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# A bibliometric review analysing intellectual landscape and mapping emerging themes on green purchase in the past three decades

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## Abstract

**Purpose** – This paper aims to study the intellectual landscape of green purchase (GP) literature, visualize and analyse the temporal evolution, thematic mapping of emerging and future research themes using a systematic and quantitative literature review approach.

**Design/methodology/approach** – The study employs a bibliometric analysis and examines the bibliometric metadata consisting of 440 studies extracted from the Scopus database for the years 1990–2022 within the GP field.

**Findings** – The findings based on performance analysis and visualization networks reveal the productivity trend of GP by years, authors, academic relationships, international collaborations, top cited publications, most occurring keywords, existing and emerging themes and temporal theme evolution.

**Research limitations/implications** – It provides a broader/macro view of the topic and lacks specificity and deeper analysis, which can be addressed in future bibliometric studies.

**Practical implications** – The integration of topics contributes to the development of the intellectual landscape of the GP research field and suggests thrust areas for future research. The study offers important implications for the academic community to gain a comprehensive and global understanding of green purchasing.

**Originality/value** – This research is unique as previous studies have not quantitatively compiled and extensively analysed work of these characteristics on the area under study using bibliometrics.

**Keywords** Green purchase (GP), Bibliometric review, Emerging themes, Thematic evolution, Performance analysis, Science mapping, Consumer behaviour

**Paper type** Review paper

## 1. Introduction

According to the Sustainable Development Report 2021, one of the most pressing challenges facing the world is the integration of economic growth with environmental sustainability (Sachs *et al.*, 2020). While consumerism plays a pivotal role in a country's economic growth, it often poses significant environmental concerns (Damania *et al.*, 2018). Recognizing this



*Conflict of interest:* The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

*Data availability statement*: The raw bibliographic data for this study were extracted from Scopus. Due to copyright restrictions with Scopus, the raw dataset cannot be made publicly available. However, visualizations derived from the data and analysed using VOSviewer and Bibliometrix are provided within the manuscript.

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dichotomy, many nations are shifting their purchasing patterns towards eco-friendly products, commonly referred to as green purchase (GP) (Can *et al.*, 2021; Nagy and Dabija, 2020). A couple of instances stand out to prove the increasing awareness towards green products across nations. For instance, Australia's "War on Waste TV" programme, the "Blue Planet II" series in the UK and India's consumer-driven battle against single-use plastics spark a cultural shift around green purchase and emerge as a viable step towards sustainability (Amit Kumar, 2021; Wainwright, 2018). As defined by Mostafa (2007), green purchase behaviour is an environmentally friendly buying behaviour, i.e. purchasing products that are environmentally beneficial, recyclable, conservable and sensitive to the concern of environmental matters. Besides, it also includes minimal use of natural resources that give a better quality of life to the present generation and the future one (Kilbourne *et al.*, 1997). To a great extent, green purchasing is a crucial factor in attaining sustainability and motivating several stakeholders. It benefits the natural environment (Mostafa, 2007), raises community health (Winds, 2007) and consumer well-being, improves the work performance of institutions (Lo *et al.*, 2018), develops business efficiency and competitiveness (Yang and Zhang, 2012), reduces the adverse environmental effect of manufacturing and use (Dubey *et al.*, 2013) and enhances the economic performance of the country (Yook *et al.*, 2017). Correspondingly, the discussion among academicians and policymakers also gained momentum, substantially enriching the body of research on GP.

Several studies examine the influencing factors, determinants and barriers affecting green purchase behaviour. A few systematic literature reviews are also employed in this domain. For instance, Joshi and Rahman (2015) evaluated 53 empirical papers for the period 2000–2014 concerning green purchase behaviour and explain several prevalent factors affecting purchase decision-making towards green products. Subsequently, Liobikienė and Bernatonienė (2017) carried out a narrative literature review of 80 papers from 2011 to 2017 assessing the influence of selected factors on general green products and specific product categories. A more recent study by Hazaea *et al.* (2022) systematically reviewed 142 articles between 1998 and 2021 on green purchasing that centres around determinants, effects and the prevalent theoretical underpinnings. However, most literature reviews within this field primarily summarize the existing studies, necessitating prolonged accumulation, synthesis and extraction of research activities. As a result, the conventional review methodologies often fall short of providing a comprehensive overview of green purchase research. This shortcoming has propelled the need for a novel approach, as described in this paper. By harnessing the capabilities of high-performance computing, expansive databases and information visualization techniques, the bibliometric method offers an innovative avenue for conducting literature surveys. Based upon the aforementioned research gaps, the given study has two primary objectives, which are as follows:

(1) To study the intellectual landscape of GP literature.

(2) To visualize and analyse the temporal evolution, thematic mapping of emerging and future research themes in green purchase research.

To pin down, the first aim pictures the unique perspective of the area by identifying the productivity of GP by years and citation, the significant author co-citations, international distribution of research output and scientific country collaborations, top cited publications and the keywords word cloud analysis. The second aim defines the evolution of the field, i.e. how the GP themes have evolved and how the shifts in these are mirrored in academia. Also, mapping these themes thematically in four quadrants namely motor, base, niche and emerging determines the new hot spots for research and discovers the future research trends.

Among the various types of review methods, this study uses the bibliometric analysis technique to achieve the objectives. Broadus (1987) defines Bibliometric analysis as the

quantitative study of available publications or bibliographic publications or their substitutes. It is known as a robust tool to quantitatively analyse the impact of academic accomplishments through knowledge building, intellectual interlinks and drawing out established and emerging research themes in the given field (Ante *et al.*, 2021; Donthu *et al.*, 2021; Marvuglia *et al.*, 2020; Zyoud and Zyoud, 2021). The motive behind using bibliometric analysis as a review method is threefold. First, unlike a qualitative review, it is less subject to the judgement bias of the reviewer (Elango, 2019). Second, it is unconstrained by data samples and time (Zhang *et al.*, 2021). Third, it is a transparent and systematic review as it relies on unbiased calculations of computer programmes (Bretas and Alon, 2021; Pereira *et al.*, 2021; Pereira and Bamel, 2021).

The outcome and information acquired by performing a bibliometric analysis on the articles published from 1990 to 2022 contribute to the literature and are of massive importance to researchers who are working on this subject matter or commencing their research. Firstly, our study quantitatively compiled and extensively analysed the area under study using bibliometrics that made this research unique. Secondly, this study makes the first attempt to uncover the thematic conceptual structure of the GP research field for analysing the theme development throughout the time period and lay outing these themes in a dimensional space. Hence, with the growing importance of sustainability across the globe, an insightful description of accumulated green purchase findings, detected themes and recommended future agendas would add significantly to the academic discipline.

This study consists of four sections: Section 1 talks about the Introduction, in which the importance of the topic, existing literature and detailed objectives are put up. Section 2 details the research methodology; Section 3 explains the intellectual landscape of GP research with the help of detailed maps, tables and figures and Section 4 points to the conclusions, limitations and future research direction.

## 2. Materials and method

In an effort to fulfil the aforementioned objectives, this study develops a comprehensive strategy that defines the research hierarchy. It involves three steps, as depicted in Figure 1. The first step involves selecting a data source and collection based on inclusion and exclusion criteria. Subsequently, relevant bibliometrics tools are chosen for executing performance analysis and mapping visualization leading to the last step, i.e. findings and future implications.

