Green marketing: A Comprehensive bibliometric analysis

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Abstract

In recent decades, green marketing has been created and developed. This marketing concept can be simply understood as marketing activities aimed at satisfying the needs of customers in such a way as to reduce the negative impact on the environment.. That is why it is important to focus on green marketing if the company wants to succeed. The aim of the study is to perform a bibliometric analysis on the concept of green marketing. VosViewer and MS Excel programs were used to perform the analysis. The data were obtained from the Web of Science database. The most publications were published in the current year 2022. Countries such as China and the USA focus on the topic the most. Slovakia deals with the issue of green marketing the most among Central European countries. Green marketing, sustainability, behavior, consumption, consumers, green and green marketing mix are considered the most frequently used keywords in connection with the solved problem. The most recent processing of the bibliometric analysis, with a focus on publishing years, country of origin, classification according to WOS, publisher, language, type of document, or university to which the researchers belonged, is what we believe to be the study's practical contribution.

Keywords: Green marketing, ecological marketing, sustainable marketing, sustainability, CSR, bibliometric analysis.

Introduction

Traditional marketing is quickly being replaced by green marketing as a result of escalating environmental issues and concerns about sustainable development (Mehraj, Quereshi, 2020). When the American Marketing Association held a workshop on green marketing in 1975, interest in this subject was raised in the late 1970s. Since its inception, green marketing has been a significant area of academic study. However, one of the main issues with the topic of green marketing is the lack of academic studies that attempt to analyse environmental or green marketing (Bulsara et al., 2021).

Green marketing is becoming more and more popular, particularly in the business's plan for preserving its current competitive advantage. However, leveraging green innovations to achieve corporate sustainability was also impacted by green marketing (Nuryakin, Maryati, 2022). According to Nistoreanu, Aluculesei & Avram (2020), the practice of green marketing is constantly expanding since consumers' interest in sustainability is rising. Meanwhile, customers are pressuring companies to reconsider their business strategies in terms of sustainability and ecological. The mentality of the younger generation, which takes great care to project a green image, is highlighted by Sarkar, Sarkar & Yadav (2019). Few academic fields have included environmental issues in their literature, despite the fact that environmental challenges have an impact on all aspects of human activity, according to Bulsara et al. (2021).

As part of our study, we set a clear goal: to perform a bibliometric analysis of the issue of green marketing. To achieve this goal, we asked the following partial research questions:

1. What were the publication trends in the monitored issue of green marketing in the years 1991-2022?
2. Which countries are most devoted to the field of green marketing?
3. Which keywords are used most often in scientific publications on green marketing?
4. What types of documents are published the most about green marketing?
5. According to the Web of Science, under which categories do publications on green marketing fall?
6. Which universities focus on the issue of green marketing the most?
7. Which publishers publish most often about the field of green marketing?

Literature review

Towards the end of the 1980s, there was an increase in demand for sustainable products. As a result of the growing trend in society about the deterioration of the environment, new marketing strategies began to be used. Newly created strategies had an impact not only on product portfolios but also on the communication policies of companies (Da Silva, Razzolini Filho, 2021). The term "green marketing" itself has been popular since the early 1990s. Environmental aspects of business activity were discussed for the first time in ecological marketing (Nadanyiova, Kramarova, 2013). According to Majerova (2015), green marketing gained popularity in the 1990s due to the argument that going green can act as a source of competitive advantage. Geng, Maimaituerxun (2022) state that the United Nations proposed the Sustainable Development Goals. They also refer to sustainable consumption plans, which require that the efficiency of the use of resources be increased while at the same time promoting a sustainable lifestyle. Thanks to this, an ecological and low-carbon economy will be gradually achieved.

Definitions of green marketing vary, but the role remains the same. It is an approach to the environment that is integrated into various areas of society (Nadanyiova, Gajanova & Majerova, 2020). Green marketing consists of marketing activities that are designed and

implemented in such a way as to ensure the satisfaction of human needs in such a way as to reduce and eliminate the negative impact on the environment (Saleem et al., 2021). Luckyardi et al. (2022) identified green marketing as an environmental process. Green marketing, according to Geng, Maimaituerxun (2022), is defined as integrating marketing and supporting sustainable marketing activities that satisfy human needs while minimizing negative environmental impact. According to Nadanyiova, Kicova & Rypakova (2015), green marketing represents an environmentally oriented approach and a process of responsible management. It's about more than just building an image. It can therefore be understood as a modern way of enforcing current environmental trends in business activities.

The green marketing mix emphasizes the consideration of environmental and developmental aspects of sustainability (Luckyardi et al., 2022). According to Saleem et al. (2021), green marketing can also be referred to as ecological marketing, environmental marketing, eco marketing or sustainable marketing. Nadanyiova, Kramarova talk about green marketing and ecological marketing as full-fledged synonyms. Majerová (2015) points out that green marketing is not just about presenting ordinary products as ecological or "green." The goal should be for the consumer to perceive sustainable or "green" products as normal. This represents a way to achieve one of the CSR goals. Amoako, Doe, & Dzogbenuku (2021) dealt more closely with the relationship between green marketing and CSR; Huang et al. (2021); Shaukat, Ming (2022); Zhang et al. (2022), etc.

