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Sustainable consumption behavior among university students: trends, influences, and themes

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ABSTRACT

Although the volume of research on sustainable consumption has grown substantially, studies focusing specifically on university students remain fragmented across themes, theoretical approaches, and research contexts, and lack a comprehensive bibliometric synthesis within the higher education domain. This study addresses this gap by employing an integrated bibliometric analysis combined with science mapping techniques to examine the development, intellectual structure, collaboration networks, and thematic evolution of research on sustainable consumption behavior among university students. Data were retrieved from the Scopus database using an author-developed search string, covering the period from 1999 to November 27, 2025. Following manual screening, 166 publications were retained and analyzed using VOSviewer. The results indicate that the field emerged relatively late but has grown rapidly, particularly since 2019, reaching a peak of 26 publications in 2025. The intellectual influence structure of the field is shaped by three main streams: foundational research on sustainable and green consumption, empirical studies on students' perceptions and behavior linked to environmental education, and institution-level research within higher education. Scientific collaboration is unevenly distributed, with the United States leading in publication output and citation impact, while China demonstrates strong collaborative linkages. Overall, the field has evolved into a relatively well-defined and increasingly interdisciplinary research area, with growing relevance for advancing sustainability in higher education.

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1. INTRODUCTION

From the 1992 Rio Earth Summit to the 2002 World Summit on Sustainable Development and the 2030 Agenda, the international community has increasingly recognized sustainable consumption and production as essential conditions for achieving sustainable development, particularly through sustainable development goal 12 (SDG) [1], [2]. In the context of escalating environmental crises, sustainable consumption has thus evolved from a policy priority into a central research topic characterized by its complexity, interdisciplinarity, and systemic nature [3], [4]. Within this trajectory, research on sustainable consumption has primarily focused on individual-level consumption choices and behaviors, particularly among university students. The university period represents a critical stage for the formation and consolidation of values, norms, and behavioral habits, during which environmentally related values and practices may exert long-term influence on future consumption patterns [5]–[8]. Consequently, sustainable

consumption behavior among university students is not only relevant to current environmental outcomes but also holds strategic importance for achieving long-term sustainability goals. From an educational perspective, sustainable consumption is also closely linked to the development of responsible citizens who are capable of recognizing the connections between individual consumption choices and their broader environmental, social, and economic impacts. Therefore, research on sustainable consumption behavior among university students is not only important for understanding a specific form of consumption behavior, but also contributes to clarifying how higher education can support the formation of values, competencies, and civic responsibility oriented toward sustainable development.

Reflecting this role, a substantial body of research has focused on analyzing sustainable consumption behavior among university students across specific domains such as food consumption and food waste [9]–[11], sustainable fashion [12], [13], electronic waste [14], green consumption [7], [15], efficient purchasing [16], and factors influencing sustainable consumption practices [17]–[23]. Over time, many studies have emphasized the role of higher education as a key factor influencing student behavior through curriculum integration [5], [24], [25], learning design and educational interventions aimed at promoting behavioral change [26], [27], as well as institutional structures and governance mechanisms that create enabling environments for sustainable consumption practices [17], [28]–[30]. These approaches suggest that sustainable consumption behavior among students is not only the result of individual-level factors, but is also significantly shaped by the educational and institutional environments in which they are embedded.

The rapid development of research on sustainable consumption behavior among university students has led to fragmentation across research themes, methodologies, and theoretical frameworks. Existing reviews tend to focus on specific domains and fail to provide a comprehensive overview of the field's developmental trajectory, the structure of scholarly influence, as well as the formation and evolution of collaboration networks and research themes. Within the education-oriented stream, João and Silva [31] classify major themes related to teaching and learning processes in higher education to identify underexplored areas in sustainable consumption education, while Sahakian and Seyfang [32] review pedagogical approaches to sustainable consumption linked to learning competencies and discuss interdisciplinary perspectives. Within the consumer-oriented stream, previous studies [33], [34] focus on responsible consumption and purchasing behavior among Generation Z, whereas Haba *et al*. [35] examine green consumers in the context of management and marketing. Topic-specific reviews also tend to concentrate on particular consumption contexts such as food waste [36] or social media marketing and consumer engagement in sustainable consumption [37]. In addition, large-scale bibliometric studies on sustainable or green consumption generally adopt a broad perspective [38]–[43].

Accordingly, the central scientific problem addressed in this study is the lack of an integrated bibliometric synthesis capable of systematically capturing the development trajectory, intellectual structure, collaboration patterns, and thematic evolution of research on sustainable consumption behavior among university students within the higher education context. To address this gap, the present study employs an integrated bibliometric analysis combined with science mapping techniques to examine the development, intellectual structure, collaboration networks, and thematic evolution of research on sustainable consumption behavior among university students, based on Scopus data. Despite the growing body of research, existing studies remain fragmented across domains and analytical approaches, limiting a holistic understanding of the field. The novelty of this study lies in its integrated and systematic approach to examining research on sustainable consumption behavior among university students within the higher education context. First, unlike existing reviews that tend to focus on specific domains or adopt either narrative or bibliometric approaches separately, this study combines bibliometric analysis with science mapping techniques to simultaneously analyze publication trends, intellectual structure, collaboration networks, and thematic evolution. Second, the study provides a focused synthesis of research specifically targeting university students, a group that has been widely studied but remains fragmented across disciplines and contexts. Third, by linking multiple dimensions of analysis within a single framework, this study offers a more comprehensive and structured understanding of the field. Based on this foundation, the paper addresses the following research questions:

- How have international publication trends in research on sustainable consumption behavior among university students evolved over time? (RQ1)
- Which publications in the dataset demonstrate the highest citation impact? (RQ2)
- Based on scientific collaboration networks, which authors and countries play leading roles in research on sustainable consumption behavior among university students? (RQ3)
- What are the core research themes in studies of sustainable consumption behavior among university students, and how has the thematic structure of the field evolved over time? (RQ4)

This study contributes to the literature on sustainable consumption behavior among university students in four main ways. First, it provides a systematic quantitative overview of the temporal development of the field based on Scopus data, thereby clarifying its growth trajectory and key developmental phases. Second, it identifies the citation impact of publications within the dataset, enabling the recognition of influential works. Third, by mapping scientific collaboration at both the author and country levels, the study offers evidence on the network structure and leading actors within the field. Fourth, through keyword co-occurrence analysis combined with network and overlay visualization, the study identifies core themes, thematic clusters, and their evolution over time, thereby providing an empirical foundation for identifying emerging research trends and priority gaps for future research.

2. METHOD

2.1. Research design and procedure

This study employs a bibliometric design combined with science mapping to systematically analyze research on sustainable consumption behavior among university students. Specifically, data were retrieved from the Scopus database and screened based on predefined criteria to identify relevant publications. The selected dataset was then analyzed using VOSviewer through citation, co-citation, co-authorship, and keyword co-occurrence analyses. This approach enables the identification of publication trends, influential works, collaboration structures, and the thematic evolution of the field.

The research process was implemented in three main stages. First, a search query was developed and data were retrieved from the Scopus database. Second, the retrieved documents were screened and assessed for relevance based on predefined selection criteria. Third, bibliometric network analyses were conducted using VOSviewer.

2.2. Search strategy and data collection

The central focus of this study is sustainable consumption behavior among university students. Through an initial review of related publications, the authors identified the concepts “sustainable consumption”, “sustainable consumption behavior/behaviour”, “green consumer behavior/behaviour”, and “environmentally responsible consumption” as terms that directly reflect research on sustainable consumption behavior. To ensure an appropriate focus on the target population, the search query was designed to restrict the scope to students within higher education contexts. Based on this rationale, the following search query was constructed and applied in the Scopus database: (TITLE-ABS-KEY (“sustainable consumption” OR “sustainable consumption behavior” OR “sustainable consumption behaviour” OR “green consumer behavior” OR “green consumer behaviour” OR “environmentally responsible consumption”) AND TITLE-ABS-KEY (“university students” OR “college students” OR “higher education students” OR “students in higher education” OR “higher education”)).

The search was conducted across the title, abstract, and author keywords fields in Scopus. At the time of data retrieval, no restrictions were imposed regarding publication year, language, or document type. Consequently, all document types indexed by Scopus, including journal articles, conference papers, book chapters, books, review articles, and other relevant documents, were included in the initial retrieval results. Scopus was selected as the data source because it is a highly reliable abstract and citation database for peer-reviewed literature and provides broad coverage of disciplines directly related to the research topic.

2.3. Document screening and eligibility assessment

As of November 27, 2025, the initial data retrieval yielded 181 documents, including journal articles, conference papers, book chapters, editorials, conference reviews, and books. To ensure that the documents included in the analysis were closely aligned with the research objectives, a manual screening process was conducted by reviewing the titles and abstracts of all retrieved documents. The screening was carried out in pairs, and in cases requiring further discussion, all members of the research team jointly reviewed and discussed the documents to reach a final consensus.

Documents were included in the analysis if they simultaneously met the following criteria: a focus on sustainable consumption behavior, intentions, or practices; university students as the study population within a higher education context; and direct relevance to sustainable consumption or to variables explaining students’ sustainable consumption behavior. Documents were excluded if they failed to meet at least one of these criteria. After the screening process, 15 documents were excluded due to irrelevance to the research scope, and the remaining 166 publications were retained for the final analytical dataset. The process of data retrieval, screening, and eligibility assessment is summarized in Figure 1.

The composition of the 166 publications retained after the screening process is summarized in Table 1. The table provides an overview of the distribution of document types within the final dataset. This distribution reflects the predominance of journal articles in the dataset.