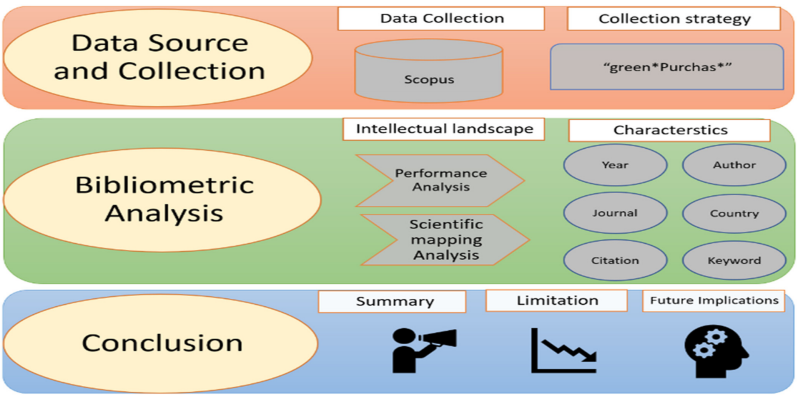



**Figure 1.**
Research methodology framework

**Source(s):** Authors' own

*2.1 Selection of database and collection of publications*

The first step involves a selection of databases. The database reflects an important platform for obtaining global academic information through its international academic journals (Figueiredo and Pereira, 2017). In an attempt to extract records, Scopus, a prestigious and influential database is chosen for this study.

After selecting the database, the next step compromises publication collection. To this end, the search of keywords about the given field is recognized from the existing literature. The term "green*Purchas*" is used as a search term to obtain the relevant publications discussing this topic. The motive behind using the asterisk symbol is to broaden the search for retrieving more words that begin with the same letters. Various fields like the title, abstracts and author-supplied keywords of the publications are searched for the given keyword phrase using the query string "TITLE-ABS-KEY". Table 1 summarizes the inclusion–exclusion criteria for searching and monitoring the information to retrieve data. The search query runs on May 17, 2022, for the period between 1995 and 2022, extracted in a total of 825 documents. To achieve the aim, only three disciplines, namely business, management and accounting, environmental science and social science are preferred. By and large, these areas symbolize the three core Sustainable Development pillars, i.e. Economy, Environment and Society (Hansmann *et al.*, 2012; Ranjbari *et al.*, 2021). Subsequently, after a thorough manual examination, the researcher removed several papers that are irrelevant due to lack of correlation, i.e. not thoroughly covering the green purchase. Thus, an aggregate of 440 significant documents is taken for further statistical analysis to meet the research objective.

*2.2 Tool selection for performance and scientific mapping analysis*

The second step in the process consists of mining and analysing the extracted data to understand the intellectual and scientific landscape of GP publications. The effectiveness and accurateness of the research results are highly dependable on the tools and techniques used for the execution of the analysis (Qin *et al.*, 2022). Hence, the two potent and substantial bibliometric tools, namely VOSviewer and Bibliometrix, are used in the given operation. VOSviewer, an excellent knowledge-driven visualization software, is constructed on the technology of Visualization of Similarities (VOS) to exhibit maps and networks in the form of

| Basis | Inclusion criteria | Exclusion criteria | No. of publications |
|---|---|---|---|
| Time period | 1990–2022 | Papers published before 1990 | 825 |
| Publication language | English | All except English | 809 |
| Source | Journals | Conference proceedings, Trade journal, Book series, Book | 684 |
| Document type | Articles | Conference chapter, Book chapter, Review note, short survey | 650 |
| Subject area | Business, management and accounting, Environmental science and social science | Other 24 subject areas on Scopus | 556 |
| Filtration and elimination | The papers thoroughly covering the green purchase topic are included | Several papers that are irrelevant due to lack of correlation are eliminated | 440 |

**Source(s):** Authors' own

**Table 1.** Inclusion–exclusion table

meaningful clusters. Furthermore, Bibliometrix, an R statistical programming language package, is used for quantitatively evaluating the conceptual, social and intellectual structure of GP publications.

This study walks on the analysis strategy developed by Han *et al.*, (2020) after making a few modifications to it. The two prominent analysis measures applied are performance and science mapping. The performance analysis deals with descriptive statistics to provide research distribution outcomes based on significant indicators such as publication year, authors, countries, citations and keywords. Based on these measures, the total publication productivity, high-performing countries, top cited documents and most frequent keywords in the GP research field are known.

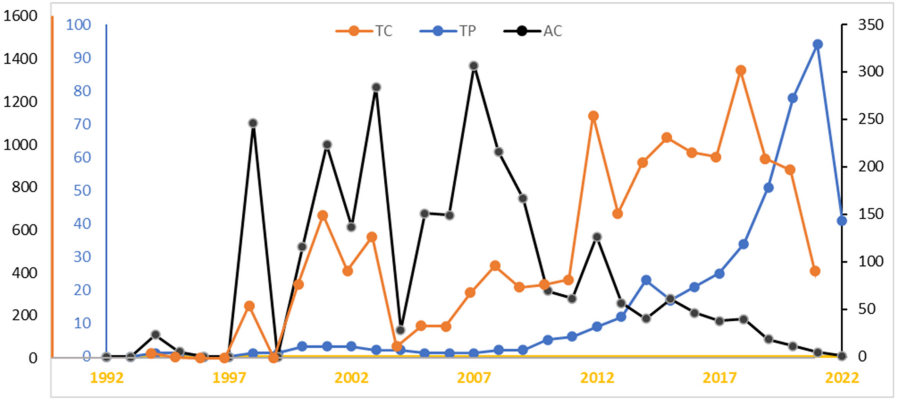
Conversely, science mapping deals with the visual representation of structures that display the connections and interlinks among the various research components (Petrovich, 2020). To understand the relationships and scholarly knowledge dynamics of the GP research domain, various science mapping analyses such as author co-citation, country collaboration, thematic mapping and temporal evolution are performed. All this analysis helps in achieving the study aim. Based on bibliometric analysis results, finally, the third step provides deep insight into conclusions, limitations and a way for future research.

## 3. Intellectual landscape of green purchase studies – performance analysis and science mapping analysis

### *3.1 Analysis of GP studies by year*

Firstly, the productivity trend of GP studies is analysed by means of three parameters – total publications (TP), total citation (TC) and average citation (AC). It can be seen in Figure 2 that in the initial years the number of TP on the GP was very less and continued till the year 2010 (Pearcy, 2010) reported that over time people have understood the need of protecting and improving the environment could be possible through the purchase of "green" products. Thereon, people consider looking for purchasing green products that received the attention of researchers towards GP.