Kar, Harichandan (2022) point out the fact that for the long-term existence of the company, marketing innovations are a necessity in the field of fighting competition. According to Moravcikova et al. (2017), green marketing represents a competitive advantage in the process of economic globalization. For example, Roach, Ryman & White (2014) say that as a solution to the problems of sustainable development, innovations are focused on the field of green marketing. Geng, Maimaituerxun (2022) point out that green marketing can be looked at from two perspectives. From the point of view of the company, this term can be understood as an activity helping to change organizational behavior with the aim of more environmentally friendly behavior. From the consumer's point of view, this is a factor helping to strengthen awareness of sustainable consumption. Luckyardi et al. (2022) believe that the producing process must not have a negative environmental impact. The product does not consist of materials that could be toxic to the environment. The product can also be created from recycled materials and recycled waste. A product may be made specifically to be reused.

Indeed, the environmental aspect has recently been a hot concern in both governmental actions and judgments as well as in the world of science. The desire to promote a sustainable environment led to the development of new tactics for minimizing individual activities' contribution to climate change. In this situation, it may be said that the EU follows worldwide trends in its actions or, if not, that it is a driving force in this field. The European Commission introduced the European Green Deal in March 2019 in an effort to succeed in reaching the objective of a sustainable environment (EGD) (Bogoslov et al., 2022). It’s two main elements are the green transformation of European businesses and the query of how it might be structured in a just manner. The "European Green Deal "'s

and revisions are driven by both of these fundamental tenets, "green" and "fair" (Fleming, Mauger, 2021). The following areas saw implementation of the European Green Deal: Clean energy (expanding the use of alternate sources of energy); sustainable industry (ensuring more ecologically responsible and sustainable production processes); sustainable mobility (encouraging the creation of eco-friendly transportation); biodiversity (making sure that habitats are protected); climate action (European Union becoming a climate-neutral territory); “from field to table” (guaranteeing the safety and sustainability of food systems) (Skydan et al., 2022).

Bibliometric analysis focused on green marketing was carried out by authors such as Wang, Liu & Pérez (2022); Kar, Haichandan (2022); Luckyardi et al. (2022); Geng, Maimaituerxun (2022); da Silva, Razzolini (2021); Saleem et al. (2021). Furthermore, the authors dealt with the bibliometric analysis of other areas related to green marketing, such as greenwashing (Pends, Nerlekar & Darda, 2022), green product (Bhardwaj et al., 2020), green advertising (Agarwal, Kumar, 2020), green consumption (Yao et al., 2022), green building (Shi, Liu, 2019; Xiao et al. 2019; Darko et al., 2019), green finance (Cai, Guo, 2021; Wang, Li, 2021)

Methods and Data

Currently, interest in bibliometric research is gradually growing, which is caused by information and communication technologies. The subject of bibliometric research is publications, specifically their representations in the form of bibliographic records. From the record, it is possible to find out, for example, the name of the document, its authors, the year of publication, keywords, etc. (Gajdosikova, Valaskova, 2022; Hlawiczka et al., 2021). The validity of the bibliometric analysis is confirmed, for example, by Durana et al. (2020); Hlawiczka et al. (2021); Vagner et al. (2021), Saleem et al. (2021); Kar, Harichandan (2022); Gajdosikova, Valaskova (2022) and others.

In this scientific publication, we will perform a bibliometric analysis of the concept of green marketing. The data required for the analysis were obtained from the scientific database Web of Science, which we can currently consider the most recognized independent scientific database in the world. We obtained the data by searching for the term "green marketing.” This means that we only focused on searching for that connection. The WOS database provided us with a total of 1,210 publications from the period 1991–2022 (the year 2022 was not ended yet). The obtained and cleaned data were processed through two programs.

We graphically processed individual graphic displays in MS Excel. The VosViewer program was used to perform a bibliometric analysis of keywords and co-authorship by country of origin. For both analyses, clusters will be identified, which will be distinguished by colour. The bibliometric map consists of two main components. It’s about bubbles and links. The size of the node indicates the occurrence of the keyword, and the higher the occurrence, the bigger the bubble. The co-occurrence of terms is represented by the link between the bubbles (i.e., keywords that occur or occur

together). Link thickness represents the frequency of simultaneous or contiguous occurrences of terms, or the co-occurrences of keywords. It is true that common occurrences between Keywords tend to occur more frequently the thicker the link between bubbles. Each hue indicates a thematic cluster, and the nodes and connections within that cluster can be used to explain both the relationships (links) between subjects (bubbles) 11occurring inside a certain topic as well as the coverage of topics (bubbles) within a given topic (cluster). The co-occurrence of terms is represented by the link between the bubbles (i.e., keywords that occur or occur together). Link thickness represents the frequency of simultaneous or contiguous occurrences of terms, or the co-occurrences of keywords. It is true that common occurrences between Keywords tend to occur more frequently the thicker the link between bubbles. Each hue indicates a thematic cluster, and the nodes and connections within that cluster can be used to explain both the relationships (links) between subjects (bubbles) 11occurring inside a certain topic as well as the coverage of topics (bubbles) within a given topic (cluster). The main stages of the creation of this study are summarized in Tab 1.

Tab. 1: An overview of the steps in the article

Searched Used Terms	**Searched Used Terms**	**Searched Used Terms**	**Searched Used Terms**	**Searched Used Terms**
Green Marketing	1991 – 2022	Web of Science™	Bibliometric analysis	VosViewer

Source: Own processing.

