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A literature review on green brand equity and future research directions

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Abstract

Despite growing interest in integrating sustainability or green transition into branding strategies, efforts to systematically review the literature on this topic remain relatively limited. This study explores various dimensions of green brand equity (GBE) literature, including document types, research growth patterns, prominent authors, influential works, research groups, geographical distribution and international collaborations, main schools of thought, and topical trends. A bibliometric-content analysis approach was adopted, utilizing Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) for screening and assessing the eligibility of 176 GBE Scopus-indexed documents from 2005 to 2023. VOSviewer was utilized for science mapping. The findings reveal a significant upward trend in GBE publications, predominantly in journal articles between 2005 and 2023. This study highlights four schools of thought in GBE: (1) Consumer and green brand relationships and green purchase intention, (2) Drivers and antecedents of GBE, (3) Green brand positioning and strategies, and (4) Impact of marketing and sustainable practices on GBE. Furthermore, the study highlights current topical trends, antecedents, consequences, mediators, and moderators of GBE; outlines future research directions. It also identifies the leading contributors to the field, including the most impactful countries, authors, documents, and research groups. It may offer valuable contributions and serve as a foundation for further shaping the themes and future research directions of the field.

Keywords Green brand equity, Brand management, Green purchase intention, Green brand loyalty, Brand positioning, Brand strategies

1 Introduction

The global climate crisis is putting pressure on all sectors in various countries to transition to green practices [1]. How to achieve sustainability while gaining a competitive advantage has become a highly debated topic among researchers [2]. This backdrop has ushered in an era of strategic green initiatives, green transitions, and elevated sustainability concerns at the forefront of contemporary business agendas [3]. Some researchers underscore the significance of greening as a choice for prosperity or even survival which is imperative for certain businesses today [4]. In this context, green brand equity (GBE) is emerging as a trend capturing the attention of researchers around the world [5]. GBE

is regarded as a set of environmental responsibilities and commitments associated with a brand, which can either enhance or diminish the value of the products or services it offers [6].

Nowadays, GBE is receiving increasing attention due to its rising significance in practice. It is being shaped by major global initiatives such as the European Green Deal and the United Nations' Sustainable Development Goals (SDGs), which have placed sustainability at the core of national and corporate strategies [7]. These frameworks exert pressure on organizations to adopt greener practices, thereby reshaping consumer expectations and brand strategies across industries. Numerous real-world examples highlight how GBE is being applied across industries. For instance, green supply chain practices, such as eco-design, sustainable sourcing, green production, and reverse logistics, are being adopted to enhance brand image and customer loyalty while reducing environmental impact [8]. Furthermore, strategic use of green marketing, including the deployment of eco-labels and authentic green messaging, has been proven to positively shape consumer perceptions and reinforce GBE [9].

So far, there appear to be very few efforts to provide a comprehensive review of the literature on GBE. Górska-Warsewicz [10] conducted a systematic literature review utilizing five databases (Scopus, Web of Sciences, Google Scholar, EBSCO, and Elsevier), analyzing 33 final empirical studies published between 2006 and 2021. Through the systematic review method, Górska-Warsewicz [10] made significant contributions in analyzing the detailed content of the documents, particularly the constituent elements of GBE. Focusing on empirical studies, Górska-Warsewicz [10] only addressed three research questions: (1) What are the primary determinants of GBE, (2) How frequently do classic GBE components appear in GBE empirical research, and (3) What particular factors influence GBE. Similarly, Ishaq and Di Maria [4] made an early conceptual contribution by synthesizing literature on the link between sustainability and brand equity, highlighting the limited theoretical development in GBE research. While their qualitative content analysis offers a unique perspective, the study does not apply bibliometric methods such as co-word analysis, bibliographic coupling, or co-authorship mapping to uncover the field's intellectual structure. Moreover, for emerging and interdisciplinary topics, updated literature reviews conducted by different authors across various fields are both necessary and highly valuable [11].

Although GBE is urgent and increasingly gaining attention, there are still significant gaps in the consolidation of knowledge on this topic. Firstly, there has been no study that utilizes bibliometric-content review, combines science mapping, and descriptive analysis, to provide comprehensive insights into growth trends, geographical distribution of studies, influential authors, research groups, and impactful documents on this topic. Secondly, there has been no single effort utilizing solely Scopus data, which is considered more comprehensive than the Web of Sciences when examining social science research [12]. Thirdly, it appears that there has been no effort to pinpoint the main schools of thought and topical trends of GBE. This study addresses the gaps by employing a bibliometric review method, integrating knowledge mapping, descriptive analysis, and content analysis. The data is sourced from Scopus. This research aims to explore various dimensions of GBE literature, including document types, research growth patterns, prominent authors, influential works, research groups, geographical distribution

and international collaborations, main schools of thought, and topical trends. This study seeks to answer the following research questions (RQ):

RQ1. What are the document types, growth trajectory, influential contributors (authors, documents, research groups), and the geographic distribution and international collaborations in GBE research?

RQ2. What are the main schools of thought and the topical trends in GBE research?

RQ3. What are the antecedents, consequences, mediators, and moderators of GBE?

RQ4. What are the future research directions for GBE?

2 Theoretical backgrounds

2.1 Brand equity

The concept of brand equity was initially proposed by Farquhar [13], and it is regarded as the added value that a brand brings to a product or service. From this perspective, brand equity comprises three components: (1) positive assessment, (2) positive attitude toward the brand, and (3) consistent brand image in consumer perception.

This viewpoint subsequently formed the basis for two widely known and extensively cited concepts by Aaker and Keller [14, 15]. According to Aaker [14], "brand equity is the combination of brand assets and liabilities connected to an organization's name and symbol that increase or decrease the value that a good or service offers". From this standpoint, brand equity consists of five main components: brand associations, perceived quality, brand recognition, brand loyalty, and other unique brand assets. Keller [16] defines brand equity as "the differential impact which brand knowledge has over consumer responses towards marketing of the specific brand".

Recent brand equity research has undergone notable transformations, reflecting the field's adaptation to rapid technological advancements and shifting consumer behavior. A key trend is the integration of augmented reality (AR) into brand experiences, as research demonstrates that AR features can enhance brand salience, meaning, consumer response, and brand relationships [17]. At the same time, brand equity in B2B contexts is gaining increasing attention, with recent studies highlighting key antecedents, mediators, and outcomes in industrial branding [18].

New concepts such as brand polarization, where brands simultaneously attract passionate supporters and strong critics, have emerged as viable strategic positioning approaches [19]. The rise of brand advocacy research, particularly after 2020, also highlights the heightened relevance of digital engagement, emotional connections, and corporate social responsibility (CSR) in strengthening brand equity [20]. These developments suggest that brand equity is increasingly shaped by technological, emotional, and global forces, calling for more flexible and multidimensional approaches from both scholars and practitioners.

2.2 Green brand equity

2.2.1 Concept of green brand equity and its distinction from brand equity

Green brand equity is a term that has emerged recently, integrating the attributes of brand equity and associations with the environment [21]. According to Chen [22], GBE is seen as the impressions, perception, and understanding of a brand in the customer's memory, correlating with concerns for sustainability and environmental friendliness. Similarly, Chen and Chang [23] (p.9) defined GBE as "a set of brand assets and liabilities

about green commitments and environmental concerns linked to a brand, its name, and symbol that add to or subtract from the value provided by a product or service". Li et al. [24] considered GBE as a collection of consumer perceptions, influences, and behaviors regarding commitments and environmental concerns associated with a brand, enhancing utility, and increasing the brand's value.

Thus, the essence of GBE concepts alludes to the added value that brands acquire through environmentally friendly attributes, meeting consumers' environmental protection needs. Bekk et al. [25] argue that products with higher GBE will be preferred by consumers. Previous studies have indicated a close relationship between sustainable business activities and enhancing brand asset value [26]. Like brand equity in general, GBE is determined by various stakeholders, especially customers who can be considered the most crucial, thus, it is essentially the key to the long-term success of an organization [27].