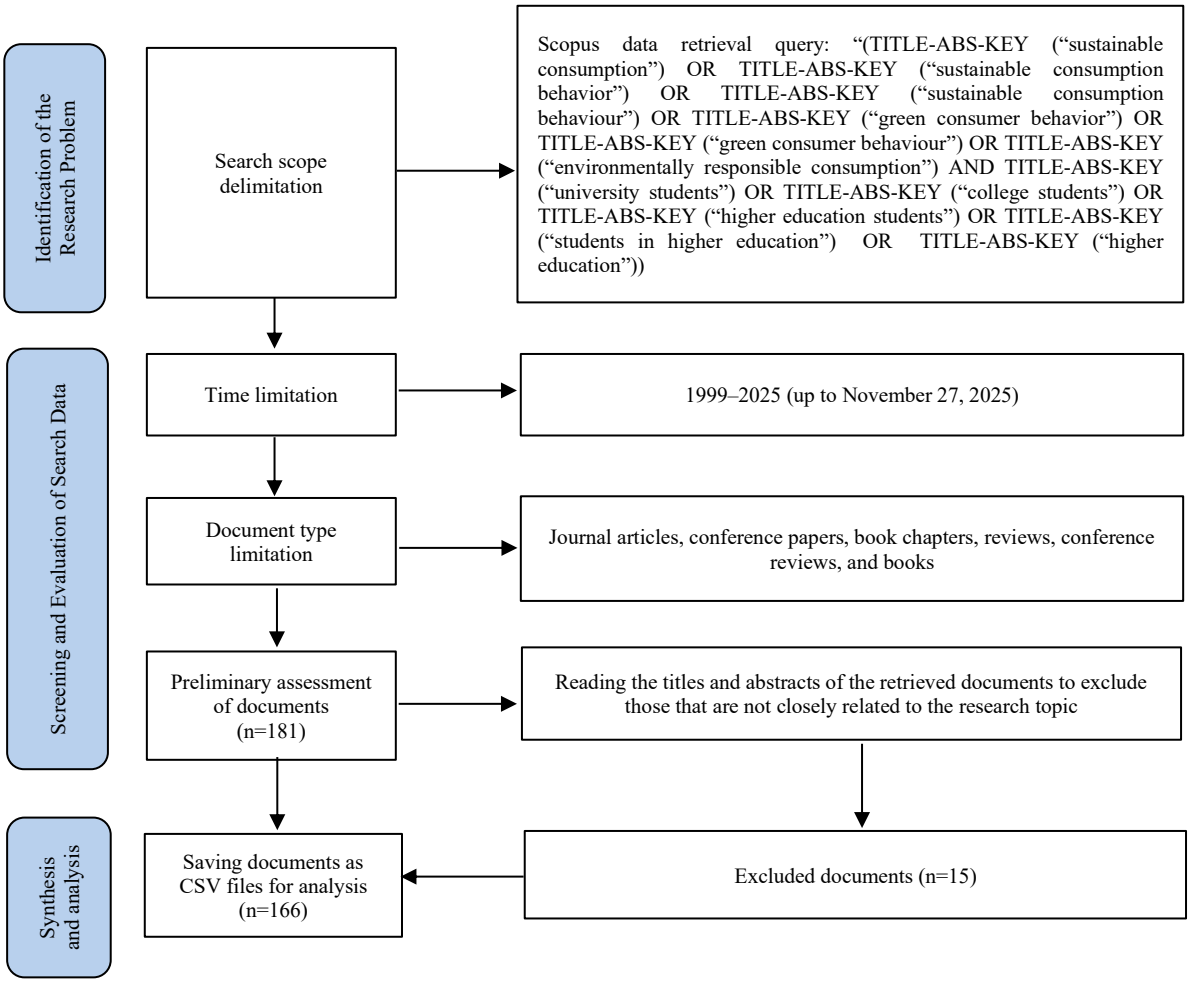


Figure 1. Research process

Table 1. Distribution of the 166 screened publications (n=166)

Document type	Number
Article	131
Conference paper	16
Book chapter	12
Review	3
Conference review	2
Book	2

2.4. Data preparation and analysis using VOSviewer

The dataset consisting of 166 publications was exported directly from Scopus in a format compatible with VOSviewer. The exported records ensured the inclusion of the following information fields: authors, affiliations or organizations, countries, author keywords, year of publication, and citation information. These fields are consistent with the requirements of the "create a map based on bibliographic data" function in VOSviewer. Bibliometric analysis and science mapping were conducted using VOSviewer, with analytical techniques aligned with the research objectives. Specifically, the study employed citation analysis to identify publications with high academic impact within the dataset; co-citation analysis of referenced documents to reveal the intellectual foundation of the field; co-authorship analysis at both author and country levels to clarify the structure of scientific collaboration; and co-occurrence analysis based on author keywords to identify core themes, thematic clusters, and their temporal evolution. The results were visualized using network, overlay, and density maps, which facilitate the depiction of structural relationships, temporal trends, and the degree of thematic concentration within the research field.

3. RESULTS

3.1. Publication trends and growth characteristics of the research field

Figure 2 visualizes the growth trajectory of research on sustainable consumption in higher education from 1999 to November 27, 2025. The figure illustrates the temporal distribution of publications, highlighting changes in research intensity across different periods. It also provides a visual basis for identifying key phases in the development of the field, particularly the transition from early emergence to rapid expansion.

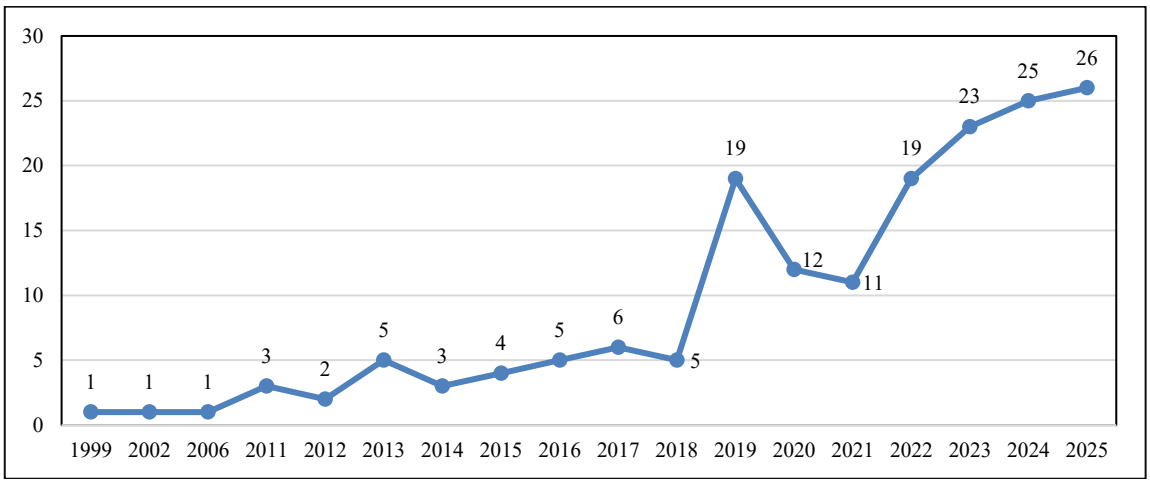


Figure 2. Growth of published scientific studies (1999–2025)

According to Scopus data retrieved using our search query, the period from 1999 to 2012 marks the emergence of the earliest studies related to sustainable consumption in higher education. During this phase, the number of published studies was very limited and generally remained at a low level. Notably, no publications were recorded in the years 2000, 2001, 2003 to 2005, and 2007 to 2010. This pattern indicates that, despite the formal introduction of the concept of sustainable development in 1987, sustainable consumption in higher education had not yet attracted widespread scholarly attention at that time. In the subsequent period from 2013 to 2018, global academic interest in sustainable consumption within higher education began to increase modestly. This was followed by a sharp and sustained growth from 2019 onwards, with a substantial rise in the number of published studies, reaching a peak of 26 publications in 2025 (as of November 27, 2025). This rapid expansion can be partly explained by the United Nations' adoption of the 17 SDGs, particularly SDG 12 on responsible consumption and production, which has stimulated research interest in promoting sustainable, green, and environmentally responsible consumption among individuals, the private sector, and the public sector across national economies. This finding is consistent with previous bibliometric studies, which report a marked increase in sustainability-related research following the adoption of the SDGs [38], [42]. Similarly, Liu *et al*. [39] report a significant increase in sustainable consumption research over time, reflecting the growing academic attention to this field.

3.2. Academic influence and highly cited studies

The citation impact analysis of the dataset indicates that the 10 most highly cited studies represent the key sources of academic influence in research on sustainable consumption behavior among university students during the period from 1999 to 2023, as shown in Table 2. These studies are identified based on citation counts and reflect major research streams that have been widely used by the scholarly community as theoretical foundations, empirical references, or analytical frameworks in subsequent research. Together, these studies provide an overview of the intellectual foundation of the field.

The study with the highest citation impact is the work by Straughan and Roberts [44], which has received more than 1,000 citations. This article is the earliest publication within the top 10 and functions as a foundational study in research on green consumer behavior. It has been widely cited due to its significant conceptual contributions, particularly its proposal of consumer segmentation criteria, including university students, based on psychological factors and the concept of perceived consumer effectiveness (PCE). The exceptionally high citation count reflects its role as a core reference for numerous subsequent empirical studies on sustainable consumption. Ranked second in terms of citation impact is the study by

Zsóka *et al*. [45], with more than 700 citations. This work is highly relevant to the focus of the field, as it directly examines secondary school pupils and university students. The article has been frequently cited in studies addressing the relationships among environmental education, knowledge, attitudes, and sustainable consumption behavior, and it is regarded as one of the most representative empirical studies among the highly cited literature in the dataset. The group of studies ranked from third to fifth in citation counts includes the works of Ramos *et al*. [46], Adomßent *et al*. [25], and Barth *et al*. [5], all published in the Journal of Cleaner Production. These articles share a common focus on sustainable consumption behavior within the context of higher education and sustainable development, with an emphasis on institutional and organizational levels. The high citation counts of these studies indicate the substantial role of higher education for sustainable development research in shaping the academic influence structure of the field.