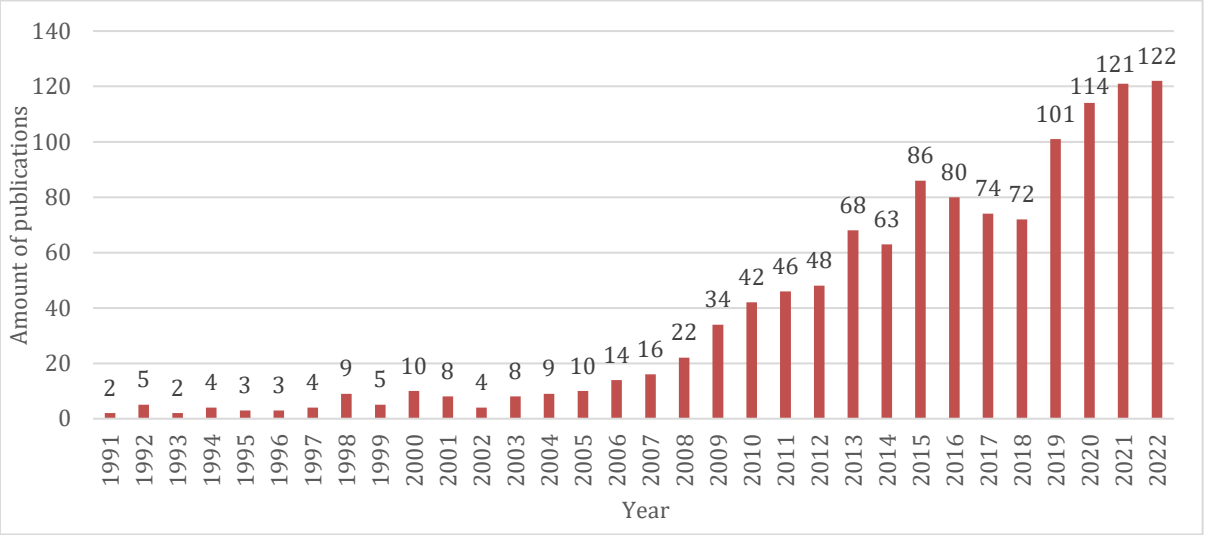
During graphic processing in VosViewer to perform the analysis, key words, and countries with a number of occurrences less than 5 were removed during clustering to ensure clarity and the removal of terms and possible countries that could make the analysis less accurate. At the same time, two clusters were eliminated in the co-authorship analysis, and their elements became part of larger clusters. The reason for this was that each of the two clusters mentioned contained only two elements.

Results

The data were obtained directly from the Web of Science website. Subsequently, they were processed using VosViewer and Microsoft Excel. Based on this, we were able to develop a detailed bibliometric analysis of the examined issue of green marketing.

Graph 1 shows the number of publications in individual years in the observed period 1991–2022. Since green marketing started to be talked about at the turn of the 80s and 90s, scientific articles were published for the first time in 1991. Only two documents were published that year, which, together with 1993, is the smallest number in 32 years. This is an understandable fact, since in the early 1990s it was a newly researched issue. Over time, more and more scientists began to deal with green marketing, which is reflected in the increasing number of publications in the WOS scientific database until 2013.

Graph 1: Annual growth of documents related to the green marketing in WOS during the period 1991-2022

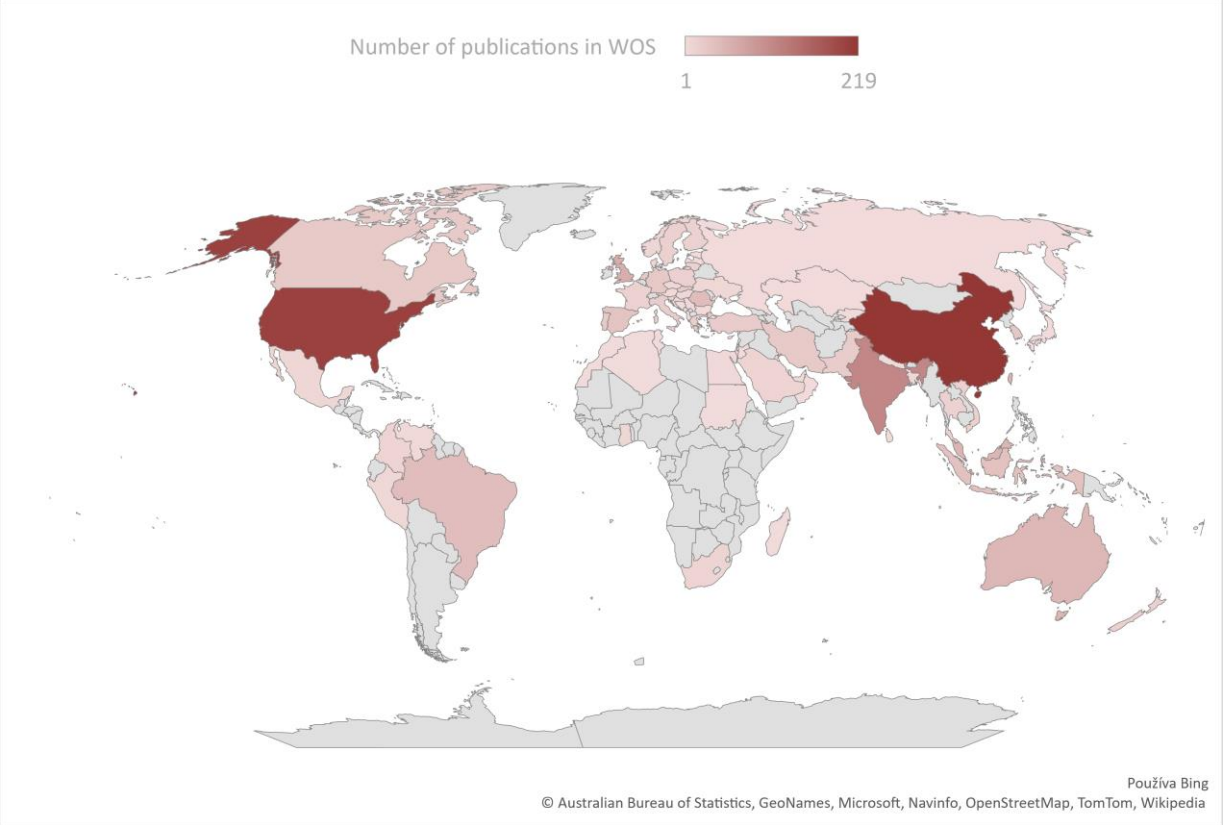


Source: Own processing.