Accordingly, the literature indicates that while brand equity in general reflects the overall value a brand creates through consumer perceptions, loyalty, and associations, GBE narrows this focus to the environmental domain. Unlike traditional brand equity, which emphasizes functional quality and market-based advantages, GBE highlights the added value a brand gains from its environmental commitments and sustainable practices. In this sense, GBE adapts the core components of brand equity to a green context, where factors such as ecological impact, ethical sourcing, and sustainability certifications play a central role. The core components of traditional brand equity largely retain their importance within the GBE framework but are often adapted to fit the green context. For example, perceived quality in GBE encompasses not only the functional performance of a product but also its environmental impact, ethical sourcing, and sustainability certifications [28]. Similarly, green brand loyalty tends to be value-driven, shaped by consumers' alignment with a brand's environmental mission rather than by satisfaction or habitual purchasing alone [29].

2.2.2 Constructs of green brand equity

There have been many efforts to explore the constructs of GBE. The article by Hartmann [30] could be considered the first work in the Scopus database focusing on perceived brand positioning and brand attitude, though it does not directly address the definition of GBE. Li et al. [24] are concerned with image, attachment, satisfaction, and green trust. Shanti and Joshi [31] addressed perception, image, attitude, quality of perception, and green satisfaction. Kazmi et al. [6] examined green customer value factors and green experience. Nguyen et al. [32] explored image, trust, satisfaction, and environmental concerns. Nguyet et al. [33] examined corporate social responsibility, satisfaction, trust, and brand associations. Sharma [1] studied two factors: green trust and green brand image. Nguyen-Viet [34] focused on brand associations, perceived quality, green trust, and green satisfaction. Dinh et al. [35] explored perceived quality, trust, and green brand associations. Hue and Oanh [28] investigated green brand image, green trust, green satisfaction, green perceived value, and green perceived quality. Hue [29] examines CSR-related drivers, including Economic CSR, Ethical CSR, Environmental CSR, CSR for the community, and CSR for employees, and how they shape green brand loyalty.

Although closely connected to related constructs, GBE should be clearly distinguished. Green brand image focuses primarily on consumers' associations with a brand's

environmental attributes, whereas GBE extends beyond perception to encompass value outcomes such as loyalty, trust, and satisfaction. Similarly, CSR-based equity reflects the broader value derived from a company's social and ethical responsibilities, while GBE centers specifically on how environmental commitments enhance brand equity. Other constructs, such as green trust, green satisfaction, or green perceived value, capture individual dimensions of consumer response, but GBE integrates these elements into a multidimensional framework that explains the overall value a brand gains from its environmental positioning. In summary, the literature demonstrates that there are numerous factors used to measure GBE.

Notably, several scholars have emphasized that GBE should be approached as a multidimensional construct [4, 36]. These studies have made important efforts to develop and validate multidimensional measurement scales that reflect the complex and underexplored nature of GBE. Ishaq [4] validated a six-dimensional GBE scale applicable to both products and services across multicultural contexts, comprising sustainability, social influence, perceived quality, brand awareness, brand associations, and brand leadership. The studies highlight the significance of recognizing GBE as a multidimensional construct shaped simultaneously by functional, social, and cultural factors.

Recent studies on GBE have highlighted several emerging developments. Digital transformation has been identified as a key catalyst in promoting green branding activities, although empirical research directly examining this relationship remains limited [37]. In addition, recent findings suggest that the effectiveness of green marketing strategies varies across regions and should be tailored to specific cultural, economic, and regulatory contexts. Methodologically, recent studies are beginning to move beyond the traditional reliance on structural equation modeling (SEM) and regression analysis, instead employing alternative approaches such as the Delphi method and Analytic Hierarchy Process (AHP) to identify and prioritize key antecedents of GBE, including perceived quality, perceived green value, green satisfaction, green trust, and green brand image [28]. These shifts reflect a growing diversification in both the content and methodologies of GBE research, opening up promising avenues for future scholarly inquiry.

3 Method

This study employs the bibliometric method as proposed by Pritchard [38]. With this approach, researchers can integrate descriptive analysis and science mapping [39]. This method has been widely used in social science e.g. [40–42]. According to Byl et al. [43], bibliometric analysis is one important tool among a basket of potential processes and related tools used to understand aspects of research output.

3.1 Identification of sources

Scopus database was chosen for bibliometric analysis instead of Web of Sciences or Google Scholar due to several advantages. Experimental evidence suggests that for fields beyond medicine and physics, Scopus provides more information than the Web of Sciences [44]. It employs a consistent rule in selecting documents for indexing, resulting in better indexing capabilities compared to Google Scholar [45]. Additionally, Scopus contains a wider range of documents evaluating social science research than the Web of Science [12].

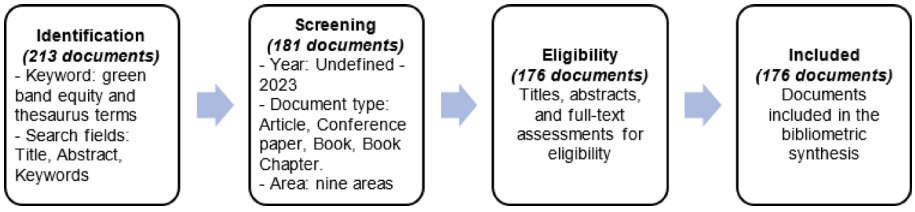

Fig. 1 PRISMA in the identification and screening of sources on GBE

Table 1 Criteria for literature inclusion and exclusion

Criteria	Inclusion	Exclusion
Database	Scopus	Others
Search fields	Title, Abstract, Keywords	–
Keywords	"green brand associations" OR "green brand attachment" OR "green brand attitude" OR "green brand awareness" OR "green brand emotion" OR "green brand equity" OR "green brand image" OR "green brand innovativeness" OR "green brand knowledge" OR "green brand loyalty" OR "green brand relationship" OR "green brand satisfaction" OR "green brand trust" OR "green branding constructs" OR "green brand evangelism" OR "green brand legitimacy" OR "green brand love" OR "green brand positioning" OR "green brand value" OR "green brand communication" OR "green brand benefits" OR "green brand management" OR "green brand extensions"	–
Type of access	All	–
Period	Undefined—2023	2024
Subject area	Business, Environment, Social Sciences, Economics, Decision, Psychology, Arts, Multidisciplinary, Health	–
Type of Documents	Articles, conference papers, book chapters, books, and reviews	–
Language	English	Others

3.2 Preferred reporting items for systematic reviews and meta-analyses

This study employed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) [46]. Specifically, the steps are illustrated in Fig. 1.

In the first step, "green brand equity" and its thesaurus terms were utilized as the abstract and keyword fields on the Scopus search engine. To ensure reliability, the keyword selection process was conducted in two stages, following the recommendations of Donthu et al. [47]. Specifically: (1) an initial list of keywords was generated by one author based on the theoretical foundations of GBE; (2) three authors engaged in brainstorming and a focused group discussion to finalize the list of keywords used for the search, as presented in Table 1. This process was designed to ensure inter-rater reliability. As a result, we obtained 213 initial documents.

Subsequently, the data was screened using inclusion and exclusion criteria, as outlined in Table 1. The selection of multiple areas and types of documents is due to the interdisciplinary and emerging nature of this topic [28], with no bibliometric analysis papers published on it to date. Consequently, we retrieved 181 documents.

Following that, during the eligibility phase, we downloaded the bibliographic data in both Excel and text formats. To ensure both reliability and validity, a double data extraction technique involving two screening stages was employed [47]. In the first stage, the two authors of this study independently reviewed the titles, abstracts, and full texts (when necessary) to identify the most relevant documents. In the second stage, they cross-checked each other's screening results to ensure accuracy and minimize the risk

of bias. As a result, we excluded five documents that were not pertinent to the GBE topic [48, 49]. Ultimately, we retained 176 relevant documents for analysis.

3.3 Data analysis

To address the research questions, we employed a combination of performance analysis and science mapping, as outlined in Donthu et al. [47]. This dual approach allows for both an evaluation of the productivity and impact of research constituents and the visualization of structural relationships among them.