Thus, the year 2010–2020 shows significantly spectacular growth as the number of studies rises considerably each year and touched its highest in 2021 with 94 publications. The rising trend of production per year shows evidence of the increasing attention of people to human-environmental behaviour. Also, there is an increase in funded GP research



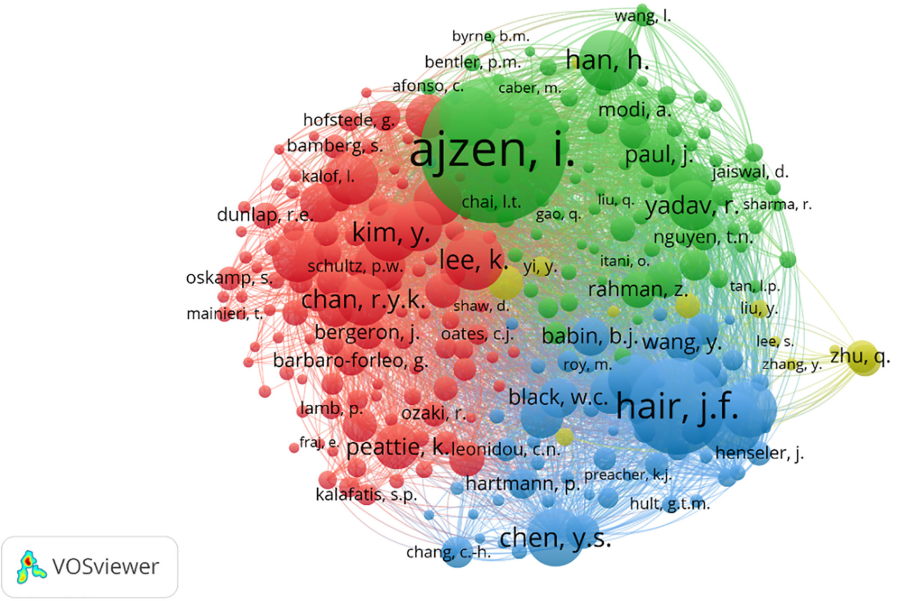

**Source(s):** Authors' own

**Figure 2.**
Productivity trend of GP studies

publications from 2015 to 2022, covering 97.6% of total funded publications in this area. The total citation (TC) per year of GP studies is also outlined in Figure 2, showing the citation trend from 1992 to 2022. In line with TP, TC depicts a tremendous rising trend from 2010. The reason could be more academic contributions and relevant publications published during this time. The AC (TC/TP) line slopes upward from 1997 to 2014 as the number of citations in comparison to publications was more. However, after 2015, the AC line moves in a downward direction as the publications rise at a higher rate than citations.

*3.2 Analysis of GP studies by authors*

To analyse the intellectual structure and direct future developments in the GP domain, the author's co-citation analysis is performed. It is a useful method for displaying the pair of authors that are cited together in the source document and contributing significantly to the literature (Kessler, 1963; Osareh, 1996). While setting the threshold limit to 30 citations per author in Figure 3, the author tries to conclude meaningful interpretations of co-cited authors' structure and their interconnectedness. The size of the coloured circle denotes the citation frequency of the author, and each prominent cluster represents some common theme. According to the visualized clustered analysis, Ajzen I. is highly associated with GP research in terms of both citation frequency (481) and position on the map (25,332 link strength). His given theory, namely the theory of planned behaviour (TPB), to determine the behaviour has been extensively used in the GP context (Ajzen, 1991). It is worth noticing that Ajzen is highly linked and closely connected to other authors belonging to different clusters, implying his pivotal role in building and expanding this area. Additionally, other authors belonging to this cluster (in green), such as Fishbein, Han H., Yadav R. and Rahman Z. focus on the theoretical framework and reviewing green purchase literature (Fishbein, 1979; Han, 2020; Joshi and Rahman, 2017; Yadav and Pathak, 2017). The majority of post-2010 studies acknowledged in



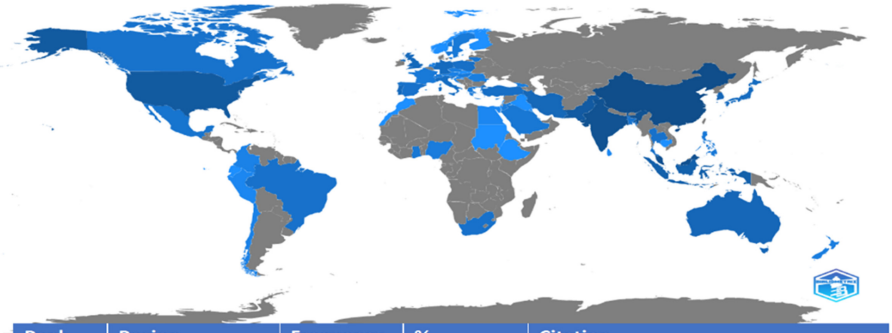

**Source(s):** Developed by authors' using VOSviewer software

**Figure 3.**
Author co-citation analysis

this cluster exemplify the authors' attention to employing the foundational theories (TRA, TPB) in the context of determining the green purchase behaviour of developing countries (Jaiswal and Kant, 2018; Kautish *et al.*, 2019; Nguyen *et al.*, 2018; Paul *et al.*, 2016; Wang, 2022). Kim, Y., Lee, K., Stern, P.C., Chan, R.Y.K., Roberts, J.A. and other authors highlighted in red belong to the old school of thought and include articles from 1996 to 2010. The GP research would perhaps not have developed without their theoretical and empirical contribution in the past (Laroche *et al.*, 2009; Roberts, 1996; Stern *et al.*, 1999). Their studies mostly targeted antecedents and determinants of green purchase behaviour in developed countries like the USA, Canada and China (Chan and Lau, 2000; Choi and Kim, 2005; Lee, 2010; Mostafa, 2006, 2007; Tanner and Wölfing Kast, 2003). The third cluster (in blue) consists of authors that deal with measurement models and statistical methods prominently used in the domain of data analysis (Black and Babin, 2019, 2019; Hair *et al.*, 2014; Fornell and Larcker, 1981; Hair, 2009; Hair *et al.*, 2010). Hair, J.F. is the most cited author in the cluster, and his work on structural equation modelling (SEM) has been widely used and appreciated in marketing and management research. The smallest cluster in yellow contains diverse and less connected authors. Zhu, Q., Sarkis, J., Klassen and R.D. contributed to building the green supply chain management research field (Zhu *et al.*, 2007, 2011).

### *3.3 Analysis of GP studies by countries*

This analysis provides the scientific production of documents by country. Figure 4 illustrates the geographical distribution of research output together with quantitative statistics of the top ten highest publication countries in this field. The shades of blue represent the productivity level, where dark blue denotes high productivity and grey denotes no productivity. The majority of the research productivity is concentrated in developing Asian countries like China (241), Malaysia (182) and India (159), which cover 56% of the total world research output. It expresses the rising consciousness and consumers' willingness to prefer



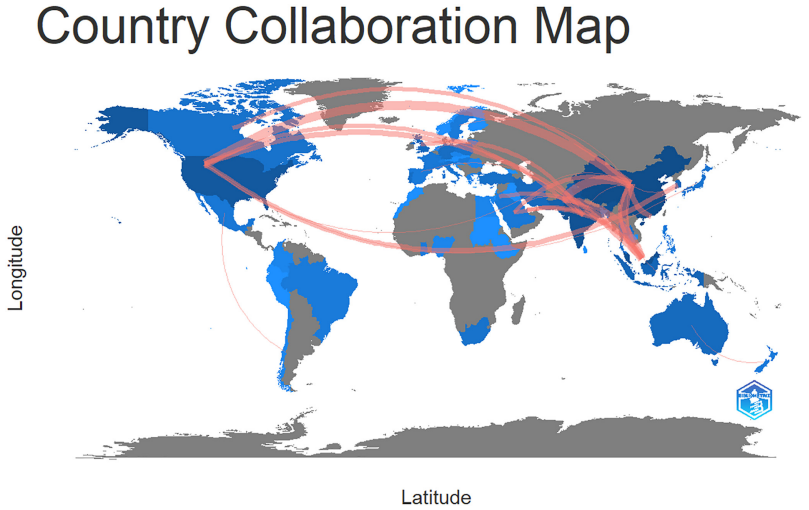
| Rank | Region | Frequency | % | Citation |
|---|---|---|---|---|
| 1 | CHINA | 241 | 23.3527132 | 2089 |
| 2 | MALAYSIA | 182 | 17.6356589 | 1124 |
| 3 | INDIA | 159 | 15.4069767 | 1539 |
| 4 | USA | 80 | 7.75193798 | 1137 |
| 5 | PAKISTAN | 76 | 7.36434109 | 52 |
| 6 | INDONESIA | 47 | 4.55426357 | 9 |
| 7 | AUSTRALIA | 27 | 2.61627907 | 216 |
| 8 | IRAN | 25 | 2.42248062 | 66 |
| 9 | SOUTH KOREA | 25 | 2.42248062 | 141 |
| 10 | UK | 22 | 2.13178295 | 722 |