There was a slight dip in 2014, but in 2015, the number of documents increased by 23 documents. In the years 2016–2018, the number of publications began to decrease, but in the years 2019–2022, it reached the highest number of publications, as in recent years there has been a lot of talk about the sustainability of products, reducing the impact on the environment, and the growing trend of interest in products with a low ecological burden. The most publications were published in the ongoing year 2022, where 122 scientific articles were published by November of this year. Growing interest in green marketing can be expected in the coming years.

It is interesting to look at the countries that devoted themselves to green marketing the most. The People's Republic of China took first place with 219 publications. The United States of America has the second-highest number of publications, as expected, with 206. The third highest number was achieved by India, with 113 scientific articles. The United Kingdom finished highest among European countries (61 articles). For the United Kingdom, we had to add publications for England (55), Wales (5), and Northern Ireland (1) as they were listed separately. The second country that is most devoted to green marketing is Romania (40). If we look at the countries of the Visegrad Group, the Slovak Republic (23) is the most researched issue, followed by Poland (15), and at the end are the Czech Republic and Hungary, which have 6 scientific articles each. If we look at the remaining two countries with which the Slovak Republic borders, Austrian scientists contributed 4 documents to the WOS scientific database, and Ukrainian scientists contributed 6. It is interesting to note the number of publications from Malaysia (52), Brazil (40), Indonesia (36), Iran (24), or Pakistan (21).

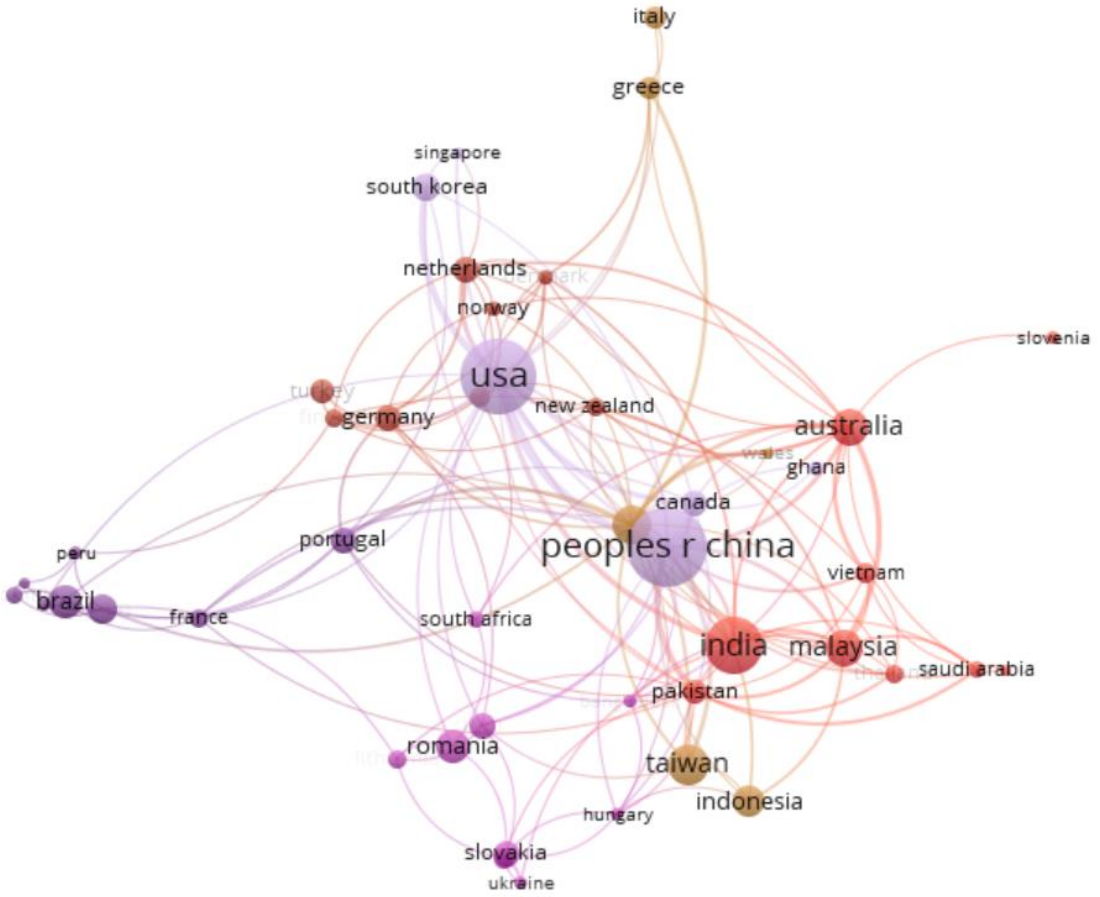
Graph 2: Number of documents related to the green marketing in WOS during the period 1991-2022 according to countries



Source: Own processing.