Microsoft Excel was used to perform performance analysis, which is descriptive in nature and highlights the contributions of authors, institutions, countries, and journals to the GBE field [47]. Key metrics included total publications, total citations, annual growth trajectory, and the most prolific and influential contributors.

For science mapping, we utilized VOSviewer, a widely recommended tool for visualizing bibliometric networks [47]. The following mapping techniques were applied:

- Co-authorship analysis examined collaborative structures among authors and across countries, helping to reveal the social dynamics and dominant research networks in the GBE domain [50]. According to Donthu et al. [47] (p.290), co-authorship analysis "enables collaborations to be mapped across different periods of time, thereby enabling scholars to review the trajectory of intellectual development".
- Keyword co-occurrence analysis identified recurring terms in author keywords to uncover topical trends and emerging themes [51]. This method is effective for "exploring existing or future relationships among topics in a research field by focusing on the written content" [47] (p. 289).
- Bibliographic coupling was employed to detect thematic clusters based on shared references among publications [50]. This method is especially suitable for identifying recent developments, as it "provides a representation of the present of the research field" [47] (p. 289).

All science mapping techniques were conducted using default VOSviewer settings, with threshold parameters adjusted to enhance clarity. The resulting maps were analyzed both visually and contextually to identify intellectual clusters, collaboration patterns, and topical evolutions.

4 Findings and discussions

4.1 Document types, volume, and growth trajectory

This section, along with the following four sections (up to 4.5), aims to address the first research objective concerning the performance analysis of the field. Regarding document types, Fig. 2 shows that journal articles comprise the majority at 88.1% (equivalent to 154 publications), followed by conference papers at 6.3% (11 publications), with the remainder being other types.

Regarding document volume and growth trajectory, Fig. 2 illustrates that overall, GBE is a relatively new and significantly growing topic in terms of scientific publications. Over the past 18 years (2005–2023), 176 documents have been published. Since the first work related to GBE was published by Hartmann [30], by 2023, the number of documents has reached its peak in nearly two decades. This indicates that although it is a

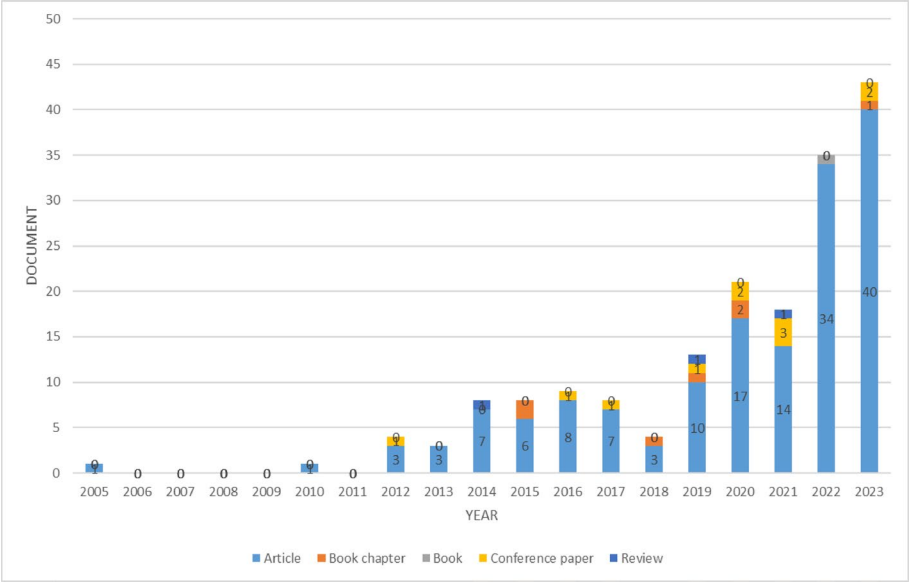

Fig. 2 Growth trajectory and document types of publications on GBE

newly emerging topic, in recent years, particularly in the last five years (2019–2023), it has been receiving increasing attention from scholars.

During the period from 2005 to 2011, GBE remained a nascent topic, with only two publications in 2005 and 2010, and no scientific publications in the intervening years. Thus, in the early years of the twenty-first century, GBE received little significant attention from researchers.

From 2012 to 2018, the number of scientific publications on GBE slightly increased compared to the previous decade, with a total of 44 studies. However, the number of publications per year remained in single digits, ranging from three to nine documents annually. Interest in this topic remained relatively unchanged during this period.

The period from 2019 to 2023 witnessed a rapid increase in publications on GBE. For five years (2019–2023), 130 documents were published, accounting for 74% of the total publications in the past 18 years. The year 2019 marked the first time the number of publications reached a two-digit Fig. (12 documents). Subsequent years saw a significant increase in research output, peaking at 43 publications in 2023.

The increasing interest of scholars in the topic of GBE since 2012 may be linked to the strong development of the sustainable development movement. Sustainability is closely associated with green marketing which is seen as a tool for sustainable development and building strong brand images [10]. In the 2000s, the emergence of the "sustainable development movement" was just beginning, and the initiatives of the United Nations on sustainability issues had hardly been introduced at that time [52]. From the early 2010s, amid concerns about climate change and environmental pollution, a series of United Nations initiatives helped to enhance concerns about sustainable management across various sectors [53–55]. Particularly in 2015, the United Nations introduced 17 Sustainable Development Goals, leading to a rapid increase in sustainability management approaches in the following years [56, 57] including green marketing and green branding.

4.2 Influential authors

Table 2 presents two rankings of the top 10 authors based on publication count and citation impact. The most productive authors are Chen Yu-Shan (National Taipei University, Taiwan), Lin Lialing (Shenzhen University, China), and Nguyen-Viet Bang (University of Economics, Vietnam). Notably, eight out of ten prolific authors are from Asia, including four from China, while only one each represents Europe (Greece) and Oceania (Australia).

In terms of citations, the top three most cited authors are Chen Yu-Shan, Jang Soocheong Shawn (Purdue University, USA), and Namkung Young (Kyung Hee University, South Korea). Again, the majority are based in Asia (six out of ten), a trend further discussed in the analysis of country-level contributions and international collaboration.

While several authors have published multiple papers on GBE, most prolific authors do not appear among the most cited ones, suggesting a weak link between publication volume and citation impact. Interestingly, only one author, Chen Yu-Shan, appears on both lists, suggesting that while many have contributed extensively to GBE publications, few have achieved notable scholarly influence. Chen Yu-Shan, a pioneer in the field, introduced the concept of GBE in 2010 [22], which has since become widely cited and foundational. This author and their collaborators continued publishing GBE research through 2020, helping to shape its theoretical development. The findings from Table 2 highlight a gap between academic output and scholarly recognition in the GBE field.

Table 2 Top 10 most influential authors according to the number of studies and citations

Top productive authors				Top cited authors			
ID	Author	Affiliation	Documents	ID	Author	Affiliation	Citations
1	Chen, Yu-Shan	National Taipei University, Taiwan ROC	7	1	Chen, Yu-Shan	National Taipei University, Taiwan ROC	1,099
2	Nguyen-Viet, Bang	University of Economics, Ho Chi Minh City, Viet Nam	5	2	Jang, Soocheong Shawn	Purdue University, The United States	330
3	Lin, Lialing	Shenzhen University, China	5	3	Namkung, Young	Kyung Hee University, South Korea	309
4	Ha, Minh-Tri	Vietnam National University, Ho Chi Minh City, Viet Nam	4	4	Hartmann, Patrick	Universidad del País, Spain	306
5	Yang, Yi-Chun	Beijing Normal University-Hong Kong Baptist University United, China; City University of Macau, China	4	5	Apaolaza Ibáñez, Vanessa	Universidad del País, Spain	306
6	Leckie, Civilai	Swinburne University of Technology, Australia	3	6	Forcada Sainz, F. Javier	Universidad del País, Spain	232
7	Papista, Erifili	Athens University of Economics and Business, Greece	3	7	Wang, Ying	University of Aeronautics and Astronautics, China	232
8	Sun, Xixiang	Wuhan University of Technology, China	3	8	Yasmeen, Humaira	Nanjing University of Aeronautics and Astronautics, China	232
9	Wang, Hui-Ju	Fo Guang University, Taiwan ROC	3	9	Zameer, Hashim	University of Aeronautics and Astronautics, China	221
10	Zhou, Z	Shenzhen University, China	3	10	Mohd Suki, N	Universiti Malaysia Sabah, Malaysia	213

4.3 Influential documents

Table 3 presents the top 10 most influential GBE studies based on citations from 2005 to 2023. All of these documents are journal articles. The most cited study is conducted by Chen [22]. This result aligns with the findings regarding influential authors. Chen [22] can be regarded as the author who established the conceptual framework and theoretical basis for subsequent GBE studies. The second and third most cited studies are by Hartmann [30] and Zameer [58] respectively.