Table 2. Statistics of the top 10 most highly cited studies

Rank	Author(s)	Title	Year of publication	Journal	Citations
1	Straughan and Roberts [44]	Environmental segmentation alternatives: a look at green consumer behavior in the new millennium	1999	Journal of Consumer Marketing	1,008
2	Zsóka *et al*. [45]	Greening due to environmental education? Environmental knowledge, attitudes, consumer behavior and everyday pro-environmental activities of Hungarian high school and university students	2013	Journal of Cleaner Production	715
3	Ramos *et al*. [46]	Experiences from the implementation of sustainable development in higher education institutions: environmental management for sustainable universities	2015	Journal of Cleaner Production	239
4	Adomßent *et al*. [25]	Emerging areas in research on higher education for sustainable development - Management education, sustainable consumption and perspectives from Central and Eastern Europe	2014	Journal of Cleaner Production	185
5	Barth *et al*. [5]	Learning to change universities from within: a service-learning perspective on promoting sustainable consumption in higher education	2014	Journal of Cleaner Production	145
6	Ahamad and Ariffin [47]	Assessment of knowledge, attitude and practice towards sustainable *consumption* among university students in Selangor, Malaysia	2018	Sustainable Production and Consumption	113
7	Su *et al*. [48]	Sustainable clothing: perspectives from US and Chinese young Millennials	2019	International Journal of Retail and Distribution Management	101
8	Chang and Watchravesringkan [49]	Who are sustainably minded apparel shoppers? An investigation to the influencing factors of sustainable apparel consumption	2018	International Journal of Retail and Distribution Management	99
9	Pacheco-Blanco and Bastante-Ceca [29]	Green public procurement as an initiative for sustainable consumption. An exploratory study of Spanish public universities	2016	Journal of Cleaner Production	99
10	Zeng *et al*. [50]	Can environmental knowledge and risk perception make a difference? The role of environmental concern and pro-environmental behavior in fostering sustainable consumption behavior	2023	Sustainability (Switzerland)	96

Subsequent studies with relatively high citation impact include Ahamad and Ariffin [47], Su *et al*. [48], and Chang and Watchravesringkan [49]. This group of articles reflects the expansion of research on students' sustainable consumption behavior into specific consumption contexts and domains, particularly sustainable apparel consumption, as well as the application of widely used behavioral frameworks such as the knowledge attitude practice model and the theory of planned behavior. Although their citation counts are lower than those of foundational studies, these articles remain among the highly cited works within the dataset. In addition, the study by Pacheco-Blanco and Bastante-Ceca [29] is also included among the top 10 most highly cited publications. Although it does not directly measure students' sustainable consumption behavior at the individual level, the article demonstrates considerable citation impact due to its policy- and governance-oriented approach to sustainable consumption within higher education, highlighting the presence of institution-level studies among the most influential literature. Finally, the work by Zeng *et al*. [50] ranks tenth in terms of citation counts and represents a group of emerging studies in the field.

Despite its recent publication and the limited time available for citation accumulation, this article has achieved a relatively high citation count within the dataset, reflecting the growing scholarly interest in topics related to environmental risk perception and students' sustainable consumption behavior.

Overall, the synthesis of the RQ2 analysis indicates that the most highly cited articles in the dataset primarily fall into three categories: foundational studies on green and sustainable consumption behavior; empirical studies focusing on students and environmental education; and studies that approach sustainable consumption within higher education from an institutional perspective. This pattern is broadly consistent with prior studies that describe sustainable consumption research as a multidisciplinary and thematically diverse field [35], [40]. These findings reflect an academic influence structure shaped by the integration of foundational theoretical contributions, empirical evidence, and contextualized research within higher education. This structure highlights the multidimensional nature of knowledge development in the field.

3.3. Research roles and collaboration networks

3.3.1. Research roles and collaboration networks among countries

Top countries by productivity and citation impact: in this study, the role of countries in the field of research on sustainable consumption behavior among university students is examined through national-level bibliometric indicators, including total publications (TP), total citations (TC), citations per publication (CPP), and citations per year (CPY). These indicators reflect both the scale and the academic influence of each country's research output, while also providing a foundational context for analyzing patterns of international research collaboration at the network level. Together, these indicators enable a balanced assessment of both productivity and impact across countries.

The results indicate that this research field involves contributions from 53 countries; however, the level of participation is unevenly distributed. The top 10 most productive countries (with a threshold of TP≥7) collectively contributed 124 publications, accounting for approximately 75% of the total output in the dataset during the period 1999–2025, whereas the remaining 42 countries accounted for only about 25%. This finding highlights a clear concentration of research productivity within a relatively small group of core countries. According to Table 3, the United States emerges as the most prominent country in terms of both research productivity and citation impact. With TP=26 (representing 15.66% of TP) and TC=1,976. In addition, the United States records a CPP of 76.00, indicating a high average citation impact of its published studies. These results confirm the leading position of the United States in terms of both research scale and academic influence in the field of sustainable consumption behavior among university students. This dominance is consistent with broader bibliometric findings in sustainability research [39]. However, prior studies also indicate that leading countries may vary depending on the dataset and analytical scope, with different countries emerging as dominant contributors across specific domains [51].

The next group of countries includes China, Spain, and the United Kingdom. China and Spain each contributed 14 publications, while the United Kingdom produced 12 publications. In terms of citation performance, China achieved a CPP of 30.14, which is higher than that of Spain (CPP=26.42), suggesting differences in academic impact among countries with comparable levels of research output. The United Kingdom recorded a CPP of 37.25, reflecting a relatively higher average citation impact than the other two countries in this group. Beyond these leading countries, several others also demonstrate notable citation performance despite moderate publication output. Hungary, with TP=9, achieved the highest CPP (86.88) among the top 10 productive countries, indicating a very strong average citation impact per publication. Similarly, Malaysia (CPP=35.77) and Portugal (CPP=37.85) also demonstrate relatively high citation performance in relation to their publication output.

Table 3. Statistics of the top 10 countries with the highest number of publications, citations, and academic impact

Rank	Country	TP	TC	TP (%)	CPP	CPY
1	United States	26	1,976	15.66	76.00	63.74 (1999–2025)
2	China	14	422	8.43	30.14	30.14 (2012–2025)
3	Spain	14	370	8.43	26.42	28.46 (2013–2025)
4	United Kingdom	12	447	7.23	37.25	18.62 (2002–2025)
5	Pakistan	10	223	6.02	22.30	44.60 (2021–2025)
6	Malaysia	9	322	5.42	35.77	32.20 (2016–2024)
7	Hungary	9	782	5.42	86.88	51.13 (2011–2025)
8	Italy	8	172	4.81	21.50	13.23 (2013–2025)
9	Thailand	8	82	4.81	10.25	5.47 (2011–2025)
10	Portugal	7	265	4.22	37.85	24.09 (2015–2025)

With respect to the CPY indicator, several countries exhibit a notable rate of citation accumulation in recent years, including Hungary, Pakistan, and Malaysia. Although the number of publications from these countries ranges from only 9 to 10 articles, their relatively high CPY values suggest that recent studies from these countries are attracting considerable attention from the international academic community. Nevertheless, it should be noted that CPY is influenced by publication timing and the active "time window" of each country within the dataset; therefore, it is used only as a supplementary indicator when comparing citation performance. Among the remaining countries, Italy, Thailand, and Portugal show a moderate level of research productivity (with TP ranging from 7 to 8). Within this group, Thailand records a CPP of 10.25 and a CPY of 5.47, which are lower than the average levels observed among the top 10 countries. This finding indicates a relatively limited citation impact despite a non-negligible publication output. Overall, these results reveal substantial cross-country differences, not only in research productivity but also in the academic influence of publications within this research field.

Country co-authorship network and collaboration leadership: to examine the role of countries in the international scientific collaboration network, this study employs country-level co-authorship analysis using VOSviewer. The network is constructed with a minimum threshold of one document per country, covering all 53 countries in the dataset. In this analysis, each node represents a country, links indicate co-authorship relationships between countries, and total link strength (TLS) reflects the overall intensity of a country's collaborative ties with other countries in the network. Figure 3 presents the network visualization map of the country collaboration network. The figure shows a highly connected structure with several countries occupying central positions. This pattern indicates the presence of strong international collaboration linkages within the field.

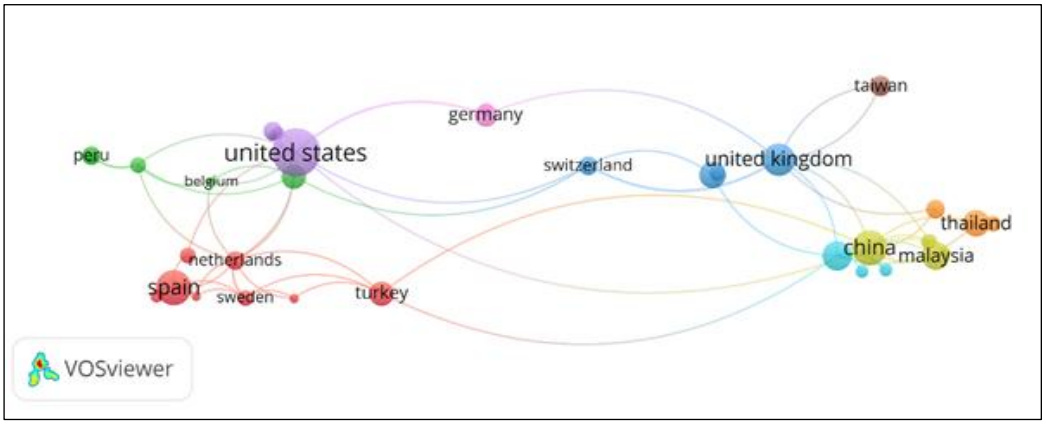


Figure 3. Network visualization of the country co-authorship network in sustainable consumption research in higher education (minimum documents per country≥1)

Within this collaboration network, the United States plays a prominent role, with 26 publications, 1,976 citations, and a TLS of 13, indicating a high level of connectivity with multiple countries. The central position of the United States reflects its multidirectional bridging role among research clusters in North America, Europe, and Asia. Its collaborative ties extend widely across several European countries such as the United Kingdom, Germany, the Netherlands, and Switzerland, as well as Asian countries, demonstrating a high degree of embeddedness in the international collaboration network. China also exhibits a strong collaborative role, with 14 publications, 422 citations, and a TLS of 16, which is the highest value in the network. A high TLS indicates that China not only participates in a large number of collaborative studies but also maintains strong and sustained linkages with multiple partner countries. On the network map, China shows pronounced connections with Malaysia, Thailand, Taiwan, the United Kingdom, and the United States, highlighting its role as a key connector between Asian research groups and major research hubs in Europe and North America. Within Europe, the United Kingdom occupies a central position, with 12 publications, 447 citations, and a TLS of 10, reflecting a high level of connectivity with both the United States and several Asian countries. The Netherlands, with a TLS of 10, also stands out as an important connecting node in the network, despite a relatively modest number of publications. In contrast, Germany and Italy exhibit moderate TLS values of 4, indicating stable participation in international collaboration but without assuming a primary central role.