The minimum number of documents for one country was set at 5, which reduced the number from 87 countries to 49. The most numerous cluster is red, with 9 entries, where countries such as India, with 113 documents, 12 links, and a total link strength of 25, were included. Malaysia has 51 publications, Australia has 49, and Pakistan has 21 publications. The purple cluster also includes 9 countries, the majority of which are from Romania (40), with a total link strength of 4 and 4 links. This group also includes Iran (24) and Slovakia (23). The dark red colour represents countries such as the Netherlands, Germany, or Turkey, with the number of items being 8. The dark purple colour symbolizes the groups with 8 items, where Brazil, Spain, and Portugal are included. Although the dark purple cluster has the fewest items, together with the orange one, there are only 6 items. However, this cluster contains the two countries that published the most, namely the People's Republic of China and the United States of America. China has the 219 publications mentioned above, with a total link strength of 69 with 20 links. The USA has 200 publications and 23 links with a total strength of 73. The orange cluster symbolizes countries such as England, Taiwan, or Indonesia. It is most often published in English (1,153), Portuguese (21), Spanish (19), and Chinese (6). Two documents were written in Turkish and two in Lithuanian. After one occurrence, they had publications in, for example, Russian, Finnish, Korean, Turkish, Polish, Malay, or Croatian.

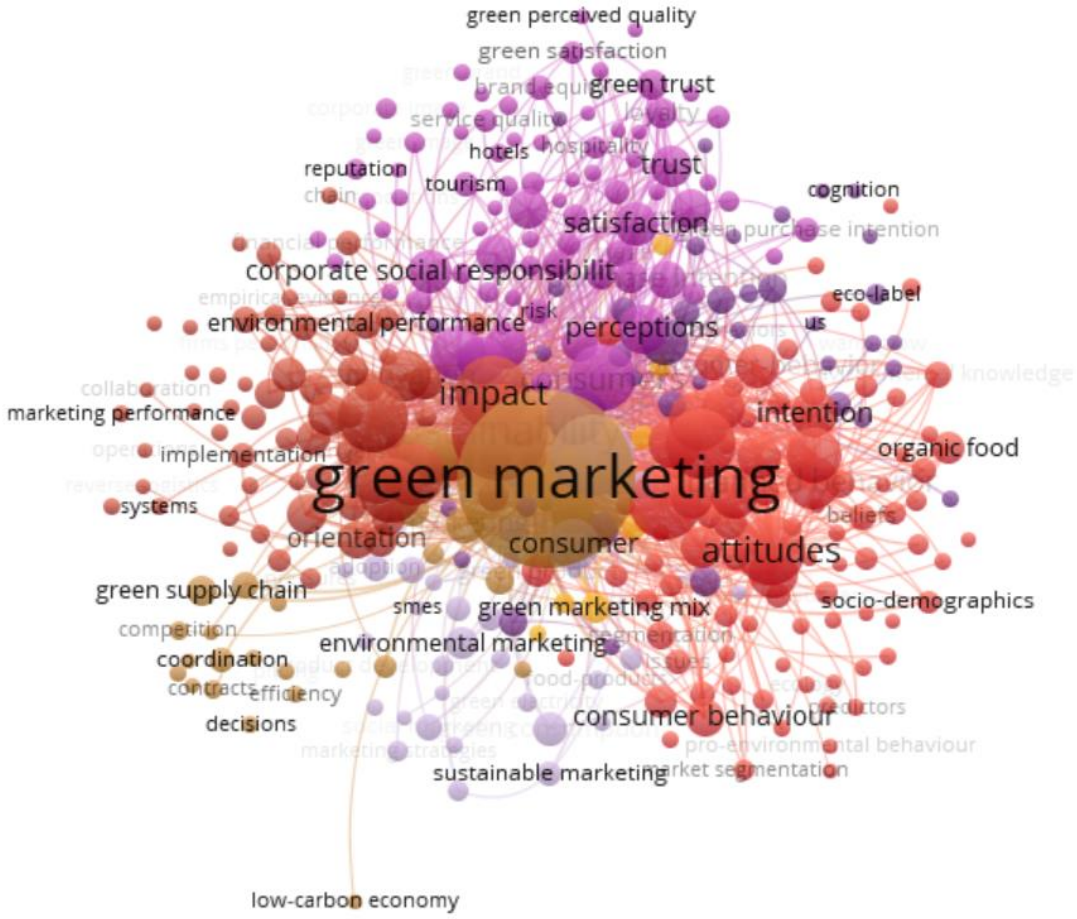
Figure 1: Bibliometric analysis of the co-authorship countries of green marketing during period 1991-2022



Source: Own processing.

By performing a bibliometric analysis, we created Figure 2. The minimum number of occurrences of keywords was set to 5. As a result, we obtained 350 of the totals of 3,623 keywords. The sorted keywords were divided into seven clusters. The most numerous cluster is shown in red. It contains a total of 94 items. The most numerous word in the red cluster is consumption, with an occurrence of 108, 238 links, and a total link strength of 865. The Links attribute and the Total link strength attribute are the two common weight attributes. The properties Links and Total link strength for a specific item show, respectively, the number of links an item has with other items and the overall strength of those links. The Total link strength characteristic shows the overall strength of the keyword linkages between the keywords of one article and the keywords of another. The second most numerous word is attitudes with an occurrence of 102, with 217 links and a total link strength of 831. Products were the third most common (100), had the most links (228), and had the highest total strength (770).