When comparing Table 2 and Table 3, an interesting finding is that among the top 10 most cited studies, only two are authored by one of the most productive authors. These are the two works by author Chen Yu-Shan. The remaining nine productive authors, despite having a higher number of publications, do not have any studies among the top-most cited ones. However, the majority (7/10) of the most cited studies in Table 2 are conducted by authors with the highest citation counts in Table 3. Notably, three of the most cited studies, [59–61], neither belong to the most cited authors nor the most productive authors. Another noteworthy point in Table 3 is that three studies published in 2020, [58, 61], and [62] are among the most cited studies.

5 Research groups

Figure 3 illustrates a total of 444 authors who have indexed at least one document on GBE in Scopus. Among them, there are only nine solo authors, while 435 authors have co-authors. Correspondingly, 435 of these scholars have formed 121 research groups, with the largest group comprising 12 members.

In terms of time, Fig. 3 depicts that most authors have only published within the past decade. The group led by Chen Yu-Shan (highlighted in blue) although the largest, has

Table 3 Top 10 most influential documents ranked by citations

ID	Authors	Title	Citation	Source title
1	Chen [22]	The drivers of green brand equity: Green brand image, green satisfaction, and green trust	794	Journal of Business Ethics
2	Hartmann et.al. [30]	Green branding effects on attitude: functional versus emotional positioning strategies	306	Marketing Intelligence & Planning
3	Zameer et.al. [58]	Reinforcing green competitive advantage through green production, creativity, and green brand image: Implications for cleaner production in China	232	Journal of Cleaner Production
4	Mohd Suki [63]	Green product purchase intention: impact of green brands, attitude, and knowledge	221	British Food Journal
5	Panda et al. [61]	Social and environmental sustainability model on consumers' altruism, green purchase intention, green brand loyalty and evangelism	198	Journal of Cleaner Production
6	Namkung and Jang [64]	Effects of restaurant green practices on brand equity formation: Do green practices really matter?	194	International Journal of Hospitality Management
7	Kang and Hur [60]	Investigating the Antecedents of Green Brand Equity: A Sustainable Development Perspective	137	Corporate Social Responsibility and Environmental Management
8	Namkung and Jang [65]	Are Consumers Willing to Pay more for Green Practices at Restaurants?	136	Journal of Hospitality and Tourism Research
9	Chen et al. [62]	Greenwash and green purchase behaviour: the mediation of green brand image and green brand loyalty	110	Total Quality Management and Business Excellence
10	Huang et al. [59]	Effects of green brand on green purchase intention	108	Marketing Intelligence and Planning

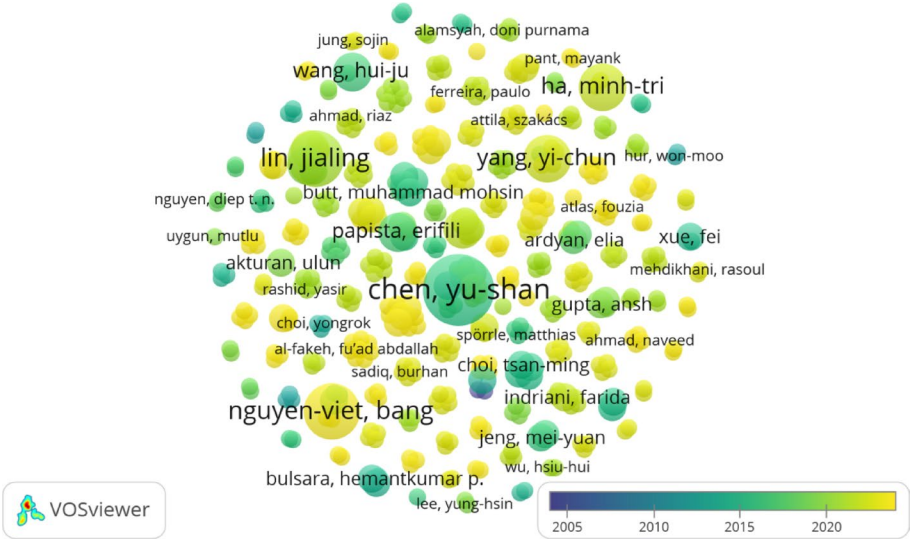

Fig. 3 Research groups in the field of GBE

publications only from the period 2005–2020, with no publications from 2021–2023. However, the group led by Chen Yu-Shan remains central to the topic, indicating their significant influence on other groups, consistent with the findings presented by prominent authors and influential documents. Other highly productive author groups such as Lin L., Nguyen-Viet B., Ha M.T, and Yang Y.C are also emerging groups (highlighted in yellow), with publications within the past three years. The majority of the remaining smaller research groups are also emerging (highlighted in yellow).

The prevalence of newly formed research groups in recent years can be attributed to several factors. Firstly, GBE remains a nascent topic despite its growing urgency and recognition in recent years [28]. Additionally, discussions around sustainable development management approaches, including green branding, have surged notably since the United Nations announced its Sustainable Development Goals in 2015 alongside various initiatives [52].

5.1 Countries and international collaborations

Figure 4 illustrates the geographic distribution of GBE documents across all 50 countries worldwide. Despite GBE appearing to be a widely discussed topic globally, a staggering 48% (equivalent to 24 countries) have only one document, while the remaining 52% of countries have at least two documents or more. This can be attributed to GBE still being in its early stages, emerging just over a decade ago [28].

In Fig. 4, darker shades in Asian countries (especially China) indicate a significantly higher number of documents in this region compared to those in the Americas, Europe, and Africa. Additionally, the number of Asian countries researching GBE surpasses that of other continents. To delve deeper into this phenomenon, we conducted a descriptive analysis of the top 10 countries with the highest number of publications and their respective proportions, as shown in Table 4.

Table 4 presents the top 10 countries with the most research on GBE. Most countries on this list are in Asia. China leads the list with 36 studies (14.4%), followed by Pakistan with 22 documents (9.1%), and Taiwan ROC in third place with 20 documents (8.2%). It's noteworthy that Taiwan ROC, despite being third in terms of quantity, ranks first in

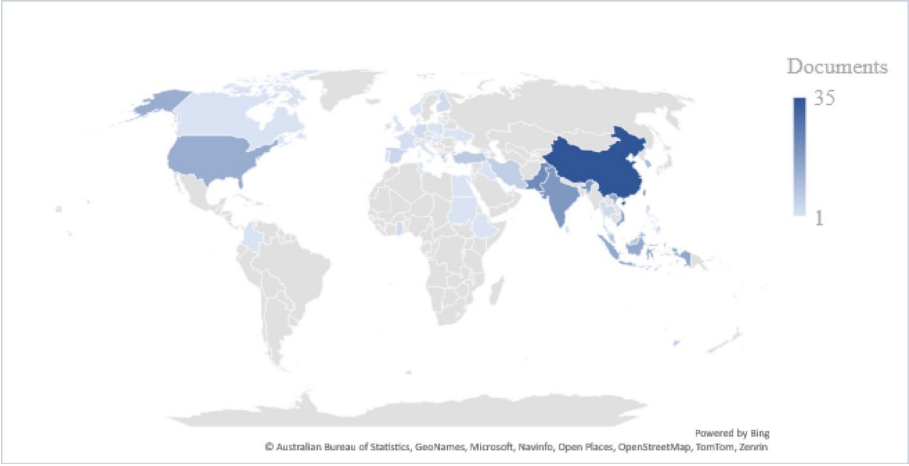

Fig. 4 Geographic distribution of GBE research

Table 4 Number of publications related GBE group by countries

ID	Country	Documents	Percent	Citations
1	China	35	14.4%	710
2	Pakistan	22	9.1%	409
3	Taiwan ROC	20	8.2%	1,397
4	India	19	7.8%	538
5	Vietnam	16	6.6%	150
6	Indonesia	15	6.2%	126
7	The United States	14	5.8%	569
8	South Korea	10	4.1%	563
9	Malaysia	8	3.3%	463
10	Turkey	7	2.9%	361

citations. This can be explained by the fact that Chen Yu-Shan, based in Taiwan ROC, tops both Tables 2 and 3 in terms of the number of studies, and citations, and is also the author of two studies in the top cited documents: [22, 62].