**Source(s):** Developed by authors' using Bibliometrix R software

**Figure 4.**
Country scientific production

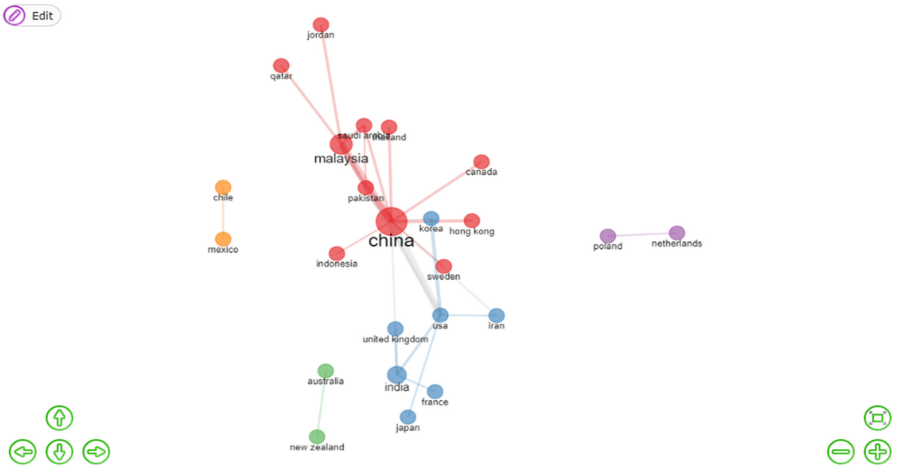
green products in developing countries. China produced the most influential documents and made a pioneering contribution in the GP field in terms of both citations (2089) and no. of documents (241). Besides this, developed countries such as the USA (76) played an important role in developing research output related to factors motivating green purchase intention. Further, Australia (27), Korea (25) and the UK (22) academia are actively adding to GP productivity.

Through the analysis of scientific country collaborations, the author provides a more detailed and comprehensive overview of cross-country cooperative relationships and links. The Biblioshiny software of R is used to carry out the collaboration network analysis while setting the node limit to 50 countries. The social structure network in Figures 5 and 6 depicts




**Source(s):** Developed by authors' using Bibliometrix R software

**Figure 5.**
Country collaboration world map




**Source(s):** Developed by authors' using Bibliometrix R software

**Figure 6.**
Cross-country cooperation links

that China is the most important and central node in the network with 93.78 betweenness centrality. It acts as an information gatekeeper by bridging the shortest path between other pairs of countries in the network. Surprisingly, the remaining countries except for Malaysia (32.14) and the USA (27.07) have 0 betweenness centrality. China has the most relevant relations and cooperative ties (links) with Malaysia, the USA, Hong Kong, and Pakistan. Although the USA belongs to another group (blue colour), it still ties a thick belt with China (red colour), implying cross-country academic liberation and development in the GP field. The second largest group that keeps open connections and communication with each other consists of India, USA, Iran, Korea, UK, Japan and France. On the other hand, countries like Australia, New Zealand, Poland, the Netherlands, Mexico and Chile have loose or no international collaboration. Moreover, they have a high closeness centrality score equal to 1 indicating a far travel to get to other countries along the paths in the network. Therefore, scholars from these countries should engage in more international collaborations and exchange research information frequently.

### *3.4 Analysis of GP studies by citations*

In order to find the progress of any research field, the number of its publications is the key (Kreiman and Maunsell, 2011). However, the citation score provided to the document is deemed important to see the global impact of that publication (Agarwal *et al.*, 2016). In the given study, the paper published in Psychology and Marketing in 2003 titled "Promoting Sustainable Consumption: Determinants of green purchases by Swiss consumers" is featured as the most enriched document with the maximum number of citations (568). This study aims to identify the contextual and individual barriers that prevent consumers from buying green food and to advance understanding of how to encourage such purchases (Tanner and Wölfing Kast, 2003). Table 2 exhibits the 15 highest rank documents in terms of total citation.

The second highest-cited document, "Determinants of Chinese consumers' green purchase behavior", authored by Chan R.Y.K (566), emphasizes on providing a better understanding of the green purchase behaviour process and its influential antecedents (Chan, 2001). Chan R.Y.K, being an early researcher, works outstandingly in explaining green purchase behaviour while holding three articles in the top 15 cited articles. Following this, Chen Y-S (467) document titled "Enhance green purchase intentions: The roles of green perceived value, green perceived risk, and green trust" ranked third (Chen and Chang, 2012). Other top documents produced by Lee K and Mostafa M.M focus predominantly on identifying gender differences in young consumers' green purchase behaviour (Lee, 2009; Mostafa, 2007). The articles written by Yadav R, Moser A.K., Akehurst G. and Jaiswal D. are also very relevant and of great academic interest to researchers employing theoretical frameworks (Akehurst *et al.*, 2012; Jaiswal and Kant, 2018; Moser, 2015; Yadav and Pathak, 2017).

### *3.5 Analysis of the GP studies by keywords*

First, the author suggests a short overview of GP research via word cloud analysis. Figures 7 and 8 provide the most frequently used words in GP research using both author keywords and keyword plus. The font size corresponds to how frequently a certain word appears in the literature. This analysis not only gives visual clarity to the readers about the topic but also acts as an essence for future GP research. For this study, the word limit is set to 50 keywords. According to author keywords, the few dominant terms include "green marketing", "green products", "green purchase behaviour", "environmental concern", "environmental knowledge", "purchase intention" and "theory of planned behaviour". These are the keywords that the authors believe are relevant in their papers. Together, they also communicate which topics of research in a particular field are more or less prominent (Pesta *et al.*, 2018). The same word "green purchase behavior" (28), "green purchase