Overall, the country collaboration network indicates that collaboration leadership is not solely determined by publication volume or citation counts, but is also strongly influenced by a country's centrality and link intensity within the network. The United States and China emerge as the two most clearly central countries, while several European countries, particularly the United Kingdom and the Netherlands, play strategic bridging roles between regional research clusters. This pattern reflects the importance of network connectivity in shaping collaborative influence within the field.

Temporal evolution of country collaboration (overlay visualization): Figure 4 presents the overlay visualization of the country collaboration network. The color of each node represents the average publication year (APY) of the associated publications. This visualization highlights the temporal evolution of national participation in the research field.

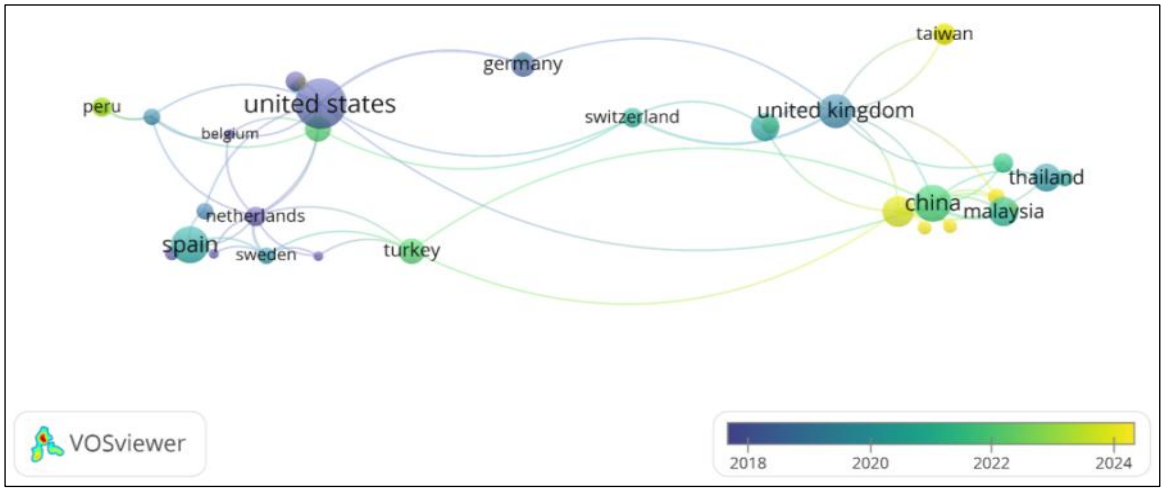


Figure 4. Overlay visualization of the country co-authorship network in sustainable consumption research in higher education (minimum documents per country≥1)

The results indicate that the United States appears in purplish tones, reflecting an earlier APY compared to many other countries. This suggests that the United States was among the earliest contributors and has maintained a continuous presence throughout the development of the field. Similarly, several European countries, such as the Netherlands, Sweden, and Spain, also exhibit purplish hues, indicating their early contributions to the research network. Countries displayed in darker green tones, including the United Kingdom, Germany, Switzerland, and Italy, represent stable participation across multiple phases. These countries have intermediate APY values, suggesting a sustained role in collaboration and consistent engagement in the field's development, while maintaining durable connections with leading countries. In contrast, China is represented by a distinctly green coloration, reflecting a later APY and a marked increase in publications in recent years. Other Asian countries, such as Malaysia, Thailand, and Taiwan, display similar color patterns, indicating the rapid expansion of research on sustainable consumption in higher education in this region during the more recent period.

The overlay visualization further reveals that the United States and the United Kingdom serve as cross-temporal connectors, with collaborative links spanning from early-contributing countries to emerging ones. Several countries, including Portugal and Turkey, exhibit intermediate APY values and occupy bridging positions between clusters, reflecting a supportive collaborative role within the network. Bright yellow nodes correspond to emerging countries, including Pakistan, Taiwan, the Czech Republic, and the United Arab Emirates. Although these countries appear later in the timeline, they demonstrate increasing network density, indicating the rapid growth of sustainable consumption research in higher education across Asia and the Middle East. This group represents the current and future growth momentum of the field.

Overall, the overlay analysis highlights a clear temporal shift in the country collaboration network of research on sustainable consumption behavior in higher education. While the United States and several European countries have maintained central roles throughout the entire period, Asian countries, particularly China, have emerged strongly in recent years, reflecting the geographical expansion and new developmental dynamics of the field. This result is broadly consistent with previous bibliometric studies, which suggest that collaboration patterns and research linkages contribute to the development of sustainability research [40], [51].

3.3.2. Research leadership based on scientific collaboration networks

To identify authors who play a leading role in research on sustainable consumption behavior among university students based on scientific collaboration networks (RQ3), this study conducts a co-authorship analysis using VOSviewer. The unit of analysis is authors, with a minimum threshold of one publication and one citation per author. TLS is employed as the primary indicator to reflect the extent of each author's collaborative connections within the network, as shown in Figure 5.

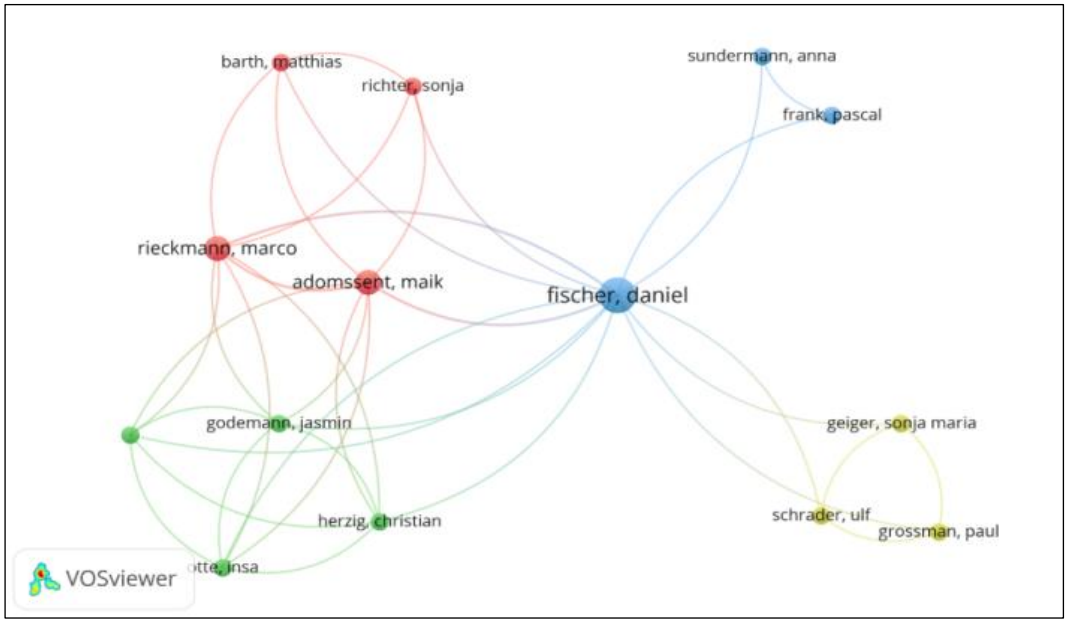


Figure 5. Co-authorship network in sustainable consumption research in higher education (minimum 1 document per author)

According to the results, the co-authorship network consists of 14 authors (14 items) and is divided by VOSviewer into four clusters. These clusters are formed based on the strength of co-authorship links, reflecting groups of researchers with relatively close collaborative relationships within this research field. Based on the VOSviewer indicators table (documents, citations, and TLS) and the co-authorship network visualization, Daniel Fischer emerges as the most prominent central author in the entire network, with a TLS of 15, four published documents, and 431 citations. In the network map, Fischer appears as a central node with multiple outward connections, directly linking authors across different clusters, which indicates a clear coordinating role in collaborative research activities.

In the subsequent tier, Adomßent and Rieckmann both record a TLS of 10, with two publications and 330 citations each. These authors belong to cluster 1 and form the core of this cluster, maintaining strong collaborative ties with one another as well as with other authors within the same group. In cluster 2, the authors Godemann; Jasmin; Herzig, Christian; Otte, Insa; and Timm, Jana Michaela each receive 185 citations and have a TLS of 6, reflecting a relatively balanced level of intra-cluster collaboration, with no single author clearly dominating the cluster in terms of link strength. Sonja Richter, also in cluster 1, records 145 citations and a TLS of 4, indicating a moderate level of collaborative involvement within the network. In addition, Watchravesringkan, Kittichai (Tu), who does not appear within the 14-author network visualized, has two publications, 200 citations, and a TLS of 4, suggesting a more limited level of collaborative integration compared to the central authors.