Figure 2: Bibliometric analysis of the keywords of green marketing during period 1991-2022



Source: Own processing

The second cluster is shown in purple and has 79 items. The term "consumers" appears the most frequently, with 93 occurrences and a total strength of 604 and 211 connections. Corporate social-responsibility has a total link strength of 516, with 211 links and an occurrence of 63. Quality had 157 links with a total strength of 398 and an occurrence of 48. The dark red cluster contains 70 items, while the most numerous is sustainability with a frequency of 193, a link strength of 1,273, and 296 connections. Impact had a link strength of 905, 261 links, and 114 occurrences. The third most numerous word with an occurrence of 102, a strength of 811, and 224 links was performance. The cluster shown in dark purple consists of 39 elements. The most frequently occurring keyword is green. The keyword frequency was 74, with 195 links and a total link strength of 499. The fifth cluster is shown in pale purple and contains 32 keywords. The word behaviour had the highest frequency: 135 with a strength of 966 and 261 links. The dark orange cluster contained 26 words. It contains the most common word of all, green marketing. The word occurred a total of 658 times with 347 links and a total strength of 3,384. The final and smallest cluster has only ten items and is represented by the colour orange. The keyword green marketing mix had the greatest strength of links, namely 130 with 79 links and a total occurrence of 19. The most frequently used keywords can be summarized as shown in Table 2.

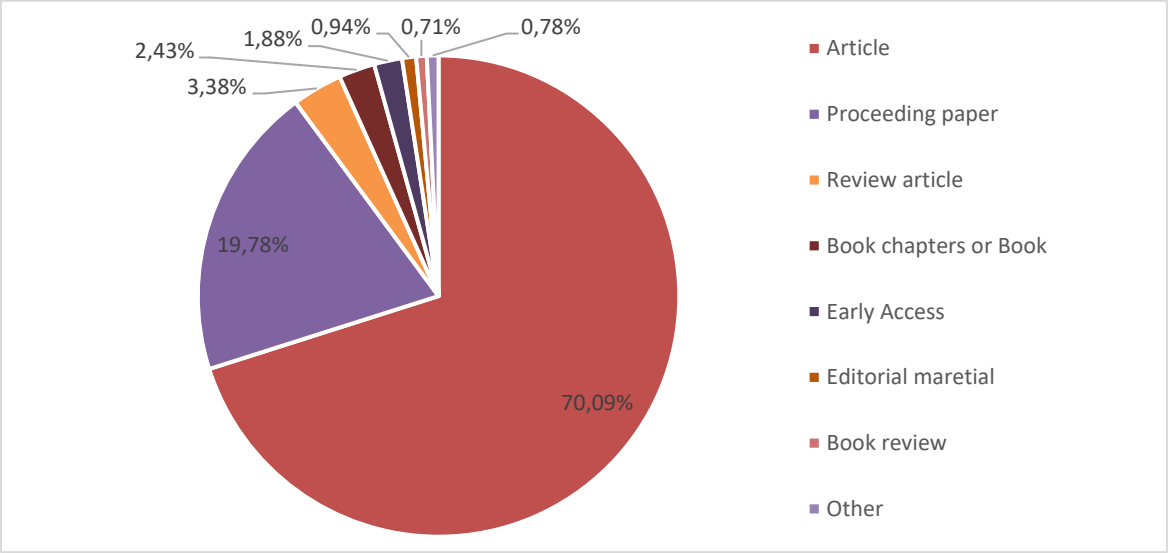
Tab. 2: The most used keywords of green marketing during period 1991-2022

Keyword	Occurrence	Links	Total link strength
Green marketing	658	347	3,384
Sustainability	193	296	1,273
Behaviour	135	261	966
Consumption	108	238	865
Consumers	93	211	604
Green	74	195	499
Green marketing mix	19	79	130

Source: Own processing.

In terms of type of document, scientific articles are the most represented in the WOS database. The number of articles is 893, which represents 70.09%. A proceeding paper comprised 19.78% (252) of the documents. The third most numerous group was review articles. Review articles had an increase of only 3.38%, which represented 43 documents. Books and book chapters accounted for 2.43% (31).

Graph 3: Type of documents related to the green marketing in WOS during the period 1991-2022

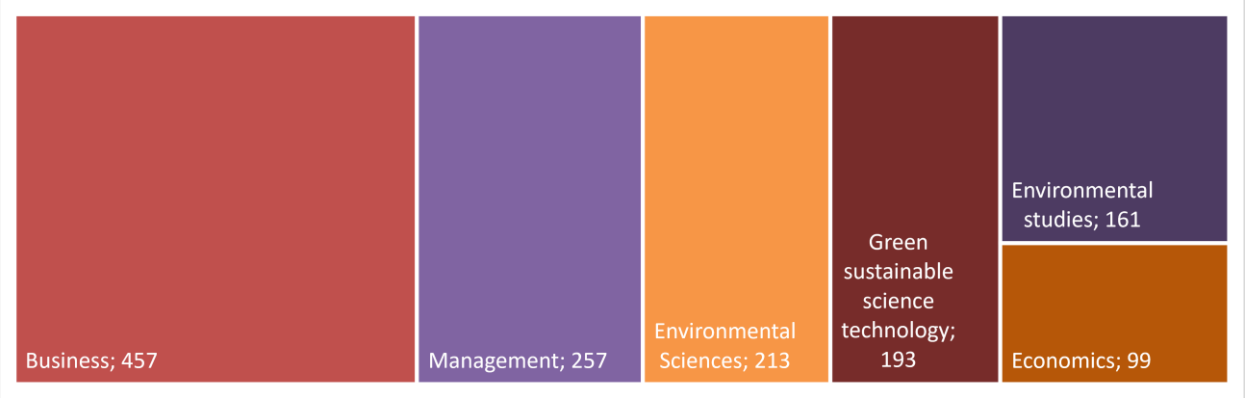


Source: Own processing.

