authorship links between researchers from different countries.

The United States emerges as the central hub with the most extensive network, highlighting its leading role in global green marketing research. Significant collaborations are evident between the United States and other major contributors such as the United Kingdom, China, India, and Germany. Other notable countries with substantial contributions and collaborations include Malaysia, Spain, South Korea, and Canada. This interconnected network underscores the global and collaborative nature of green marketing research, reflecting the diverse geographic involvement and the importance of international partnerships in advancing this field (Chu et al., 2022; Saleem et al., 2021). Regional clusters of collaboration are also shown in the visualization. These clusters include countries in Europe (such as the UK, Germany, and Italy) and Asia (such as China, Malaysia, and India), and they emphasize the extensive academic interest and joint efforts in promoting sustainability through green marketing practices (Cobo et al., 2011; Wang et al., 2023).

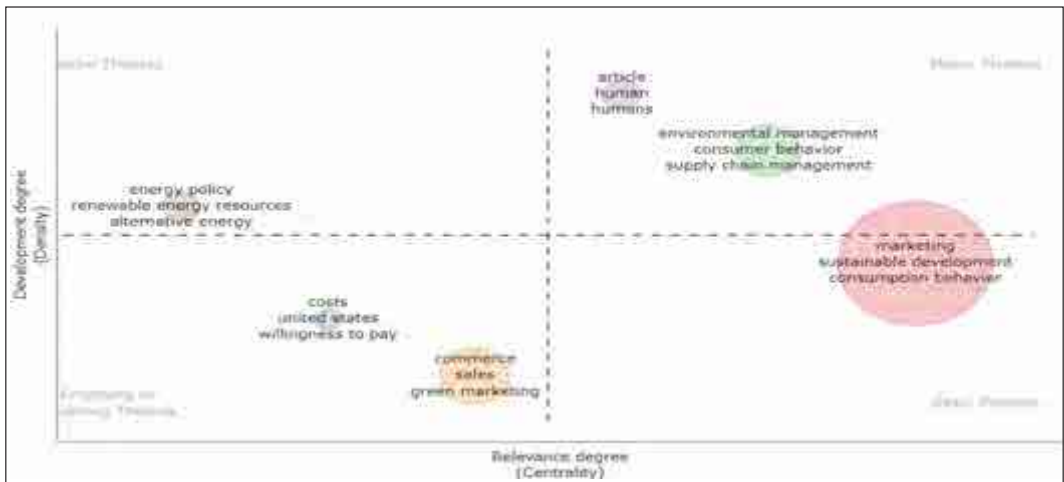
**Figure 12: Collaborative work**



Source: Compiled by the author by Vos viewer

### 5.12 Thematic Content

**Figure 13: Maps with Themes**



Source: Compiled by the author by Biblioshiny

In Figure 13, a strategic diagram that organizes the themes of green marketing research according to their centrality and density, showing how they have evolved over time. Each of the four corners represents a distinct topic category: basic, emerging/declining, niche, and motor. In the upper right quadrant, motor themes such as “environmental management,” “consumer behaviour,” and “supply chain management” indicate well-developed and highly relevant areas driving green marketing research (Chu et al., 2022). The lower right quadrant contains basic themes like “marketing,” “sustainable development,” and “consumption behaviour,” which are fundamental and central to the field but may not be as densely developed (Wang et al., 2023). Located in the top left quadrant, niche subjects like “energy policy,” “renewable energy resources,” and “alternative energy” are expertly crafted but not front and centre (Saleem et al., 2021). Some topics that are growing in popularity or going out of style may be seen in the lower left quadrant. These include “costs,” “United States,” “willingness to pay,” and “green marketing” (Cobo et al., 2011). The research landscape in green marketing is comprehensively illustrated in this strategic diagram, which also highlights new trends and important areas of attention.