The finding that Asian countries are more interested in GBE topics further reinforces the study results of Górska-Warsewicz et al. [10]. This finding can be explained by the urgent need for green transitions in Asia more than any other continent. Asia is the most populous continent in the world, with some of the fastest-growing economies, accompanied by the most vulnerable status to climate change impacts and numerous serious environmental issues. Hence, there are urgent calls for sustainable business research and responsibility in developing and emerging countries [66]. Recent attention to sustainability is increasingly strong in developing countries [67, 68].

Figure 5 illustrates the collaboration network among 39 countries, each of which has at least one document on GBE. In the map, each node represents a country, and the link strength indicates the total number of co-authors between two countries. China and Taiwan ROC are positioned at the center, connecting other countries. This can be understood as these are the countries with the most documents and the highest citation rates, as shown in Table 4, and Chen Yu-Shan, is also highly cited for laying the foundation for the concept and theory of GBE through research in 2010 [22]. Furthermore, Fig. 5 reveals the most significant collaboration between China and Pakistan (total link strength of 10). Overall, the scale of nodes and links in Fig. 5 indicates that the level of

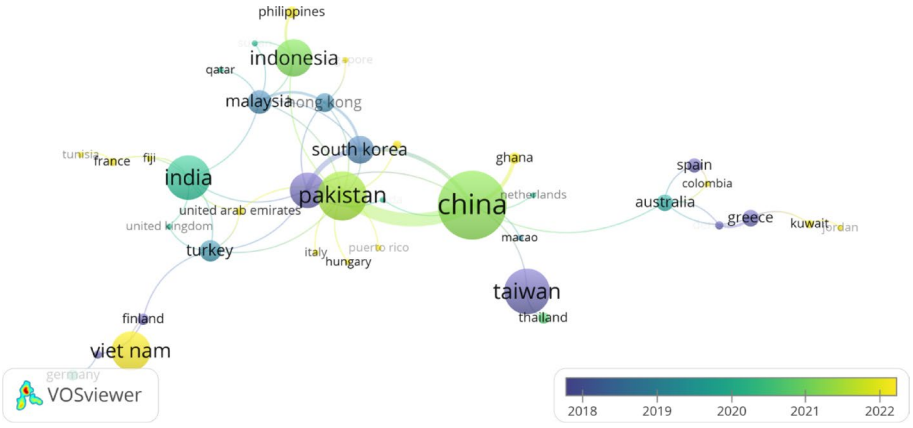

Fig. 5 International collaborations in GBE research

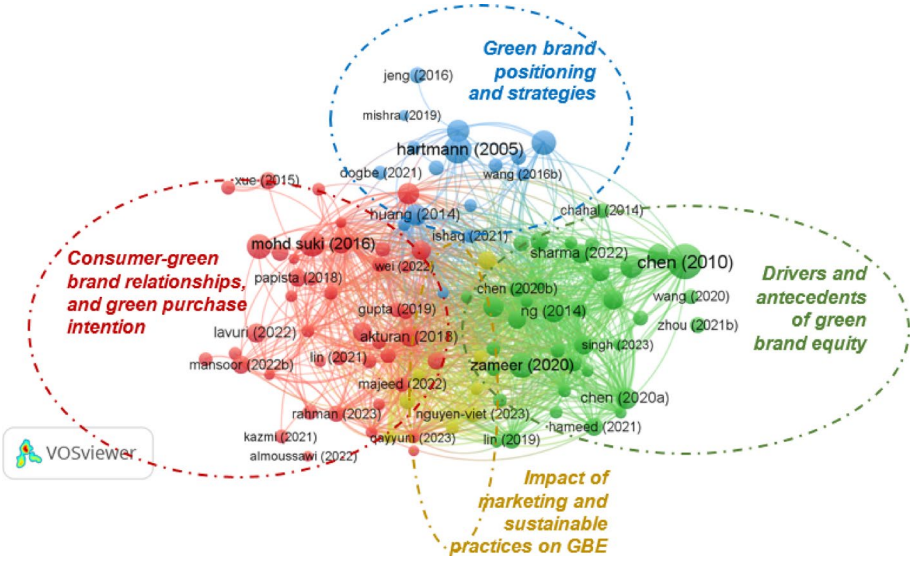

Fig. 6 Bibliographic coupling analysis science mapping for GBE research documents (threshold 6 documents, 106 documents)

collaboration among countries in GBE research is still limited. This is consistent with the findings presented in previous sections, as this is a relatively new topic that has only received scholarly attention for just over a decade.

5.2 Main schools of thought

This section aims to address the second research objective, which is to identify the main schools of thought within the GBE field.

The bibliographic coupling analysis was employed to identify the main themes of GBE research between 2005 and 2023. Using a minimum threshold of six citations per document, we identified four main schools of thought on GBE from a total of 106 qualifying documents, as illustrated in Fig. 6. The content of these themes and the number of documents is presented in Table 5.

The first cluster (in red color) examines consumer-green brand relationships and green purchase intention, comprising a total of 44 documents. This school of thought tends to focus on experimental studies concerning the factors driving consumer purchases of

Table 5 Main schools of thought in the GBE literature

No	Cluster	Number of documents	The most cited documents
1	Consumer-green brand relationships, and green purchase intention	44	[61, 63, 69–71]
2	Drivers and antecedents of GBE	38	[22, 58, 60, 62, 72]
3	Green brand positioning and strategies	16	[30, 59, 64, 65]
4	Impact of marketing and sustainable practices on GBE	8	[9, 31, 34, 73]

green products and enhancing the interactive relationship between customers and green brands. A prominent study in this cluster is [63], which discovered significant impacts of green branding, attitudes, and knowledge on green purchase intention. Akaturan [70] explores the complex relationship between greenwashing, GBE, and purchasing intention. Papista and Dimitriadis [74] are pioneers in examining the relationship between customers and green brands, re-evaluating the benefits of the relationship, quality, and outcomes. Panda et al. [61] propose an environmental sustainability model on consumers' altruism and green purchase intention. Overall, scholars in this school of thought tend to believe that GBE influences consumer trust and often plays a strong role in driving customer intention and purchasing behavior.

The second cluster (in green color) focuses on exploring the drivers and antecedents of GBE, comprising a total of 38 documents. Overall, scholars in this school of thought argue that the nature of GBE is multidimensional, with multiple constituting factors [4]. Figure 6 illustrates that [22] is a seminal study leading this trend, with 794 citations, the highest among all GBE studies. Other authors have also made significant contributions to this research direction, such as [58], emphasizing the importance of green production, creativity, and green brand image for green competitive advantage. Kang and Hur [60] proposed five constructs—green satisfaction, green affect, green trust, and green brand loyalty, and found that positive emotional consumption plays a significant role in establishing GBE and green loyalty for sustainable growth. Overall, in this cluster, many experimental studies have continued to develop the model proposed initially by Chen [22], extending beyond the framework of brand assets by Aaker [14] and Keller [15] in the context of today's fiercely competitive green market.

The third cluster (in blue color) delves into green brand positioning and strategies, comprising a total of 16 documents. For instance, Namkung and Jang [64] and Namkung and Jang [65] explore the impacts of green practices on branding strategies. Jeng and Yeh [75] uncover the influences of consumer values on green brand positioning. Dogbe et al. [76] demonstrate the role of green brand positioning in new product success. Overall, scholars in this trend emphasize the long-term guiding role of brand positioning and strategies in developing consumer-based GBE.