3.4. Thematic structure and major research streams

3.4.1. Core themes in research on sustainable consumption behavior of university students

To identify the core themes in research on sustainable consumption behavior among university students, this study conducts a keyword co-occurrence analysis using VOSviewer. The core themes of research on sustainable consumption behavior of university students are illustrated in Figure 6. This analysis provides a structured overview of the main thematic areas within the field.

The analysis was conducted on a dataset comprising 63 keywords that met the minimum occurrence threshold. The clustering results indicate that the knowledge structure of the field is organized into four major thematic clusters, reflecting distinct yet closely interconnected research approaches and focal areas. These clusters provide a systematic basis for understanding the thematic organization of the research field.

Cluster 1 (red, 23 keywords) focuses on sustainable consumption and the socio environmental context. This is the largest cluster and represents the foundational theme of the research field. The central keywords include sustainable consumption, sustainable consumption behavior, sustainability, and SDG, which exhibit the highest frequencies and TLS across the entire network. This cluster encompasses concepts related to environmental and social contexts such as climate change, environment, environmental impact, environmental awareness, ecology, food, food waste, and consumption. In addition, cluster 1 is closely associated with keywords reflecting research subjects and methods, including students, higher education student, university students, surveys, and public attitude. The co-occurrence of these keywords indicates that most studies approach sustainable consumption among university students as a phenomenon embedded in global environmental challenges, commonly measured through surveys of awareness, attitudes, and behaviors within the higher education context. This cluster plays a central role in the network, connecting with all other clusters.

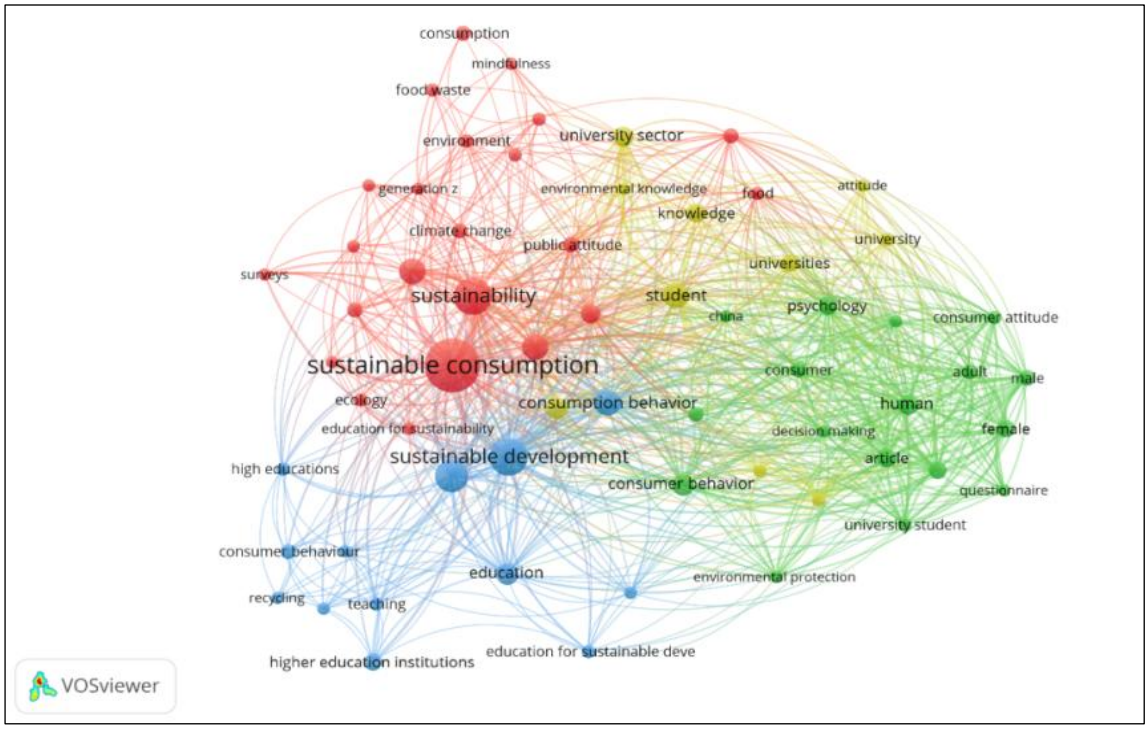


Figure 6. Network visualization of the keyword co-occurrence network on sustainable consumption in higher education (minimum threshold: 4 occurrences per keyword)

Cluster 2 (green, 17 keywords) concentrates on consumer behavior and individual psychological factors. This cluster represents a micro-level approach, emphasizing the role of psychological and demographic factors in explaining sustainable consumption behavior. Prominent keywords include consumer behavior, consumer attitude, decision making, psychology, motivation, environmental concern, and environmental protection. Keywords such as human, adult, female, male, and questionnaire reflect the prevalence of individual level data and analyses of differences across population groups. This cluster also includes contextual and subject related keywords such as university student, student, and consumer, highlighting the dominance of empirical studies focusing on university students in specific national settings. Overall, cluster 2 represents a stream of research that examines sustainable consumption behavior through psychological and behavioral models, with particular attention to the relationships among attitudes, motivation, awareness, and consumption decisions.

Cluster 3 (blue, 13 keywords) reflects the role of higher education as a mechanism for shaping sustainable consumption behavior. The central keywords in this cluster include education, higher education,

higher education institutions, education for sustainable development, curricula, and teaching. Specific behaviors such as recycling and consumption patterns also appear, indicating links between teaching activities, curricular design, and students' sustainable consumption practices. This cluster highlights the connection between formal education and consumption behavior, viewing universities as spaces that simultaneously provide education and serve as sites for sustainable practice. The co-occurrence of educational and behavioral keywords suggests that studies within this cluster often conceptualize education as a key mediating factor between awareness and sustainable consumption behavior.

Cluster 4 (yellow, 10 keywords) focuses on the role of environmental knowledge and awareness in shaping attitudes and sustainable consumption behavior. The main keywords include environmental knowledge, environmental education, knowledge, attitude, and perception. Keywords such as student, universities, and university sector indicate that this cluster is firmly situated within the higher education context. Cluster 4 functions as a bridge between the behavior-oriented cluster (cluster 2) and the education-oriented cluster (cluster 3), reflecting studies that emphasize the measurement of students' environmental knowledge and awareness as antecedents of sustainable consumption behavior. Research in this cluster typically employs survey instruments to assess students' levels of knowledge, attitudes, and perceptions regarding environmental and sustainability issues. Overall, the keyword co-occurrence analysis reveals that research on sustainable consumption behavior among university students is structured around four core themes: sustainable consumption within a broader socio environmental context; consumer behavior and individual psychological factors; the role of higher education and education for sustainable development; and students' environmental awareness and attitudes. These thematic clusters are highly interconnected, reflecting the interdisciplinary nature of the field and the close integration of education, psychology, environmental science, and consumer behavior research.

3.4.2. Temporal evolution of the thematic structure of research on sustainable consumption behavior among university students

The temporal evolution of the thematic structure in research on sustainable consumption behavior among university students is presented in Figure 7 through the overlay visualization map, in which colors represent the APY of the keywords. The results indicate that the thematic structure has undergone a sequential shift from foundational conceptual frameworks toward behavioral, psychological, and context-specific approaches focused on particular target groups. This pattern reflects the progressive development and increasing specialization of the research field over time.

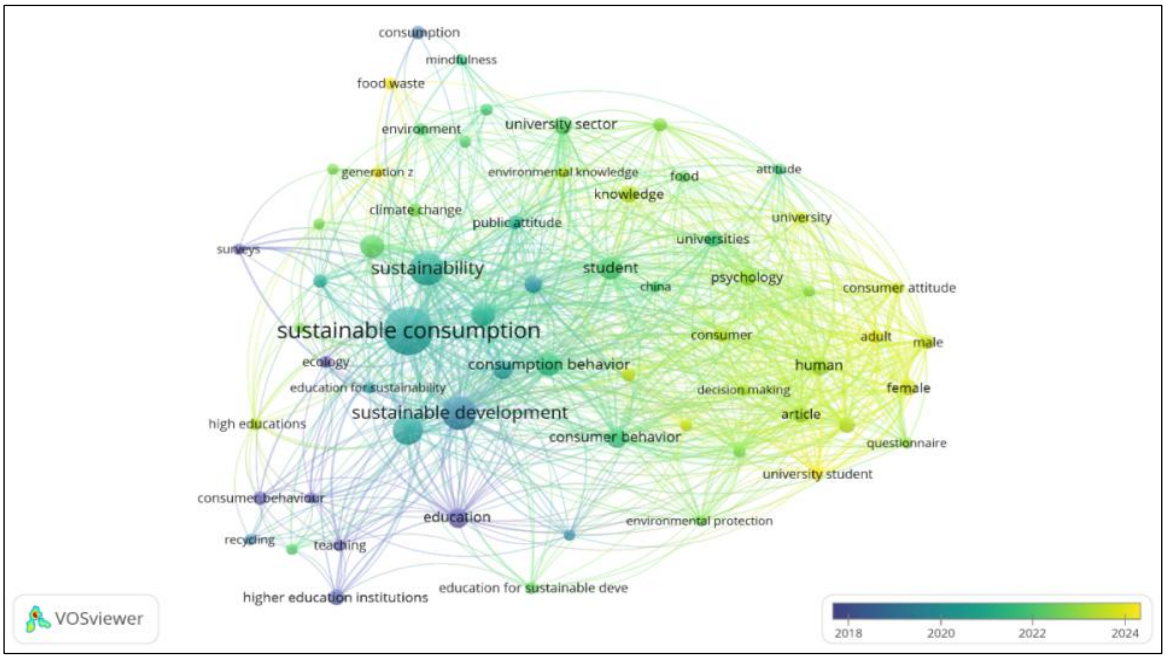


Figure 7. Overlay visualization of keyword co-occurrence (minimum 4 occurrences) in sustainable consumption research in higher education

In the early phase prior to 2020 (keywords shown in blue to dark blue, indicating an earlier APY), the thematic structure primarily focused on normative and institutional concepts, including sustainable development, education, education for sustainable development, higher education institutions, teaching, and recycling. These keywords were strongly interconnected with one another but exhibited limited connections to micro level concepts related to individual behavior. This pattern suggests that early research mainly approached sustainable consumption among students within the broader frameworks of higher education and sustainable development, emphasizing the role of education and institutions rather than specific behavioral mechanisms.