The field of business was the most represented in the scientific database Web of Science, which is focused on a wide range of scientific disciplines with a total of 457 categories. Areas related to economic categories were also represented in addition to business, management (257), and economics (99). From the environmental field, it was environmental science (213) and environmental studies (161). A separate category was green sustainable science technology with a number of 193. The listed categories on graph 4 show the least-represented categories. Categories such as social science interdisciplinary, communications, business finance, ethics, and psychology multidisciplinary, for example, are worth mentioning because they demonstrate that green marketing does not only concern the economic and marketing fields but also

extends to ecology, psychology, sociology, and technology.

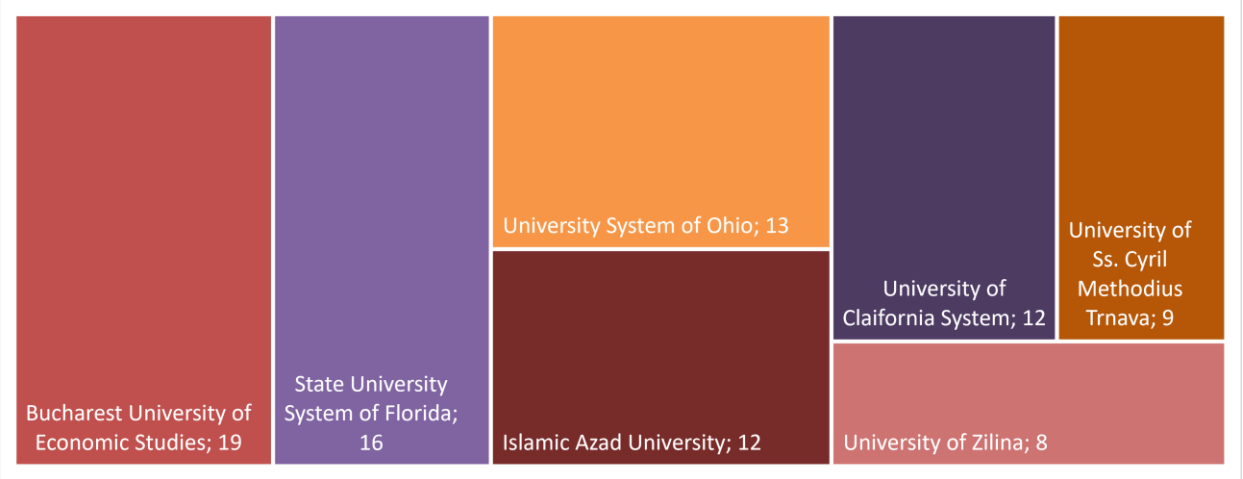
Graph 4: WOS categories of documents related to the green marketing during the period 1991-2022



Source: Own processing.

The university that is most devoted to the field of green marketing is the Bucharest University of Economic Studies, which is supported by Graph 2. Romania has the second-highest number of publications in the WOS database among European countries.

Graph 5: Universities with most documents in WOS related to the green marketing during the period 1991-2022



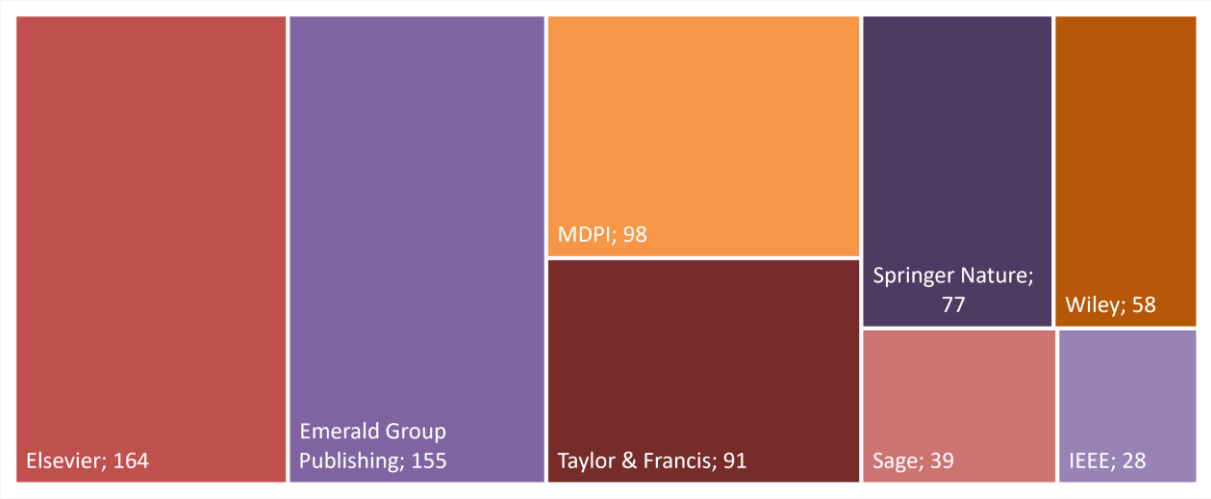
Source: Own processing

Subsequently, among the most published universities are four American ones: the State University of Economic Studies (19), the State University System of Florida (16), the State University System of Ohio (13), and the University of California System (12). The only non-American university in the top 5 ranked universities is Islamic Azad University, located in Tehran, Iran. From the Slovak universities, we selected the two with the highest number, namely the University of Ss. Cyril Methodius Trnava (9), and the University of Zilina (8).