The fourth cluster (in yellow color) tends to focus on the impact of marketing and sustainable practices on GBE. This school of thought has a smaller scale, comprising eight documents. In Fig. 6, compared to other clusters, this cluster does not have any significantly large nodes. Konuk et al. [73] provide recommendations on green marketing by exploring the relationship between green trust, green satisfaction, and GBE. Nguyen-Viet [9] uncovers the impacts of eco-labels and green advertising on GBE. Nguyen-Viet [34] provides a comprehensive assessment of the impacts of all elements of the green marketing mix on GBE. Shanti and Joshi [31] highlight the effects of sustainable practices on GBE. Dinh et al. [35] explore how the green promotion mix drives GBE. Overall,

scholars in this school believe that green marketing and sustainable practices play a crucial role in enhancing the GBE of businesses.

Taken together, these clusters are not isolated but complementary. For instance, the first cluster highlights how green purchase intention serves as the initial stage of consumer–brand interaction, while the second cluster extends this by demonstrating how trust, satisfaction, and affect translate intention into long-term green loyalty. The third cluster emphasizes how positioning and strategies provide a long-term framework that sustains both purchase intention and loyalty, whereas the fourth cluster illustrates the practical role of green marketing and sustainable practices in reinforcing these relationships. Thus, the clusters collectively depict a progression from intention to loyalty, guided by strategic positioning and supported by sustainable practices.

5.3 Topical trends

To identify the topical trends in GBE literature, this study employs a keyword co-occurrence analysis over time. This technique allows us to examine the distribution of keywords across time based on the publication date of documents. Brighter yellow nodes represent topics that are currently gaining attention from scholars in the field, while darker nodes represent topics that were once of interest. Size, color, and position (relationship to other topics) are the most important factors in interpreting this map [52]. Figure 7 presents the results of the analysis for 33 keywords with a minimum occurrence threshold of three times per keyword.

Figure 7 presents a keyword co-occurrence map generated using VOSviewer to visually capture the thematic landscape of GBE literature. A minimum threshold of three keyword occurrences was set to ensure both relevance and clarity, resulting in the display of 33 frequently co-occurring terms. The size of each node represents the frequency of the keyword's occurrence, while the distance and thickness of the connecting lines indicate the strength of co-occurrence relationships. The color gradient, based on average publication year, highlights the temporal evolution of topics, showing, for example, how terms like green brand loyalty and green purchase intentions have gained

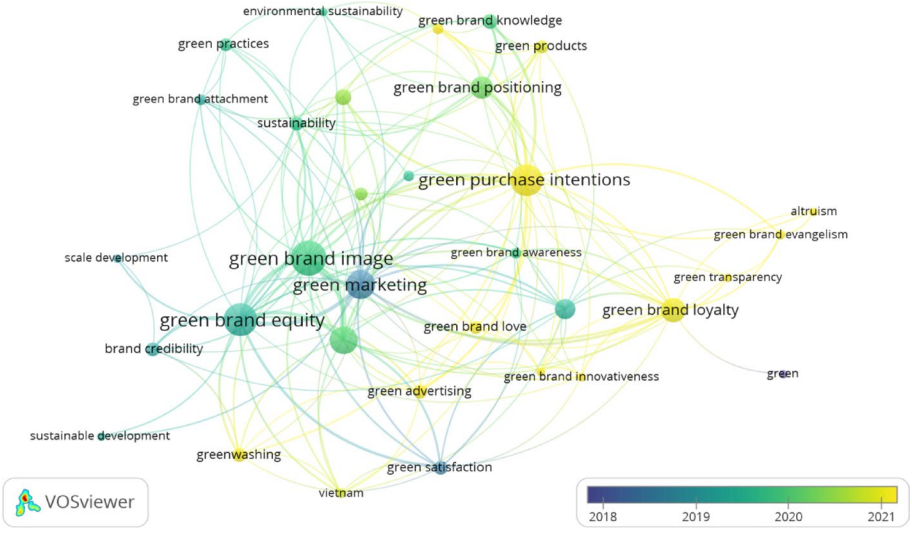

Fig. 7 Co-occurrence of keywords map of the GBE literature (threshold 3 occurrences, display 33 keywords)

prominence more recently (indicated by yellow), while foundational terms such as green brand equity and green brand image emerged earlier.

Figure 7 reveals that green purchase intentions are an emerging trend (yellow), with a high frequency of occurrence (45 occurrences) and significant connections to other keywords (70 total link strength). This finding echoes the discussion of the main schools of thought in GBE literature, where consumer-green brand relationships and green purchase intention form the largest cluster, continuing to attract the attention of many researchers. Key keywords associated with this theme include green brand knowledge, green products, environmental concern, green brand attachment, and green brand attitudes.

This finding contrasts with the observations of [10], who highlight that most studies predominantly focus on the antecedents of GBE, with relatively limited attention given to green product purchasing. These contrasting findings could be attributed to differences in periods, research methods, and data sources. It is plausible that scholars have recently shown a growing interest in green purchase intentions compared to previous periods e.g. [77, 71, 78].

Green purchase intention plays a crucial role as it predicts customer behavior [35], whereas GBE significantly enhances customers' conversion intentions towards purchasing green products [6]. Concerns have been raised that while consumers exhibit positive attitudes towards green brands, they may not necessarily translate into green product purchasing behaviors [79]. Several factors contribute to this attitude-behavior gap, such as inadequate information about green brands, lack of support services, and greenwashing [80, 81]. This gap has urged researchers to actively develop insights into solutions to enhance green product purchase intentions and behaviors [6]. Our findings mirror the growing scholarly interest in GBE-related factors that drive green purchase intentions. It appears that in today's competitive and fast-paced environment, research on green purchase intentions is becoming increasingly important, as it helps bridge the gap between consumer perceptions and behaviors towards green brands, enabling businesses to attract more customers and generate more revenue beyond mere brand preference.

Green brand loyalty is another emerging trend (yellow), with a high frequency of occurrence (21 occurrences) and significant connections to other keywords (38 total link strength). This finding is supported by Górska-Warsewicz [10], which suggests that green brand loyalty is one of the most examined factors in GBE literature. Perhaps green brand loyalty is now emerging as a more independent area of research. Examining the key keywords of this trend, such as green brand evangelism, altruism, and green transparency, can shed light on this phenomenon. In today's competitive green market, with numerous green brands emerging, maintaining green brand loyalty is essential [82]. When customers feel they have received something valuable from a green brand, they may feel a sense of obligation, prompting them to re-engage in a mutually beneficial relationship with the brand and exhibit loyal purchasing behavior, a concept known as the "reciprocity mechanism" [24]. Furthermore, concern for the environment further strengthens consumer loyalty to companies [83]. Loyalty can even ignite brand enthusiasm [84]. Moreover, the prevalence of greenwashing today is eroding consumer trust and loyalty, as consumers are becoming more perceptive and cautious about such practices [85]. Perhaps this is why maintaining green brand loyalty has become a top concern for scholars today.

Table 6 Antecedents, consequences, mediators, and moderators of GBE

Factor type	Variables
Antecedents	Green brand image
	Green satisfaction
	Green trust
	Sustainability marketing
	Stakeholder orientation
	Environmental commitment
	Corporate social responsibility
	Green packaging
	Green advertising
	Eco-labeling
	Green marketing
	Environmental performance
	Green innovation
	Brand leadership
	Social influence
	Sustainability
	Reputation
	Attachment
	Brand Strength
	Fulfillment
Consequences	Brand loyalty
	Willingness to pay premium
	Purchase intention
	Brand preference
	Competitive advantage
	Stronger brand differentiation
	Brand credibility
	Market performance
	Customer engagement
	Word of mouth
	Firm performance
Mediators	Green trust
	Green brand image
	Green satisfaction
	Green perceived value
	Environmental concern
	Sustainability initiatives
	Market performance
	Consumer confusion (negative mediator)
Moderators	Switching cost
	Perceived risk
	Consumer environmental consciousness
	Green skepticism
	Brand familiarity
	Firm innovation capability
	Green personal value
	Attitude toward green brand
	Brand familiarity
	Green brand positioning

5.4 Antecedents, consequences, mediators, and moderators of green brand equity

This section aims to address the third research objective, which is to identify the antecedents, consequences, mediators, and moderators of GBE. The authors conducted a content analysis of GBE studies. Unlike the quantitative findings presented earlier, this section presents the results of qualitative content analysis, intended to complement the quantitative results and provide deeper insights into the topic. Table 6 provides a summary illustration of these findings.