During the intermediate phase between 2020 and 2022 (keywords shown in green, indicating a medium APY), the thematic structure expanded markedly toward individual behavior and awareness. Keywords such as sustainable consumption, sustainability, consumption behavior, consumer behavior, student, and students emerged as central nodes with high occurrence frequencies and strong TLS values. At the same time, mediating concepts such as environmental awareness, environmental knowledge, public attitude, theory of planned behavior, and climate change appeared more prominently and were closely connected to education-related keywords. This phase reflects a structural shift from a macro level perspective toward an integrated approach linking education, environmental awareness, and students' consumption behavior.

From 2022 onward (keywords shown in yellow to light yellow, indicating a later APY), the thematic structure continued to shift toward micro level, psychological, and group specific perspectives. Keywords such as consumer attitude, decision making, psychology, motivation, questionnaire, human, female, male, adult, university student, and Generation Z appeared with later APY values and high linkage density. In parallel, more application-oriented topics such as food, food waste, mindfulness, and environmental protection emerged as new research streams, directly connected to sustainable consumption and consumption behavior. This indicates that the thematic structure has expanded from general conceptual frameworks to specific consumption behaviors and differentiated student groups.

Overall, the overlay map shows that sustainable consumption has consistently maintained its role as the central axis throughout the entire time span, while the surrounding satellite themes have continuously evolved. The thematic structure has progressed from education and sustainable development-oriented approaches toward behavior and consumption related perspectives, and further toward psychological factors, decision-making processes, and contextualized analyses focusing on specific student groups. This evolution clearly reflects the expansion and refinement of the knowledge structure in research on sustainable consumption behavior among university students over time. This evolution is broadly consistent with prior bibliometric studies, which identify the emergence and growing prominence of behavior-related and application-oriented themes alongside broader sustainability topics [35], [43].

4. DISCUSSION

This study was conducted to clarify the developmental trajectory, intellectual influence structure, collaboration patterns, and thematic evolution of research on sustainable consumption behavior among university students. The findings reveal four major trends. First, this is a relatively recent field that has experienced rapid growth, particularly since 2019. Second, its intellectual structure is shaped by three main streams: foundational research on sustainable and green consumption; empirical studies on students' perceptions and behavior linked to environmental education; and institution-level research within higher education. Third, scientific collaboration is unevenly distributed, with the United States leading in publication output and citation impact, while China demonstrates strong collaborative linkages. Fourth, the thematic structure has shifted over time from conceptual and institutional approaches toward more micro-level, psychologically oriented, and context-specific perspectives on student consumption behavior. Taken together, these findings suggest that research on sustainable consumption behavior among university students has evolved into a more distinct and increasingly interdisciplinary field within the broader domains of sustainable consumption and higher education.

4.1. Development trends and the evolution of the research agenda

The observed growth in publications indicates that research on sustainable consumption behavior among university students emerged later than the broader field of sustainable consumption, but has accelerated significantly in recent years. This pattern can be interpreted in two ways. On the one hand, early research tended to situate sustainable consumption within broader agendas such as sustainable development and environmental education in higher education, before gradually evolving into a more specialized behavioral research stream. On the other hand, the recent surge may be associated with the increasing prominence of international policy and academic frameworks, particularly the SDGs and SDG 12, as a shared reference for responsible consumption research. In this sense, the findings align with broader field-level observations. Liu *et al*. [39] describe the evolution of sustainable consumption research from practice-

oriented approaches toward a more diversified and systematized domain, while Kumar and Polonsky [40] highlight the growing centrality of behavioral prediction frameworks in green consumer research. Similarly, Raman *et al*. [51] note the increasing prevalence of quantitative sustainability-related studies in the context of SDGs. These patterns suggest that student-focused research reflects a process of contextual specialization, building upon established behavioral frameworks while gaining prominence as higher education is increasingly recognized as a site for observation and intervention.

4.2. The structure of scholarly influence

Citation patterns indicate that this subfield draws heavily on foundational work in sustainable consumption and on bridging studies that adapt behavioral theories to higher education contexts. This interpretation is consistent with Liu *et al*. [39], who characterize the field as increasingly interconnected and diversified. At the same time, the presence of institution-level studies among highly cited works suggests that the intellectual foundation of the field extends beyond individual-level analysis. This interpretation is also supported by previous studies that emphasize the role of environmental education and student engagement in shaping sustainable consumption behavior [5], [25]. These findings imply that understanding students' sustainable consumption behavior may require multilevel analytical frameworks, where individual behavior is shaped through interactions with institutional conditions, policies, and educational environments. However, it is important to note that this implication is derived from patterns of scholarly influence rather than direct causal testing within the present study.

4.3. Leadership and collaboration in scientific networks

Collaboration analysis reveals a multi-centered structure, in which countries with well-established research systems tend to dominate early stages, while several Asian countries have become increasingly prominent in recent years. This reflects the expansion of the knowledge landscape as sustainability becomes a global research and policy priority. Similar patterns of geographically clustered collaboration have also been reported in sustainability research, reflecting uneven global research capacities and regional linkages [41], [43]. These findings are consistent with bibliometric evidence in the broader field, where international collaboration plays a key role in knowledge development [39], and long-term accumulation of knowledge leads to relatively stable author networks [40]. Importantly, the results suggest that prominence within collaboration networks is not determined solely by publication output or citation counts, but also by the degree of connectivity within the network. In this regard, TLS should be interpreted primarily as an indicator of network embeddedness rather than as a direct measure of bridging roles. The relatively clustered nature of collaboration also indicates opportunities for expanding cross-regional and cross-cluster cooperation, which is particularly relevant for university-based research, where cultural and institutional differences may strongly influence sustainable consumption behavior. Again, these implications are inferred from network structures rather than direct evidence of collaboration effectiveness.

4.4. Thematic structure and evolution

Keyword co-occurrence analysis shows that the field is organized around a stable conceptual core of sustainable consumption, surrounded by clusters related to behavior, education, and environmental awareness. This multidimensional structure is also broadly consistent with previous research highlighting the roles of environmental awareness, behavioral intention, and educational context in shaping sustainable consumption practices [45], [47]. This structure reflects the multidimensional nature of the field, where behavior is simultaneously an individual-level phenomenon and an outcome shaped by educational processes and institutional contexts. In comparison with broader literature, the findings are consistent with Araújo *et al*. [38], who identify major clusters in sustainable consumption research, including consumer behavior, interdisciplinarity, and sustainability education. The shift from broad conceptual and institutional discussions toward more micro-level and practice-oriented topics can be interpreted as a sign of increasing specialization as the field matures. Furthermore, when compared with research on young consumers, emerging themes increasingly intersect with contemporary consumption concerns. Li and Hassan [34] highlight the growing relevance of sustainable consumption within Generation Z purchasing behavior, while Halibas *et al*. [33] identify themes such as sustainable food consumption, sharing economy, circular economy, and sustainable fashion, alongside psychological and social drivers. In this sense, research on university students represents an intersectional space, integrating broader sustainable consumption frameworks with emerging youth consumption trends, while remaining shaped by the specific context of higher education. It should be emphasized that this interpretation is based on thematic structures rather than direct evidence of causal mechanisms. Taken together, these findings not only clarify the structural characteristics and developmental trajectory of the field, but also provide important insights for theory building, research design, and the development of interventions to promote sustainable consumption in higher education.

4.5. Theoretical, methodological, and practical implications

Several cautious implications can be drawn. Theoretically, the widespread use of the theory of planned behavior confirms the continued relevance of behavioral prediction models, as noted by Kumar and Polonsky [40]. However, the increasing interdisciplinarity of the field suggests the need to better integrate institutional and contextual factors into behavioral frameworks. Methodologically, the dominance of survey-based designs and structural equation modeling reflects prevailing research practices. At the same time, Haba *et al*. [35] advocate for more advanced synthesis techniques to better trace relationships among authors, ideas, and knowledge gaps. In the university context, longitudinal, quasi-experimental, and experimental designs may offer valuable avenues for strengthening causal inference and ecological validity. Practically, the findings suggest that promoting sustainable consumption behavior among students cannot rely solely on raising awareness or changing attitudes. Instead, a systemic approach that integrates education, consumption environments, and institutional policies may be more effective. These observations are in line with prior studies emphasizing the importance of integrating behavioral, institutional, and contextual factors in promoting sustainable consumption in higher education [5], [24]. Universities can thus be viewed as strategic contexts for designing, testing, and refining sustainability interventions. However, these implications are derived from structural patterns rather than direct evaluation of intervention outcomes.

4.6. Research gaps and future directions

Building on these findings, several directions for future research are particularly important. First, more multilevel and cross-national comparative studies are needed to enhance the generalizability of behavioral models, especially given the regionally clustered nature of current collaboration networks. Second, more intervention-based and impact evaluation studies are required to provide stronger evidence beyond self-reported survey data. Third, there is a need to develop more integrative theoretical frameworks to bridge fragmented research streams, in line with broader trends of interdisciplinarity in sustainable consumption research. Finally, combining bibliometric analysis with systematic reviews or in-depth qualitative approaches may further enrich understanding of emerging themes related to young consumers. For the university context, such integrative approaches can help connect macro-level knowledge structures with micro-level behavioral mechanisms and institutional conditions more effectively.