**Table 2.** Highest cited GP publications

| Rank | Author | Title | Year | Country | Methodology | Source | Total citations |
|---|---|---|---|---|---|---|---|
| 1 | Tanner | Promoting sustainable consumption: Determinants of green purchases by Swiss consumers | 2003 | Switzerland | Quantitative | *Psychology and Marketing* | 568 |
| 2 | Chan R..Y.K | Determinants of Chinese consumers' green purchase behavior | 2001 | China | Quantitative | *Psychology and Marketing* | 566 |
| 3 | Chen Y..S | Enhance green purchase intentions: The roles of green perceived value, green perceived risk, and green trust | 2012 | China | Quantitative | *Management Decision* | 467 |
| 4 | Lee K | Opportunities for green marketing: young consumers | 2008 | Hong Kong | Quantitative | *Marketing Intelligence and Planning* | 432 |
| 5 | Yadav R | Determinants of Consumers' Green Purchase Behavior in a Developing Nation: Applying and Extending the Theory of Planned Behavior | 2017 | India | Quantitative | *Ecological Economics* | 369 |
| 6 | Gleim M.R. | Against the Green: A Multi-method Examination of the Barriers to Green Consumption | 2013 | USA | Mixed | *Journal of Retailing* | 353 |
| 7 | Mostafa M.M | Gender differences in Egyptian consumers' green purchase behaviour: the effects of environmental knowledge, concern and attitude | 2007 | Egypt | Quantitative | *International Journal of Consumer Studies* | 307 |
| 8 | Lee K | Gender differences in Hong Kong adolescent consumers' green purchasing behavior | 2009 | Hong Kong | Quantitative | *Journal of Consumer Marketing* | 293 |
| 9 | Moser A.K. | Thinking green, buying green? Drivers of pro-environmental purchasing behavior | 2015 | Germany | Quantitative | *Journal of Consumer Marketing* | 263 |
| 10 | Akehurst G | Re-examining green purchase behaviour and the green consumer profile: new evidences | 2012 | Portugal | Quantitative | *Management Decision* | 262 |
| 11 | Chan RY.K. | Antecedents of green purchases: a survey in China | 2000 | China | Quantitative | *Journal of Consumer Marketing* | 255 |
| 12 | Green K | Green purchasing and supply policies: do they improve companies' environmental performance? | 1998 | UK | Qualitative | *Supply Chain Management* | 246 |
| 13 | Biswas A | Green products: an exploratory study on the consumer behaviour in emerging economies of the East | 2015 | India | Quantitative | *Journal of Cleaner Production* | 237 |
| 14 | Chan RY.K. | Explaining Green Purchasing Behavior | 2002 | China | Quantitative | *Journal of International Consumer Marketing* | 229 |
| 15 | Jaiswal D | Green purchasing behaviour: A conceptual framework and empirical investigation of Indian consumers | 2018 | India | Quantitative | *Journal of Retailing and Consumer Services* | 211 |

**Source(s):** Authors' own


**Source(s):** Developed by authors' using Bibliometrix R software

**Figure 7.**
Word Cloud map of Author Keywords


**Source(s):** Developed by authors' using Bibliometrix R software

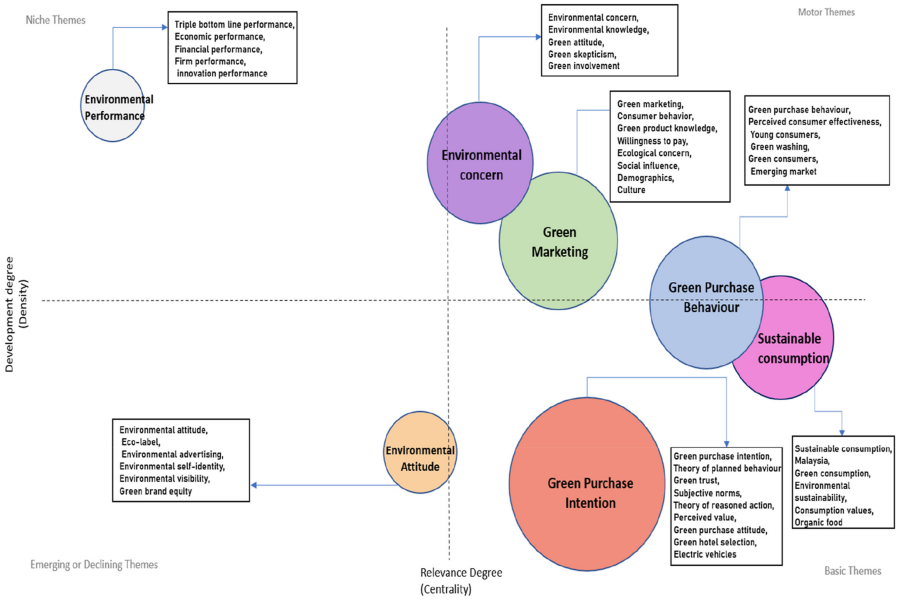
**Figure 8.**
Word cloud map of Keyword-plus

behaviour" (38 times) and "green purchasing behaviour" (11) as speled differently in American and British English so appearing separately. Surprisingly, "Green marketing" (49), labelled in green colour is one among the most frequently occurring terms in the GP studies, indicating a strong association with the topic under study. Many researchers have analysed the impact of the green marketing mix on consumer purchase behaviour and identified the factors that influence customers to choose green products (Dangelico and Vocalelli, 2017;

Groening *et al.*, 2018; Liao *et al.*, 2020; Nekmahmud and Fekete-Farkas, 2020). On the other hand, keyword plus result demonstrates the word "sustainability" as the most appearing word. This gives us an impression of the wide and core theme of GP. Sustainability concern is one of the major reasons behind the consumption of green products worldwide (Huang and Rust, 2011). Other highlighted words include "environmental protection", "green economy", etc. which are wide and relevant research topics in themselves.

### *3.6 Thematic mapping*

In this part, the conceptual structure (research front) of the GP field is developed for the given time using a scientific thematic mapping approach. The thematic map obtained through retrieved data using the Bibliometrix R package helps detect and visualize the notable themes, lay-outing them dimensionally and analyse them by employing the clustering algorithm to the keyword network (Aria and Cuccurullo, 2017; Garfield, E., 1994). Each bubble shown in Figure 9 indicates a network cluster labelled with the highest occurring keyword name contained in it. Further, the size of the bubble in the map is proportionate to the word occurrences in the cluster, i.e. the larger the occurrences, the bigger the bubble size is. For this analysis, 300 author keywords with a minimum of three cluster frequencies are taken. The position of these clusters in the map depends upon two parameters, i.e. centrality and density. Centrality, as defined by Callon *et al.* (1991) measures the network's external strength that means the degree of association of one theme with other themes in the network. In contrast, density measures the internal strength, i.e. the degree of association among all keywords under a research theme (Aparicio *et al.*, 2019; Cobo *et al.*, 2015). Broadly, centrality reflects the significance of a particular theme in the development of the entire research field, whereas density measures a theme's development (Cobo *et al.*, 2011). In the given two-dimensional strategic diagram, the seven clusters are divided into four quadrants based on the centrality and density's mean and median values. The four quadrants are: (1) Motor




**Source(s):** Developed by authors' using Bibliometrix R software

**Figure 9.**
Thematic mapping

quadrant (upper right), (2) Basic or transversal quadrant (lower right) () Niche or peripheral quadrant (upper left) and (4) Emerging or declining quadrant (lower left). These are discussed one by one in detail below.

*(1) Motor theme* – The themes included in this quadrant are well developed and occur frequently in the research studies. They are closely related (high density) and connected to other external themes of the research field (high centrality) (Murgado-Armenteros *et al.*, 2014). The themes that form the base structure for the green purchase research field are green marketing and environmental concern.

The research on the green marketing theme aims to analyse the strategies of green marketing by evaluating its impact on the behaviour of consumers and suggests the better use of marketing tools and campaigns by marketers for attracting consumers for green products (Bathmanathan and Rajadurai, 2019; do Paço *et al.*, 2014; Goh and Balaji, 2016). In response to rising environmental concerns and social responsibility, marketers offered a solution to consumers by offering green products that, in return, provided financial incentives to marketers. Many studies have listed various internal (green product knowledge, consumer willingness to pay and ecological concern) and external factors (social influence, demographics and culture) that marketers should consider while implementing green purchase strategies to achieve sustainability goals. Later on, researchers view it from a new dimension of threat also, i.e. green washing practices used by businesses, consumer scepticism towards green products and green marketing myopia (Jog and Singhal, 2020; Urbański and ul Haque, 2020).