5.5 Antecedents of GBE

Research has identified several key antecedents that shape the development of GBE. Green satisfaction plays a foundational role by positively influencing brand image, trust, and ultimately GBE [86, 87]. Green brand image and green trust, confidence in a brand's environmental claims, directly enhance GBE [22, 86], while green perceived quality also contributes positively [28]. Other cognitive factors include green brand awareness [88] and green perceived value [28].

Marketing-related antecedents such as green marketing mix elements, eco-labels, sustainable packaging, and green advertising, are also shown to strengthen GBE [9, 89], as is green innovation in products and processes [90]. CSR activities, particularly those targeting external stakeholders, have also been found to have a significant and positive effect on building customer-based brand equity [33].

Recent studies highlight the multidimensional nature of GBE, incorporating sustainability, social influence, perceived quality, brand awareness, brand associations, and brand leadership [36]. Among these, social influence and brand credibility are particularly influential through their effects on consumer perceptions and trust [4, 36]. In addition, the literature also indicates several other factors that promote GBE, as presented in Table 6.

5.6 Consequences of GBE

Strong green brand equity yields a range of positive outcomes. Chief among them is enhanced brand loyalty, with high GBE encouraging repeat purchasing and emotional commitment to the brand [87, 88]. Additionally, GBE facilitates positive word-of-mouth, as consumers are more inclined to share favorable opinions about brands perceived as environmentally responsible [25, 92]. On a strategic level, GBE also contributes to improved firm performance, including better market positioning and financial outcomes [92]. Moreover, it increases purchase intention, with consumers more likely to choose green brands when GBE is strong [9].

Expanding on these findings, Ishaq and Di Maria [4] demonstrated that specific GBE dimensions have distinct behavioral consequences: perceived quality and brand leadership significantly predict purchase intention, while sustainability and social influence are more strongly associated with brand preference. These results reinforce the view that different facets of GBE lead to different types of consumer responses, highlighting the need for a nuanced understanding of GBE's multidimensional effects [93].

5.7 Mediators of GBE

Several constructs have been found to mediate the relationship between GBE antecedents and its outcomes. For instance, green brand attachment mediates the impact of green practices on GBE, emphasizing the emotional bonds formed through sustainability initiatives [82]. In addition, green satisfaction and green trust play mediating roles in the relationship between green brand image and GBE, underlining the importance of consumer experience and perceived credibility [22]. Moreover, green brand image itself has been shown to mediate the link between green satisfaction and GBE [22, 86]. At the organizational level, market performance can act as a mediator between brand equity and overall firm success [92].

5.8 Moderators of GBE

Current research has primarily concentrated on moderators related to consumer perceptions and evaluations, such as attitude toward green brands [94], brand familiarity [95], and green trust [96]. Marketing and brand-related factors, including green brand positioning [76, 77], have also received attention.

However, macro-level or organizational capability moderators remain underexplored, particularly cultural values and innovation capability. For instance, although Qureshi et al. [97] examined religious values, a cultural dimension, as a moderator, the findings indicated no significant effect. This outcome underscores the complexity and context-specific nature of cultural values, which warrants further investigation across diverse cultural settings. Similarly, green innovation capability [77] and realized absorptive capacity [76] have only been addressed in a limited number of studies as moderators of the relationship between green market orientation and new product success. Other potential moderators within the knowledge and capability domain, such as green knowledge [98], green awareness [99], and technological capability, remain largely unexplored.

6 Future research directions and implications

6.1 Future research directions

This section aims to address the fourth research objective, which is to identify future research directions for the GBE field.

Firstly, future research on *green brand innovativeness* (GBI) and its relationship with GBE holds significant potential. In Fig. 7, GBI appears as a small bright yellow node, indicating a promising direction that has only recently emerged. Green brand innovativeness refers to a brand's ability to introduce new and sustainable products, services, or processes to address environmental challenges, thereby creating a competitive advantage [100]. Studies have shown that GBI plays a critical role in enhancing customer loyalty, as consumers increasingly value innovation in sustainability when selecting brands [101]. Integrating green innovations into brand offerings elevates customers' perceived value, further strengthening loyalty to green brands [99]. Future research could explore this relationship further, especially through cross-national and cross-industry studies, providing deeper insights into how GBI influences GBE across diverse cultural and market contexts. Additionally, such research could investigate how brands can leverage innovativeness to differentiate themselves in competitive, environmentally-conscious markets. Examining the impact of GBI on green word-of-mouth intentions, particularly among consumers with high green knowledge, would also be a valuable area of focus [102]. These investigations would help expand current understandings of the indirect pathways through which GBI enhances overall GBE.

Secondly, future research on *green transparency* and its relationship with GBE holds substantial potential for advancing sustainable branding strategies. Figure 7 illustrates that this is a newly emerging keyword that has only recently appeared. Green transparency refers to the degree to which brands openly and accurately disclose information about their green attributes, practices, and initiatives, fostering trust and authenticity among consumers [103]. This concept has gained importance as consumers increasingly demand transparency in green claims to reduce skepticism and enhance brand authenticity [104]. Recent studies highlight the critical role of green transparency in building green perceived value, self-brand connection, and brand loyalty, with transparency

acting as a mediator between CSR initiatives and consumer behaviors [105]. Furthermore, transparency in green practices can significantly influence green customer citizenship behavior, encouraging consumers to advocate for and remain loyal to green brands [103]. Exploring these dynamics in greater depth, particularly in digital contexts where transparency intersects with digital service adoption and green product consumption, presents an exciting avenue for research [106]. Future studies could investigate how varying levels of green transparency influence the dimensions of GBE, such as green brand trust, green satisfaction, and green brand loyalty, across diverse cultural and industry contexts. Additionally, longitudinal research examining how green transparency initiatives evolve and their sustained impact on consumer perceptions could provide invaluable insights for both academics and practitioners.

Thirdly, the *impact of artificial intelligence* (AI) on green branding represents a noteworthy direction for future research. The rapid emergence of AI and its influence on brand-building has garnered significant attention from researchers in recent years [107]. However, there appears to be a noticeable gap in the literature when it comes to exploring AI's specific effects on GBE. This presents a valuable opportunity for future investigations to bridge the divide and deepen our understanding of AI's role in fostering green branding initiatives. The integration of AI into green branding offers new opportunities for promoting sustainability. For instance, AI can support green product innovation, enhancing a brand's perceived value and differentiation [108]. In the tourism sector, AI is leveraged to position green destinations and improve GBE through regenerative and sustainable practices [109, 110]. Furthermore, embedding AI with green ideology in corporate strategies has proven instrumental in aligning branding efforts with environmental goals, creating a competitive advantage in sustainability-driven markets [111]. AI applications in green branding and green transparency remain underexplored, particularly in areas such as AI-driven green communication, real-time environmental disclosure, and detecting greenwashing. Future research could examine how AI affects consumer trust, ethical risks in automated green messaging, and the personalization of green brand experiences based on consumer values. These directions offer valuable insights into enhancing both the effectiveness and credibility of green branding through technology.

Fourthly, more attention should be given to exploring the antecedents, consequences, mediators, and moderators of GBE that remain underexamined or overlooked. Regarding antecedents, future studies should investigate factors such as perceived quality, brand identity, product attributes, and strategic green marketing campaigns, particularly across different industry sectors and diverse cultural contexts. While commonly studied antecedents include green brand image, trust, self-identity, and consumer loyalty, several other potential drivers, such as perceived quality, brand identity, product attributes, and targeted marketing campaigns, have received limited attention in the literature [10, 112]. In addition, the influence of cultural and contextual differences on GBE antecedents remains underexplored, as most studies tend to focus on specific regions or sectors [25, 28].