Elsevier, a Dutch publishing house, published the most publications (164), followed by Emerald Group Publishing, a British publishing house (155). The Swiss publisher MDPI

has published 98 publications, followed by the English publisher Taylor & Francis with 91 documents in the field of green marketing.

Graph 6: Publishers of documents in WOS related to the green marketing during the period 1991-2022



Source: Own processing.

The two years with the most publications each were 2021 and 2022, with 121 and 122 respectively. The People's Republic of China (219 publications), the United States of America (206 publications), and India (113) are the three nations most engaged in green marketing. With 23 documents, Slovakia has the most documents of any Central European nation. It is followed by Poland, the Czech Republic, Hungary, Ukraine, and Austria. Consumption, consumers, sustainability, green, behaviour, green marketing, and green marketing mix are the most often used terms in this field. The categories of business, management, environmental science, and green sustainable science and technology were those in which the documents were most frequently found. The university with the most publications is Bucharest University of Economic Studies. The University of Ss. Cyril and Methodius in Trnava and the University of Zilina were the top-ranked Slovak institutions, although American universities were well-represented. Elsevier, Emerald Group Publishing, MDPI, or Taylor & Francis were the publishers of choice for publications the most.

Discussion

Saleem et al. (2021) performed a bibliometric analysis, unlike our study, from 1977 to 2020. The authors simultaneously used data from WOS and Scopus. According to their findings, the United States of America is the most active in green marketing, followed by China, the United Kingdom, Romania, and India. Within the keywords, the authors revealed the most commonly used terms: green marketing, sustainability, sustainable development, sustainable marketing, environmental marketing, etc. The findings of the authors differ from ours, which is due to the difference in the investigated period or the use of databases. The results of our research coincided only partially; the differences were, for example, in the countries that are most devoted to green marketing. In terms of

keywords, we discovered a relative match. The differences were caused by the different periods examined and the scientific databases used.

Kar, Harichandan (2022) used data from the WOS and Scopus databases to conduct a bibliometric analysis from 1990 to 2021. The authors say that since 2015, the literature in the field of green marketing has been on the rise. The authors pointed out that the publication leader is China, followed by Spain and the USA. Among the most used keywords were green marketing, sustainability, sustainable consumption, green investment, etc. In addition to the use of the Scopus database or the investigated period, the difference is also in the investigated issue, since the authors also included innovations in the analysis. The authors found, just like us, that China is the most devoted to the researched issue, but the second place is Spain, which in our research was ranked 11th. Relative agreement was reached in the area of keywords. The differences were caused by the different periods examined and the scientific databases used.

Da Silva, Razzolini Filho (2021) performed a bibliometric analysis for the years 1991–2020. Data were obtained from Scopus. Authors pointed out that 1,149 documents were published during the monitored period. The most publications were published in the English language, and the USA was named the most productive country. We have reached an agreement with the authors on the country that is most dedicated to the researched issue or the language that is most commonly used. With this research, we achieved the highest degree of similarity, as the period covered was almost the same length, which also applies to the number of publications. However, the difference was in the scientific database used.

A study by Luckyardi et al. (2022) provides an analysis of data on the application of green marketing in the chemical industry in 2017–2021. The bibliometric analysis of the concept of green marketing was further addressed by Bhardwaj et al. (2020); Chyhryn et al. (2020); Agarwal, Kumar (2021); Bhattacharyya (2022); Chyhryn et al. (2022); Geng, Maimaituerxen (2022); Yao et al. (2022), etc. The main causes of differences can be considered different time periods and the number of used scientific databases. However, each of the research is unique as it examines different areas in detail.

Conclusions

In our publication, we demonstrated that green marketing is a topical issue that is still attractive to scientists. We consider the set goal fulfilled, as well as the set research questions. In the Web of Science scientific database, there were a total of 1,210 publications that dealt directly with green marketing. However, one of them has been removed, as its publication date refers to 2023. The most publications were published in the current year 2022, namely 122, and in the previous year 121. The three countries most involved in green marketing are the People's Republic of China (219 publications), the United States of America (206 publications), and India (113 publications). Within the countries of Central Europe, Slovakia is the most devoted to the examined issue with 23 documents, followed by Poland, the Czech Republic, Hungary, Ukraine, and Austria. The most common keywords

associated with green marketing are consumption, consumers, sustainability, green, behaviour, green marketing, and green marketing mix. The documents were most often included in the categories of business, management, environmental science, or green sustainable science technology. The most used language is English. The Bucharest University of Economic Studies has the most publications. American universities were well represented, while the University of Ss Cyril Methodius Trnava and the University of Zilina ranked highest among Slovak universities. Publications were most often published by Elsevier, Emerald Group Publishing, MDPI, or Taylor & Francis.

We consider the practical contribution of this study to be the most up-to-date processing of the bibliometric analysis, focused on the years of publication, country of origin, classification according to WOS, publisher, language, type of document, or university to which the researchers belonged.

One limitation of the study is that we limited the search to the term "green marketing" in order to avoid distorting the data. For that reason, only 1,210 publications were found, from which we also eliminated the publication with the year of publication in 2023. This also explains why the analysis was carried out in 1991. The limitation of the study is also due to the fact that only one scientific database was used. Therefore, in the future, it will be appropriate to perform the analysis again, but with the involvement of other databases, such as Scopus or Google Scholar. We also pointed out this fact in the discussions, as foreign scientists worked with different time periods and databases.

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