5. CONCLUSION

This study employed an integrated bibliometric analysis combined with science mapping techniques to examine the development, intellectual structure, collaboration networks, and thematic evolution of research on sustainable consumption behavior among university students. Based on Scopus data and analyses conducted using VOSviewer, the study systematically addressed four research questions related to publication trends, citation impact, leadership in scientific collaboration, and thematic development. Four main conclusions can be drawn. First, research on sustainable consumption behavior among university students emerged relatively late but has grown rapidly in recent years, particularly since 2019. Second, the field's intellectual influence structure is shaped by the interaction of three major streams: foundational research on sustainable and green consumption, empirical studies on students and environmental education, and institution-level research within higher education. Third, research leadership is unevenly distributed across countries and authors, with only a limited number of key actors playing prominent roles in terms of publication output, citation impact, and collaboration intensity. Fourth, the thematic structure has shifted over time from normative, conceptual, and institutional discussions toward more behavior-oriented, psychological, and context-specific approaches focusing on students' actual consumption practices.

These findings suggest that research on sustainable consumption behavior among university students is no longer a peripheral topic within sustainable consumption or education for sustainable development, but has evolved into a relatively distinct and increasingly interdisciplinary research field, characterized by a growing body of knowledge and a more clearly defined thematic structure. In this sense, the study contributes by systematizing a previously fragmented domain and by clarifying how knowledge in this field has been developed, expanded, and restructured over time. From a practical perspective, the findings indicate that sustainable consumption behavior among university students should not be approached solely as an individual behavioral issue, but rather as a phenomenon embedded within educational environments, institutional structures, and intervention strategies in higher education. Accordingly, universities can be viewed not only as learning spaces but also as strategic contexts for intervention, where sustainable consumption practices can be promoted, tested, and systematically evaluated. These results also suggest that higher education institutions can play a proactive role in fostering sustainable consumption through curriculum integration, the design of practice-oriented learning activities, the creation of supportive consumption environments, and the implementation of institutional policies such as waste management, green campus initiatives, and behavioral intervention programs aimed at translating awareness into action.

It is important to note that the conclusions of this study are based on quantitative bibliometric evidence derived from publication data, citation patterns, and knowledge network structures. As such, the study is able to identify developmental patterns, scholarly influence structures, collaboration relationships, and thematic evolution, but does not directly test causal mechanisms or intervention effectiveness at the behavioral level. Several limitations should also be acknowledged, including the use of a single database (Scopus), potential biases related to search strings, screening criteria, analytical thresholds, and clustering procedures, as well as the absence of in-depth qualitative analysis of individual studies. Future research could build on these findings by integrating bibliometric analysis with systematic reviews, qualitative synthesis, or content analysis to further explore theoretical mechanisms, contextual conditions, and intervention strategies related to sustainable consumption behavior among university students. Greater attention should also be given to cross-national comparative studies, multilevel explanatory frameworks, and intervention-based research in real higher education settings. Overall, this study demonstrates that research on sustainable consumption behavior among university students is a rapidly expanding and increasingly structured field, with growing significance for both academic inquiry and the promotion of sustainability in higher education.

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This journal uses the Contributor Roles Taxonomy (CRediT) to recognize individual author contributions, reduce authorship disputes, and facilitate collaboration.

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C : **C**onceptualization
M : **M**ethodology
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E : Writing - Review & **E**diting
Vi : **Vi**sualization
Su : **Su**pervision
P : **P**roject administration
Fu : **Fu**nding acquisition

CONFLICT OF INTEREST STATEMENT

Authors state no conflict of interest.

DATA AVAILABILITY

This study is based on bibliographic data retrieved from the Scopus database. No new primary data were generated. The dataset analyzed during the current study is available from Scopus, subject to its licensing restrictions.

REFERENCES

[1] United Nations, "Agenda 21: programme of action for sustainable development," Rio de Janeiro, Brazil, 1992. Accessed: Apr. 30, 2026. [Online]. Available: https://digitallibrary.un.org/record/1701

[2] United Nations, "Report of the world summit on sustainable development: Johannesburg, South Africa, 26 August–4 September 2002," New York, NY, USA, 2002. Accessed: Apr. 30, 2026. [Online]. Available: https://digitallibrary.un.org/record/478154

[3] D. Gasper, A. Shah, and S. Tankha, "The framing of sustainable consumption and production in SDG 12," *Global Policy*, vol. 10, no. S1, pp. 83–95, Jan. 2019, doi: 10.1111/1758-5899.12592.

[4] K. Mensah, C. Wieck, and B. Rudloff, "Sustainable food consumption and sustainable development goal 12: conceptual challenges for monitoring and implementation," *Sustainable Development*, vol. 32, no. 1, pp. 1109–1119, Feb. 2024, doi: 10.1002/sd.2718.

[5] M. Barth, M. Adomßent, D. Fischer, S. Richter, and M. Rieckmann, "Learning to change universities from within: a service-learning perspective on promoting sustainable consumption in higher education," *Journal of Cleaner Production*, vol. 62, pp. 72–81, Jan. 2014, doi: 10.1016/j.jclepro.2013.04.006.
[6] M. E. Eryucel *et al.*, "Sustainable dietary behavior and food choices among sport sciences students: a cross-sectional study within the theory of planned behavior," *Frontiers in Nutrition*, vol. 12, p. 1689613, Oct. 2025, doi: 10.3389/fnut.2025.1689613.
[7] M. Cali, X. Rusi, and L. Lazimi, "The relationship between students' attitudes and behavior intention toward sustainable consumption and being a sustainable employee," *The International Journal of Social Sustainability in Economic, Social, and Cultural Context*, vol. 22, no. 1, pp. 1–21, Aug. 2025, doi: 10.18848/2325-1115/CGP/v22i01/1-21.
[8] D. Rew, W. Cha, S. Lim, and J.-W. Kim, "Do mindful consumers matter to sustainability?" *Social Responsibility Journal*, vol. 21, no. 9, pp. 1937–1956, Oct. 2025, doi: 10.1108/SRJ-11-2024-0786.
[9] K. Gul, S. Fasih, S. Morande, and M. Ramish, "Participatory visual methods and artificial intelligence-driven analysis for sustainable consumption insights," *Sustainability*, vol. 16, no. 16, p. 6956, Aug. 2024, doi: 10.3390/su16166956.
[10] C. Malefors, A. Sjölund, and N. Sundin, "Food waste quantities, carbon footprint and nutrient loss in university students' households in Sweden," *Sustainable Production and Consumption*, vol. 54, pp. 441–451, Mar. 2025, doi: 10.1016/j.spc.2025.01.017.
[11] M. S. Rahman *et al.*, "Do online food delivery platforms contribute to food waste? Evidence from Indonesian university students," *Food and Humanity*, vol. 5, p. 100886, Dec. 2025, doi: 10.1016/j.foohum.2025.100886.
[12] C. M. J. Martinez and S. Iran, "Making the 'short game' a 'long game': promoting clothing longevity in the use phase," *International Journal of Sustainable Fashion & Textiles*, vol. 3, no. 1, pp. 49–77, Apr. 2024, doi: 10.1386/sft_00039_1.
[13] N. Mollel-Matodzi and A. Mastamet-Mason, "A review of South African consumer awareness of fast-fashion and sustainable practices in the textile and clothing industry," in *2024 International Conference on Multidisciplinary Research (MyRes)*, 2024, pp. 222–238, doi: 10.26803/MyRes.2024.16.
[14] N. Rathnayake, S. Munasinghe, N. Jayasuriya, V. Rajapakse, and N. Dharmapriya, "Assessing the awareness and attitudes towards green smartphone purchase intention among university academics in Sri Lanka," in *2024 International Research Conference on Smart Computing and Systems Engineering (SCSE)*, Apr. 2024, pp. 1–7, doi: 10.1109/SCSE61872.2024.10550879.
[15] I. Salifu, F. Arthur, and S. A. Nortey, "Green consumption behaviour among higher education students as an approach to achieving sustainable source reduction of marine plastic pollution," *Young Consumers*, vol. 25, no. 4, pp. 528–553, Jun. 2024, doi: 10.1108/YC-10-2023-1881.
[16] L. J. M. Carmona, A. G. P. Barretto, and E. Bacinello, "Does intention translate into actual purchase? Analysis of inducers of sustainable consumption in higher education students," *Young Consumers*, vol. 25, no. 1, pp. 45–64, Jan. 2024, doi: 10.1108/YC-03-2023-1710.
[17] G. Maione, S. Supino, M. Grimaldi, and O. Troisi, "Exploring the political-institutional perspective of sustainable consumer behavior within the circular economy: a structural equation modeling approach from nudge theory," *Socio-Economic Planning Sciences*, vol. 100, p. 102254, Aug. 2025, doi: 10.1016/j.seps.2025.102254.
[18] H. Jillani, M. N. Chaudhry, S. R. Jafri, and H. Zahid, "The impact of social media on knowledge, attitude and practices (KAP) towards sustainable consumption in higher education institutions," *Cleaner and Responsible Consumption*, vol. 17, p. 100284, Jun. 2025, doi: 10.1016/j.clrc.2025.100284.
[19] A. W. Hamidi *et al.*, "Understanding of sustainable consumption among university students: a cross-sectional study at Herat, Afghanistan," *Environmental Quality Management*, vol. 35, no. 2, p. e70222, Dec. 2025, doi: 10.1002/tqem.70222.
[20] F. P. S. Surbakti, H. A. Hutahaean, M. M. W. Inderawati, J. M. Madjid, L. E. Sely, and Y.-M. Yee, "How AI-driven personalization shapes green purchasing behavior among youth in Java Island," *Sustainability*, vol. 17, no. 21, p. 9600, Oct. 2025, doi: 10.3390/su17219600.
[21] E. Varese, M. Wojnarowska, P. Dziekański, Ł. Popławski, and M. C. Cesarani, "Gen Z consumption: who chooses green?" *Business Strategy and the Environment*, vol. 34, no. 7, pp. 8034–8051, Nov. 2025, doi: 10.1002/bse.70008.
[22] A. Uzun, O. Akhan, S. Turan, and A. Özkaya, "Determining the global citizenship tendencies of international university students for a sustainable world," *PLOS ONE*, vol. 20, no. 10, p. e0335817, Oct. 2025, doi: 10.1371/journal.pone.0335817.
[23] A. Cardoso, A. Silva, M. S. Pereira, J. Figueiredo, and I. Oliveira, "Sustainable consumption intentions among Portuguese university students: a multidimensional perspective," *Sustainability*, vol. 17, no. 17, p. 7569, Aug. 2025, doi: 10.3390/su17177569.
[24] S. Gombert-Courvoisier, V. Sennes, M. Ricard, and F. Ribeyre, "Higher education for sustainable consumption: case report on the human ecology master's course (University of Bordeaux, France)," *Journal of Cleaner Production*, vol. 62, pp. 82–88, Jan. 2014, doi: 10.1016/j.jclepro.2013.05.032.
[25] M. Adomßent *et al.*, "Emerging areas in research on higher education for sustainable development–management education, sustainable consumption and perspectives from Central and Eastern Europe," *Journal of Cleaner Production*, vol. 62, pp. 1–7, Jan. 2014, doi: 10.1016/j.jclepro.2013.09.045.
[26] N. Braithwaite and L. Trencher, "Building a student community for social change: how institutional collaboration and peer learning supports a strategy for embedding sustainability within fashion business education," in *Sustainability in Business Education, Research and Practices*, T. Wall, L. V. Trevisan, W. L. Filho, and A. Shore, Eds., Cham: Springer Nature Switzerland, 2024, pp. 63–76, doi: 10.1007/978-3-031-55996-9_5.
[27] M. Krishnamoorthi, M. Mathiyarasan, S. Siddiqui, P. Venkatesh, K. Jayakumar, and B. Vinnarasi, "Impact of environmental studies on sustainable consumption among the students: a study from Indian higher education institutions," in *Sustainable Digital Technology and Ethics in an Ever-Changing Environment*, M. Al Mubarak, Ed., Cham: Springer Nature Switzerland, 2025, pp. 169–177, doi: 10.1007/978-3-031-86712-5_13.
[28] M. I. H. Reza, "Sustainability in higher education: perspectives of Malaysian higher education system," *Sage Open*, vol. 6, no. 3, pp. 1–9, Jul. 2016, doi: 10.1177/2158244016665890.
[29] B. Pacheco-Blanco and M. J. Bastante-Ceca, "Green public procurement as an initiative for sustainable consumption. An exploratory study of Spanish public universities," *Journal of Cleaner Production*, vol. 133, pp. 648–656, Oct. 2016, doi: 10.1016/j.jclepro.2016.05.056.
[30] I. S. Zen, D. Subramaniam, H. Sulaiman, A. L. Saleh, W. Omar, and M. R. Salim, "Institutionalize waste minimization governance towards campus sustainability: a case study of green office initiatives in Universiti Teknologi Malaysia," *Journal of Cleaner Production*, vol. 135, pp. 1407–1422, Nov. 2016, doi: 10.1016/j.jclepro.2016.07.053.
[31] I. M. João and J. M. Silva, "The role of higher education towards sustainable consumption behavioural change: topics discussed in sustainable consumption education," in *2022 IEEE Global Engineering Education Conference (EDUCON)*, Mar. 2022, pp. 1419–1428, doi: 10.1109/EDUCON52537.2022.9766778.