## 6. Results

An examination of annual publications on green marketing from 1990 to 2022, depicted in Figure 2, shows a significant upward trend. From a relatively low and stable number of publications in the early 1990s to the mid-2000s, there has been a notable increase in the volume of research starting from 2006. This surge became more pronounced after 2015, reflecting a growing academic and practical interest in green marketing. The peak in recent years highlights the expanding importance of sustainability and environmental considerations in marketing strategies. Figure 3 illustrates the relationships between prominent authors, key research themes, and contributing countries. Major authors such as Herbes C, Polonsky MJ, and Wang X are linked to crucial themes like “green marketing,” “sustainability,” and “sustainable development.” Significant contributions come from countries like China, the USA, India, and Malaysia, indicating a global collaborative effort in green marketing research. This interconnectedness underscores the interdisciplinary and international scope of the field. As shown in Figure 4, the leading sources in green marketing research include “Sustainability (Switzerland),” with 148 publications and the “Journal of Cleaner Production”, with 90 publications. These journals play a significant role in disseminating research findings. Other notable sources are “IOP Conference Series: Earth and Environmental Science” and “Energy Policy,” reflecting the interdisciplinary nature of the research that spans environmental science, business strategy, and policy. The bar chart illustrating the H-index of top journals in Figure 5 highlights the impact of various journals based on their citation metrics. The “Journal of Cleaner Production” leads with an H-index of 42, followed by “Energy Policy” with an H-index of 28 and “Business Strategy and the Environment” with an H-index of 24. This metric indicates the influence and citation frequency of these journals, showcasing their significant contributions to the field of green marketing. The analysis of global citations in Figure 6 reveals the most cited documents in green marketing research. The paper by Diabat A. (2011) in “Resources Conservation and Recycling” leads with 697 citations, followed by works from Dangelico RM. (2010) and Chen Y-S. (2010) in “Journal of Business Ethics.” These highly cited documents reflect seminal contributions that have significantly shaped the research landscape in green marketing. Figure 7 highlights the most cited authors in green marketing research. Prominent authors include Diabat A., Dangelico RM, and Chen Y-S, whose works have been extensively cited in the literature. These citations reflect the impact and influence of their research in advancing the field of green marketing.

Figure 8 highlights the impact of various authors based on the H-index, with Chen Y-S leading at an H-index of 8. Following closely are Herbes C, JR, Mohd Suki N, and Wang Y, each with an H-index of 7. This metric indicates these authors' influence and the frequency of citations of their work, showcasing their significant contributions to the field of green marketing. Figure 9 identifies the "University of Brawijaya" as the leading institution with 41 publications, followed by "Universiti Malaysia Sabah" and "Universiti Teknologi Malaysia," each with 20 publications. This demonstrates strong institutional support and research output in green marketing, particularly in Asia. Other institutions, such as "Northeastern University" and "Bina Nusantara University," also show significant contributions. The trend topics visualized in Figure 10 show the evolution and emergence of various terms related to green marketing research from 1999 to 2022. Key terms like "sustainability," "renewable energy," and "environmental management" have shown continuous relevance over the years. The increasing density and variety of terms in the later years indicate a growing and diversifying interest in green marketing topics, driven by evolving environmental concerns and technological advancements. The network visualization of keyword co-occurrence in Figure 11 places "green marketing" at the centre, connected to a broad array of related topics such as "sustainable development," "green product," "consumer behaviour," and "environmental concern." This dense network highlights the interdisciplinary nature of green marketing research and the integration of various environmental and marketing concepts, showcasing the depth and breadth of the field. The network visualization of international collaboration (Figure 12) highlights the interconnectedness of research efforts across different countries. The United States, as the central hub, shows extensive collaboration with other leading countries such as the United Kingdom, China, India, and Germany. This network visualization emphasizes the importance of international partnerships in advancing green marketing research, reflecting a globally coordinated effort to address sustainability challenges. The strategic diagram in Figure 13 categorizes research themes based on their development and relevance. Motor themes like "environmental management," "consumer behaviour," and "supply chain management" are well-developed and central, driving the field forward. Basic themes such as "marketing," "sustainable development," and "consumption behaviour" are fundamental and central to green marketing research. Niche themes like "energy policy" and "renewable energy resources" are highly developed but less central, indicating specialized areas of focus. Emerging or declining themes, including "costs" and "willingness to pay," represent areas of fluctuating relevance, highlighting potential areas for future research.

## 7. Conclusion

The comprehensive analysis of green marketing research from 1990 to 2022 reveals a dynamic and growing field characterized by increasing publication volume, extensive international collaboration, and interdisciplinary integration. Key research themes have evolved, reflecting broader societal and environmental trends. Prominent authors, influential publications, and leading academic institutions have significantly contributed to the development and dissemination of knowledge in this area. The strategic importance of motor and basic themes underscores the foundational role of sustainability in contemporary marketing practices. The research highlights the significant contributions of top journals, authors, and institutions, showcasing a robust and collaborative research environment. The evolving trends and emerging themes indicate that green marketing is not only expanding but also adapting to new environmental challenges and technological advancements, further solidifying its relevance and impact in the global research community.

## 8. Limitations and the Need for More Research

Despite the thorough analysis, this study has certain limitations. The reliance on the Scopus database may exclude relevant research indexed in other databases, potentially limiting the scope of the analysis. Additionally, focusing on publication volume and citation metrics may not fully capture the qualitative impact of the research. Future studies should consider a more diverse range of data sources and qualitative assessments to provide a more holistic view of green marketing research. There is also a need for more research on emerging themes, particularly in regions and contexts that are currently underrepresented, to address global sustainability challenges comprehensively. Expanding the scope of interdisciplinary research and fostering greater international collaboration will be crucial in advancing the field of green marketing and promoting sustainable development worldwide. Further exploration into niche and emerging themes can uncover new insights and strategies to tackle evolving environmental issues, ensuring that green marketing continues to adapt and remain relevant in addressing global sustainability goals.

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