Environmental concern is the second motor theme and is comprised of keywords such as environmental concern, environmental knowledge, green attitude, green scepticism and green involvement. The number of published studies in this domain is high, and themes related to it like "ecology", "environment consciousness" and "environmental strategy" began to appear between 2009 and 2015 and caught the attention of the researchers in the subsequent years. As the consciousness for environmental protection is growing among people, they are becoming more and more environmentally concerned and realizing that their purchasing behaviour can make a huge impact on the environment (Majeed *et al.*, 2022). With the ongoing research in this field and increasing environmental knowledge, the research shifted to green scepticism and shows that customers with a high level of environmental concern and less sceptical tend to have a positive attitude and strong intention that encourages future purchases (Albayrak *et al.*, 2013). Moreover, the studies investigated how gender, product category and country differ in context of environmental concern (Albayrak *et al.*, 2013; Bertrandias and Elgaaïed-Gambier, 2014; Casalegno *et al.*, 2022). Notably, consumer environmental concern and motivation to protect the environment continue to bring change to the market through the introduction of more sustainable products.

One theme, namely green purchase behaviour, is transmitting from the basic quadrant to the motor quadrant, implying the topic of slow maturity attainment in the research field. The maximum publications on this theme appeared in 2018–2019 and continue contributing to the research field. Figure 9 shows the allocation of this important research theme from an underdeveloped theme (low density) to a developing theme (moderate density). Among all the other nine themes, this stands third in terms of largest theme and is constituted of keywords green purchase behaviour, perceived consumer effectiveness, young consumers, green washing, environmental consciousness, green consumers, pro-environmental behaviour and emerging market. The studies revolving around this theme primarily assess the predictive power of various variables to conclude the key predictors influencing the green purchase decision-making of consumers (Joshi and Rahman, 2017; Nguyen *et al.*, 2018). Another topic discusses the generation that is highly targeted in GP research. It includes young consumers,

as they are more likely to be green, understand the green phenomenon well, and are interested in a healthier lifestyle (Jhanji and Sarin, 2018; Khare and Sadachar, 2017; Tan *et al.*, 2019; Yadav and Pathak, 2017).

*(2) Base quadrant* – The green purchase intention is the biggest theme cluster in terms of both volume of research and occurrence and is highly relevant (high centrality) for the research field. The leading keywords covered by it are green purchase intention, theory of planned behaviour (TPB), subjective norms, theory of reasoned action (TRA), green trust, perceived value, green purchase attitude, green hotel selection, electric vehicles and green apparel. This theme covered the bulk of publications between 2015 and 2020 and may be termed the heart of green purchase research. Research on this theme is outlined to the green purchase intention aspect, wherein a deep insight on factors motivating green purchase intention is viewed to strengthen knowledge for promoting green purchases. It is studied from several perspectives applying different theoretical frameworks such as the TPB, TRA, theory of consumption value and many more behavioural theories. For instance, TRA draws on the foundation that intention is the only and immediate determinant of behaviour. Major studies find consumer attitude and subjective norms as the most affecting green purchase intention factors (Bai *et al.*, 2019; Richa and Bisai, 2018; Zhuang *et al.*, 2021). This theme later extended from general to specific product categories, namely automobile (electric vehicles), food (organic food) and textile (green apparel) industry, thereafter to services (green hotel and green tourism). Ahead, a new dimension of perceived values is introduced to the theme. As mentioned above, this theme is not fully developed in terms of internal tie strength and therefore requires more research.

While looking at the strategic map, the second largest theme is sustainable consumption, where sustainable consumption, Malaysia, green consumption, environmental sustainability, consumption values and organic food are the key topics. The location of the theme on the map illustrates the theme progression as a single practice-oriented research theme (high centrality) that contains diverse topics within it. Two elements, namely environment and development, have been combined with consumption, giving a boom to sustainable consumption studies (Liu *et al.*, 2017). The theme is well connected with other external themes involving sustainability, consumption behaviour and environmental impact. The other known term used for sustainable consumption includes green consumption. Many publications on this theme study it through the theory of green consumption values (Awuni and Du, 2016; Biswas, 2017; Lee *et al.*, 2015).

*(3) Emerging or declining theme* – The lower left quadrant represents either an evolving or disappearing theme. This quadrant theme has both low density and low centrality, which suggests weak internal linkages and weak external connectedness. According to this study, one theme lies in this quadrant, namely "environmental attitude".

The topics environmental attitude, eco-label, environmental advertising, environmental self-identity, environmental visibility and green brand equity fall under this theme. Considering the volume of publications, the environmental attitude seems to be an evolving theme that is gaining much scholarly interest. It includes the analysis of various frameworks measuring the inward and outward outlook of ecological attitude (Trivedi *et al.*, 2018). Additionally, a few studies have identified the relationships between attitude and green marketing tools (eco-label, environmental advertising and green brand) in order to gauge the consumer purchasing intention in green products (Liao *et al.*, 2020). The other cognitive and social influencing factors, such as environmental self-identity and environmental visibility, are also at an initial stage and require integration with green purchase research (Dagher and Itani, 2014; Mutum *et al.*, 2021; Wang, 2014).

*(4) Peripheral theme* – The themes in this quadrant (upper left) have strong internal specialization and marginal external importance. These are termed peripheral or niche themes because of their low external linkage with other themes and are relatively less important to the main research field (Pereira and Bamel, 2021). As evident from the map, the theme "environmental performance" has low centrality and high density. Both are discussed in detail below:

Environmental performance consists of keywords, namely triple bottom line performance, economic performance, financial performance, firm performance and innovation performance. The publication timeline of these themes is very fluctuating, as it appears in gaps earlier in 1998 (Green *et al.*, 1998), then in 2016–2017 (González-Benito *et al.*, 2016) and again in 2020–2021 (Chin *et al.*, 2020; Foo *et al.*, 2019; Galeazzo *et al.*, 2020; Najmi *et al.*, 2020). Environmental performance is a relevant and niche theme that has been thoroughly studied as a measure of firm performance, especially in the context of the supply chain. Over time, as the business sustainability concern rises, the researchers turn their attention towards sustainability firm performance, i.e. triple bottom line performance (financial, social and environmental). The topic is though well researched as a theme in itself but lacks connection with other themes central to this research field.

### *3.7 Thematic evolution*

After obtaining the themes of research interest, it is necessary to study how these themes have evolved, merged or split over time as a theme and trending topics in GP research. The study, therefore, made the thematic evolution analysis using the Sankey diagram in R software by dividing the time period into three different consecutive sets of subperiods (time slices). Figure 10 depicts the longitudinal representation of GP research performance for the periods 1994–2008, 2009–2018 and 2019–2022 to provide an insight into the most contributing and productive sub-themes, changes in research direction and topic conceptual development over time. To analyse this, 250 author keywords with a minimum cluster