Regarding the consequences of GBE, future research should place greater emphasis on examining its long-term effects on firms' financial performance and competitive advantage, as well as its differentiated impacts across specific sectors such as luxury goods, services, and everyday consumer products. Existing research has primarily emphasized

short-term outcomes such as consumer preference and purchase intention. However, the long-term effects of GBE on firm performance and market success remain insufficiently examined [92, 113, 114]. Moreover, the industry-specific consequences of GBE, such as how it influences luxury brands versus everyday consumer goods, represent another under-researched area [87].

Regarding mediators, future research should further clarify the complex mediation mechanisms by simultaneously testing multiple variables (e.g., brand attachment, word-of-mouth intention, and brand loyalty) to gain deeper insights into how GBE is transformed into consumer behavior. Although some studies have identified mediators like market performance, green trust, and green satisfaction, the complex interplay of multiple mediators in the relationship between GBE and consumer or firm outcomes is not yet fully understood [32, 92]. Behavioral intentions such as word of mouth and brand loyalty have been overlooked as mediating variables linking GBE to consumer actions [91].

Moderating factors such as environmental knowledge, firm innovation capability, religious commitment, and cultural values should be integrated into theoretical models to clarify the conditions under which GBE is most effective. The moderating effects of consumer knowledge and information, especially in the context of greenwashing, are still not well documented [21]. Similarly, while firm innovation capability has been identified as a moderator in some studies, its role across different contexts and industries remains underexplored [92]. Lastly, religious commitment and other cultural factors have rarely been examined as moderators of the relationship between GBE and green consumption behavior, despite their potential influence [115].

Regarding methodology, future research on GBE could benefit from adopting interdisciplinary perspectives that move beyond traditional marketing and branding theories. For example, integrating behavioral economics may help explain consumer decision-making biases and trade-offs between environmental values and price sensitivity, while insights from environmental psychology can shed light on the role of ecological identity, pro-environmental norms, and emotional responses in shaping brand-related outcomes. Additionally, incorporating perspectives from organizational studies (e.g., innovation management, absorptive capacity) and cultural studies could deepen our understanding of how firm capabilities and societal value systems moderate GBE formation across different contexts.

6.2 Implications

This study provides theoretical implications by addressing several gaps in the existing literature on GBE. While previous reviews, such as those by Górska-Warsewicz [10], focused on empirical studies and the primary determinants of GBE, this paper utilizes bibliometric techniques combined with science mapping and descriptive analysis. This integrated approach offers a more comprehensive understanding of the growth trends, geographic distribution, influential authors, and research groups involved in GBE research. International collaboration, especially across continents, remains relatively limited, highlighting opportunities for cross-national and cross-cultural cooperation to bring fresh and unique insights into this emerging topic. The study also contributes to identifying the main schools of thought and topical trends, thereby offering a holistic picture of the state of GBE research. By unveiling the patterns and key influences in this

field, the study sets a foundation for future research, especially in identifying new areas of exploration within the GBE literature, such as the role of innovation, AI, and green transparency in green brand development, or the antecedents, consequences, and mediators, or moderators of GBE that remain underexplored.

From a practical standpoint, the findings of this study offer insights for businesses seeking to enhance their GBE. By analyzing the growth trajectory of GBE research and identifying the most influential authors, documents, and research groups, the study provides managers with a clearer understanding of the evolving trends in consumer preferences for sustainability. Organizations can use these insights to tailor their green initiatives and marketing strategies to meet the increasing consumer demand for environmental responsibility. Furthermore, the study highlights the growing importance of green purchase intentions and green brand loyalty, suggesting that businesses should focus on building strong consumer relationships through sustainable practices to foster brand loyalty and differentiate themselves in the competitive market. By clarifying the growth trends of GBE and the geographical distribution models of studies, organizations can gain a better understanding of the regions where sustainable initiatives are thriving. These insights help businesses target markets that are more receptive to environmentally responsible products and services. Understanding the main schools of thought and research trends in GBE will provide valuable direction for businesses as they seek to innovate green strategies, allowing them to stay ahead of industry changes and meet the increasing expectations of consumers.

7 Conclusions

This study sets out to assess the state of the art of GBE research indexed in Scopus over an 18-year period from 2005 to 2023. By integrating scientific mapping techniques with descriptive analysis, it provides a comprehensive synthesis of the knowledge accumulated in this domain. In addressing the first research question, the findings reveal a steadily increasing trajectory in the number of GBE-related publications, with a noticeable surge in recent years and a peak in 2023. Most of these contributions are in the form of journal articles. The analysis also uncovers the most influential contributors in the field, including the top 10 most productive and most cited authors, and the most impactful documents based on citation scores. Although GBE research groups have begun to form, collaboration among them remains limited. Geographically, most of the research activity is concentrated in Asia, where intra-regional collaboration is evident, but cross-continental cooperation remains minimal.

In response to the second research question, the study identifies four major schools of thought that shape the intellectual landscape of GBE research. These include studies focusing on consumer-green brand relationships and green purchase intention, investigations into the drivers and antecedents of GBE, research on green brand positioning and strategic approaches, and work examining how marketing and sustainability practices influence GBE. Furthermore, two emerging topical trends, green purchase intention and green brand loyalty, have gained increasing attention in recent years, signaling a shift toward consumer-centric and loyalty-based studies in this field.

For the third research question, the study synthesizes the diverse factors that contribute to or result from GBE. It highlights a range of antecedents such as green trust, green satisfaction, and green perceived quality, as well as consequences like brand loyalty and

positive word of mouth. The findings also identify mediating and moderating mechanisms that explain how and under what conditions GBE is formed and strengthened, adding depth to the understanding of its underlying dynamics.

Finally, in addressing the fourth research question, the study proposes several future research directions. These include a call for more qualitative and mixed-method studies to deepen theoretical insights, especially in underexplored contexts such as developing economies. It also suggests exploring constructs that have received limited attention, such as green transparency and perceived green value, and encourages cross-cultural and longitudinal research designs to better capture the evolving nature of green branding practices.

This study has certain limitations. In terms of data, the paper only considers English-language documents indexed on Scopus. Additional exclusion criteria related to subject areas and document types also limited the number of publications reviewed. As a result, relevant and valuable documents in other languages, disciplines, or databases may have been overlooked. While the Scopus database offers several advantages and is widely used in bibliometric research, it may provide less comprehensive coverage of books and conference proceedings. Future studies should consider incorporating additional databases, broadening inclusion criteria, and expanding dataset size to offer more comprehensive insights into this topic. Methodologically, due to the word limit for each paper, some other analysis techniques could not be employed, such as bibliographic coupling analysis for sources and co-authorship analysis for organizations. Finally, while we incorporated content analysis into the paper, particularly by examining the full text of documents to identify the main schools of thought and topical trends, overall, bibliometrics remains a method that leans more heavily on bibliographic indicators. Systematic review approaches based on clearly structured frameworks or theory-driven reviews that require deeper qualitative analysis have not yet been conducted. Future research could use bibliometrics in combination with other methods and more qualitative content analysis to gain a deeper understanding of the GBE research landscape. Taken together, this study may offer the first comprehensive bibliometric mapping of GBE research over nearly two decades, and establishes a clear roadmap that highlights its intellectual foundations, emerging trends, and promising directions for future inquiry.

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Author contributions
Trinh Thi Hang: Conceptualization; Software; Validation; Formal analysis; Investigation. Truong Thi Hue: Resources; Data Curation; Writing—Original Draft; Methodology. Thi Minh Ngoc Luu: Writing—Review & Editing. Xuan Hoa Nghiem: Writing—Review & Editing. Hiep-Hung Pham: Writing—Review & Editing; Supervision. Luong Dinh Hai: Project administration; Visualization.

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Data availability
The datasets analysed during the current study are available in the Dataverse repository, https://doi.org/10.7910/DVN/CWROGM.

Declarations

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Competing interests
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