[32] M. Sahakian and G. Seyfang, "A sustainable consumption teaching review: from building competencies to transformative learning," *Journal of Cleaner Production*, vol. 198, pp. 231–241, Oct. 2018, doi: 10.1016/j.jclepro.2018.06.238.
[33] A. Halibas, U. Akram, A.-P. Hoang, and M. D. T. Hoang, "Unveiling the future of responsible, sustainable, and ethical consumption: a bibliometric study on Gen Z and young consumers," *Young Consumers*, vol. 26, no. 7, pp. 142–171, Dec. 2025, doi: 10.1108/YC-11-2024-2327.
[34] P. Li and S. H. Hassan, "Mapping the literature on Gen Z purchasing behavior: a bibliometric analysis using VOSviewer," *Innovative Marketing*, vol. 19, no. 3, pp. 62–73, Aug. 2023, doi: 10.21511/im.19(3).2023.06.
[35] H. F. Haba, C. Bredillet, and O. Dastane, "Green consumer research: trends and way forward based on bibliometric analysis," *Cleaner and Responsible Consumption*, vol. 8, p. 100089, Mar. 2023, doi: 10.1016/j.clrc.2022.100089.
[36] D. Kumar, S. Choudhuri, A. K. Shandilya, R. Singh, P. Tyagi, and A. K. Singh, "Food waste & sustainability through a lens of bibliometric review: a step towards achieving SDG 2030," in *2022 International Conference on Innovations in Science and Technology for Sustainable Development (ICISTSD)*, Aug. 2022, pp. 185–192, doi: 10.1109/ICISTSD55159.2022.10010596.
[37] P. Bryła, S. Chatterjee, and B. Ciabiada-Bryła, "The impact of social media marketing on consumer engagement in sustainable consumption: a systematic literature review," *International Journal of Environmental Research and Public Health*, vol. 19, no. 24, p. 16637, Dec. 2022, doi: 10.3390/ijerph192416637.
[38] A. C. M. Araújo, V. M. Oliveira, and S. E. N. Correia, "Sustainable consumption: thematic evolution from 1999 to 2019," *RAM. Revista de Administração Mackenzie*, vol. 22, no. 2, pp. 1–34, 2021, doi: 10.1590/1678-6971/eramg210209.
[39] Y. Liu, Y. Qu, Z. Lei, and H. Jia, "Understanding the evolution of sustainable consumption research," *Sustainable Development*, vol. 25, no. 5, pp. 414–430, Sep. 2017, doi: 10.1002/sd.1671.
[40] P. Kumar and M. J. Polonsky, "An analysis of the green consumer domain within sustainability research: 1975 to 2014," *Australasian Marketing Journal*, vol. 25, no. 2, pp. 85–96, May 2017, doi: 10.1016/j.ausmj.2017.04.009.
[41] N. Kashyap, S. Khandai, and J. Mathew, "Sustainable consumption: a bibliometric study," *Dynamic Relationships Management Journal*, vol. 12, no. 2, pp. 65–79, Nov. 2023, doi: 10.17708/DRMJ.2023.v12n02a05.
[42] D. T. Vergura, C. Zerbini, B. Luceri, and R. Palladino, "Investigating sustainable consumption behaviors: a bibliometric analysis," *British Food Journal*, vol. 125, no. 13, pp. 253–276, Dec. 2023, doi: 10.1108/BFJ-06-2022-0491.
[43] N. Chotisarn and T. Phuthong, "Green production processes and consumer behaviour: a theory-context-characteristics-methodology framework-based systematic review and future research agenda," *International Journal of Sustainable Engineering*, vol. 18, no. 1, p. 2480100, Dec. 2025, doi: 10.1080/19397038.2025.2480100.
[44] R. D. Straughan and J. A. Roberts, "Environmental segmentation alternatives: a look at green consumer behavior in the new millennium," *Journal of Consumer Marketing*, vol. 16, no. 6, pp. 558–575, Dec. 1999, doi: 10.1108/07363769910297506.
[45] Á. Zsóka, Z. M. Szerényi, A. Széchy, and T. Kocsis, "Greening due to environmental education? Environmental knowledge, attitudes, consumer behavior and everyday pro-environmental activities of Hungarian high school and university students," *Journal of Cleaner Production*, vol. 48, pp. 126–138, Jun. 2013, doi: 10.1016/j.jclepro.2012.11.030.
[46] T. B. Ramos, S. Caeiro, B. van Hoof, R. Lozano, D. Huisingh, and K. Ceulemans, "Experiences from the implementation of sustainable development in higher education institutions: environmental management for sustainable universities," *Journal of Cleaner Production*, vol. 106, pp. 3–10, Nov. 2015, doi: 10.1016/j.jclepro.2015.05.110.
[47] N. R. Ahamad and M. Ariffin, "Assessment of knowledge, attitude and practice towards sustainable consumption among university students in Selangor, Malaysia," *Sustainable Production and Consumption*, vol. 16, pp. 88–98, Oct. 2018, doi: 10.1016/j.spc.2018.06.006.
[48] J. Su, K. (Tu) Watchravesringkan, J. Zhou, and M. Gil, "Sustainable clothing: perspectives from US and Chinese young millennials," *International Journal of Retail & Distribution Management*, vol. 47, no. 11, pp. 1141–1162, Nov. 2019, doi: 10.1108/IJRDM-09-2017-0184.
[49] H. J. Chang and K. (Tu) Watchravesringkan, "Who are sustainably minded apparel shoppers? An investigation to the influencing factors of sustainable apparel consumption," *International Journal of Retail & Distribution Management*, vol. 46, no. 2, pp. 148–162, Jan. 2018, doi: 10.1108/IJRDM-10-2016-0176.
[50] Z. Zeng, W. Zhong, and S. Naz, "Can environmental knowledge and risk perception make a difference? The role of environmental concern and pro-environmental behavior in fostering sustainable consumption behavior," *Sustainability*, vol. 15, no. 6, p. 4791, Mar. 2023, doi: 10.3390/su15064791.
[51] R. Raman, H. Lathabhai, D. Pattnaik, C. Kumar, and P. Nedungadi, "Research contribution of bibliometric studies related to sustainable development goals and sustainability," *Discover Sustainability*, vol. 5, no. 1, p. 7, Jan. 2024, doi: 10.1007/s43621-024-00182-w.

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