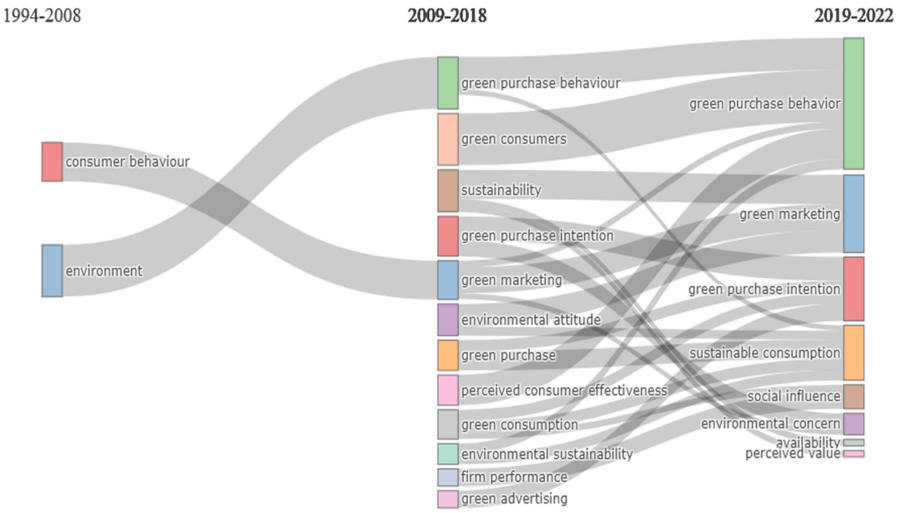
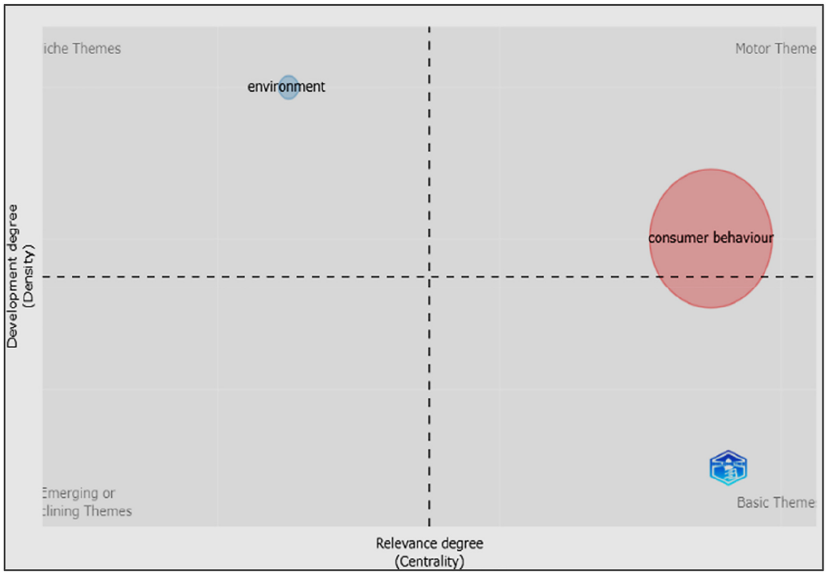



**Figure 10.**
Thematic evolution of GP research from 1994 to 2022

**Source(s):** Developed by authors' using Bibliometrix R software

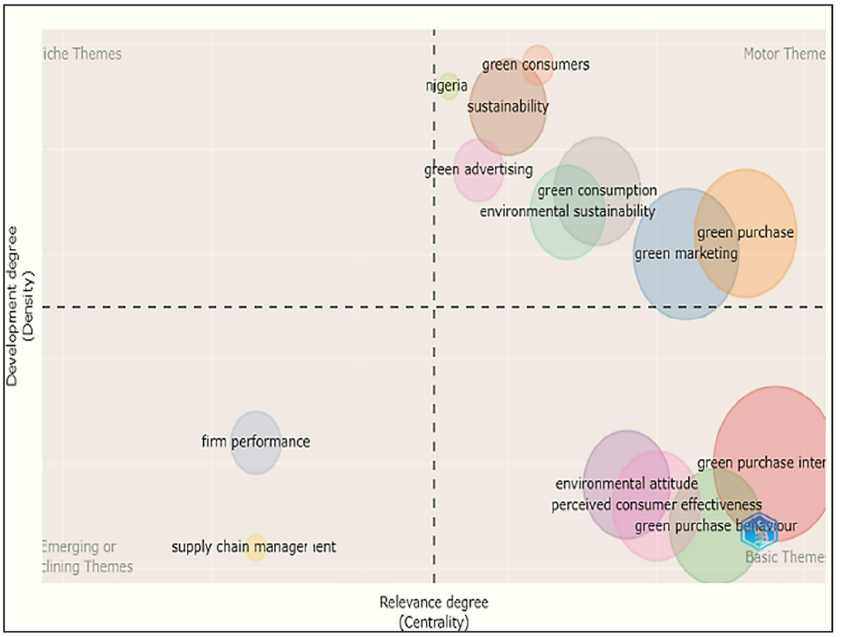
frequency of 5 are taken. Under each time slice, there are a few rectangular blocks, each representing a specific theme labelled with the most occurring keyword under that theme. The thickness of the connecting lines indicates the degree of correlation between the two themes, and the size of the rectangular block (theme) represents the number of keywords linked with that theme (Mougenot and Doussoulin, 2022). In the first time slice (1994–2008), terms like "environment" and "consumer behaviour" emerge as a central theme, implying the rising environmental issues and the importance attached to consumer behaviour in that period (ölander and ThØgersen, 1995). As shown in Figure 11, the consumer behaviour term is a developed theme having a high density and centrality value. It flourishes in this time period and later appears along with other terms (green marketing).

The 2009–2018 mark a crucial period for the GP research field as it sees the newly evolving and developing themes and subdomains with huge occurrences such as green purchase intention, green purchase behaviour, green marketing, environmental attitude, green purchase, environment sustainability, perceived consumer effectiveness, green consumption, green consumers, green advertisement and so on. Moreover, the base quadrant in Figure 12 also detects the close positioning of four large and relevant themes (green purchase intention, green purchase behaviour, perceived consumer effectiveness and environmental attitude) as they overlap each other. The third time slice 2018–2022 observes many themes from the second slice merged or converted into independent new concepts. The term green purchase intention turns more stable and grows by submerging terms, namely green purchase intention, TPB, environmental knowledge, green purchase attitude and green advertising, from the second time slice. Some terms, such as environmental concern, included in one of the theme clusters of the second time slice now come out as a research theme in itself. Lastly, as shown in Figure 13, a few factors, such as cognitive factors, social influence, perceived value and availability have low degree of link strength with other themes and are not directly related to GP research.



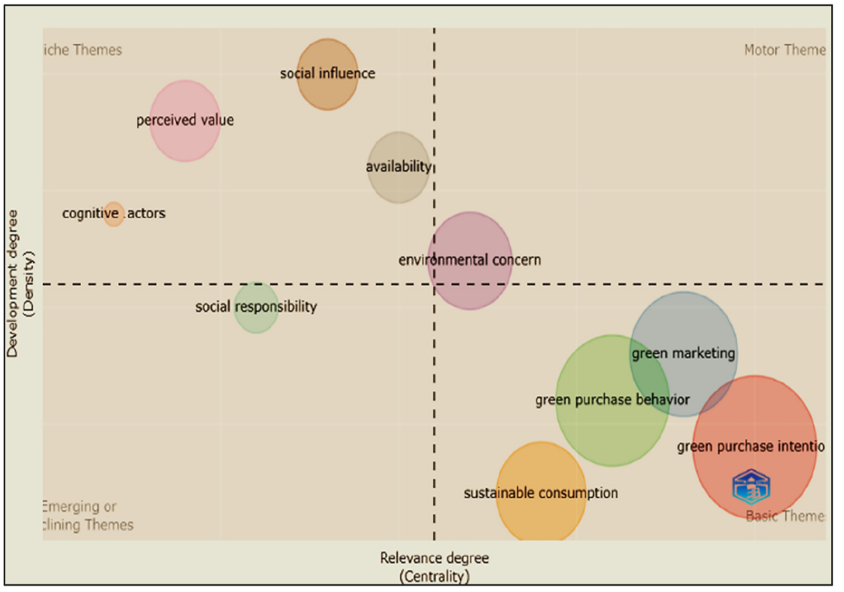

**Source(s):** Developed by authors' using Bibliometrix R software

**Figure 11.** Thematic evolution of GP themes for Time slice 1: 1994–2008




**Source(s):** Developed by authors' using Bibliometrix R software

**Figure 12.**
Thematic evolution of GP themes for Time slice 2: 2009–2018




**Source(s):** Developed by authors' using Bibliometrix R software

**Figure 13.**
Thematic evolution of GP themes for Time slice 3: 2018–2022

## 4. Concluding summary, limitations and future research implications

This section of the study delves into the paper's findings in order to contribute to the green purchasing literature. The integration of the topics works as a way to acquaint the novel readers with the topic.

### *4.1 Summary*

The findings provide a summary of the literature by highlighting the salient characteristics of previously published research in this field.

First, the research projects descriptive analysis to know which years are most productive for the growth of this field. From a slow beginning (1994) to a moderate increase (2010), exponential growth has been seen after 2014. The years 2014–2022 are being regarded as the most productive period. The reason behind this rapid rise in the publication may perhaps be attributed to growing awareness regarding consumption-related environmental problems and climate change in recent years. Also, the increase in funding from governments (national and international), environmental organizations and big companies has supported the academic development of this field.

Second, the author's research provides insight into the author's co-citation analysis. The analysis provides an understanding of authors sharing similar themes and their specialized research subjects. As aforementioned, the author Ajzen I. is being highly cited with other authors pertaining to GP research.

Third, from the viewpoint of global academic research distribution, the countries, namely China, Malaysia and India, have generated the maximum articles and held a dominant position in the GP research field internationally. The reason these Asian economies outrank Western economies may be because of growing people's interest in sustainability, green products relatively new to these markets, rapid economic growth and rising academic institutions. Furthermore, the African and Arab countries lack research discussing green purchases that pave a way for future researchers to study it by taking into account their cultural and religious differences. In terms of collaboration, China shares the maximum cross-national cooperation with Malaysia, the USA and Pakistan. Despite this, the global inequalities in research sharing still exist among countries that are unconducive to the development of GP research.

Fourth, the study articulated 15 highly cited publications of academic interest to comprehend the intellectual dynamics of the GP field. The analysis finds the predominance of quantitative studies, being 13 out of 15 including quantitative research techniques. Importantly, among them, the maximum cited documents belong to China, followed by India and Hong Kong.

Finally, numerous keyword analyses are conducted to better understand the topic of green purchase research. To give a quick snapshot of dominant terms that appear in the literature, word clouds work as an outstanding starting point for analysis. It includes significant keywords such as "green marketing", "green products", "green purchase behaviour" and "environmental concern". Through this analysis, we find that though system-driven keywords (keyword plus) are conceptually broader than author-given keywords, they lack inclusiveness in reflecting an article's content appropriately. Besides, the thematic map unveils the knowledge base of GP research by producing the conceptual network structure of themes depending upon density and centrality rank value. The location of the seven identified subthemes in the analysis showcases the importance of a particular theme in the research area, like two themes, namely Green Marketing and Environmental concern, which are mapped as highly researched and developed. Whereas, other theme green purchase behaviour moving from base to motor quadrant implies the growing maturity of this theme. Another important observation includes the overlapping of two important themes, green purchase behaviour and

sustainable consumption, as they are positioned closely. Furthermore, the study identifies the themes that are fundamental to the research field (green purchase intention) and those which are niche or less related to the research base (environmental performance). Later, through the temporal thematic evolution analysis, we draw the evolution and development of the theme in multiple time spans from 1994 to 2022. It illustrates that many themes such as green purchase intention, green purchase behaviour, green marketing, environmental attitude, green purchase, environment sustainability, perceived consumer effectiveness, green consumption, green consumers and green advertisement are evolving and developing during the second phase (2009–2018). Thereafter, various themes from the second slice (2009–2018) change their research direction and are merged or converted into an independent new concept in the third slice (2018–2022), suggesting the diversification of topics in the GP research. To conclude, this work tries to benefit the researchers by providing a broad, comprehensive bibliometric analysis of the GP research.

### *4.2 Limitations*

The study findings associated with publication pattern, most productive authors, influential documents, international collaboration and keywords depicting relevant themes for future study, and other entities on the green purchase help accelerate the development of the topic in research. However, the study has a few limitations.

First, the current study only includes the records accessible via the SCOPUS database. There are various other resourceful databases, like Web of Science or combined databases, that could be contemplated to bring a bigger and more robust picture of the GP research.

Second, to assure the accuracy of the analysis, the author tries to define an appropriate search protocol by using "green purchas*" as the search string. Yet it cannot be inferred with absolute accuracy that all relevant papers pertaining to green purchase research have been included. Also, the final selected papers after scrutiny largely rely on the manual examination and mental calibre of the author, which is subject to flaws. Moreover, it could be possible that a related research area may also get omitted in this study. Therefore, trying various other combinations could have yielded more precise results.

Third, some topics receive more citations in comparison to others and are treated as more significant than others. For instance, articles that have a high citation score are assumed to be prominent and helpful, but the entire field of the research is not represented by them. Hence, the researcher sees the half-filled glass and fails to see the half-empty glass.

Fourth, this paper provides a limited analysis related to the green purchase topic. Thus, future researchers can conduct a comprehensive Bibliometric analysis of institutions, funding and references.

Lastly, though the bibliometric tool very impressively displays the large scientific and statistical data using maps, it lacks specificity and deeper analysis. It only provides a broader/macro view of the topic. The shortcomings of the study discussed above might be overcome by the upcoming research on Bibliometrics in this field.

### *4.3 Implications and direction for future research*

The findings of the study provide significant scholarly and managerial implications. First, the broad research provides an all-encompassing advancement status of GP literature, which is an imperative and prospective research area for attaining Sustainable Development Goals (SDGs). There are some recent publications that have not revealed their true and fair potential at this time, but over time, they can prove to be very resourceful. Thus, the current study serves as a valuable reference point for follow-up researchers in scrutinizing their impact and adding to development in the field. Second, the study contributes to identifying the research gaps in previous literature that future studies can cover and work on. For say, the study's

findings highlighted the dominance of GP publications from the consumer perspective, suggesting further research from a firm, industry and policy perspective. Further, the notable scarcity of GP studies in Arab and African countries suggests unexplored research avenues, emphasizing the need for researchers to probe green purchasing behaviours, policies and trends within these regions. The study also confirms the dominance of quantitative studies in the field and a need for more qualitative and mixed-methods research to provide a comprehensive understanding of GP. Third, the location of seven identified themes in the study helps managers recognize trending topics in GP research and ensure they are focusing on key, influential topics. Fourth, the study suggests the themes to guide decision-makers in devising strategies to promote green purchases and formulate marketing tactics to attract customers. It highlights the "Green purchase intention" theme as pivotal, offering insights into factors driving green purchase intention to strengthen knowledge for promoting green purchases. Further, it classifies green marketing mix (Product attributes, Price, Promotion and Place) as a central and core theme hinting managers to align their strategies and initiatives to this core area in their field. Considering the evolving theme, the study identifies environmental attitude as a significant evolving theme that is gaining much scholarly interest. Thereby, guiding marketers to reflect on the environmental attitude of consumers, especially in the context of significant global events, like the Covid-19 pandemic. Lastly, the temporal evolution offers a valuable aspect to policymakers for comparing historical research with recent research. The identification of trends and shifts in the GP field will help policymakers in designing timely and relevant policies.

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