Sustainable Practices in Academia and Their Influence on Consumer Behaviour: A Bibliometric Review

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ABSTRACT

The growing attention toward Education for Sustainable Development (ESD) reflects its potential to shape future consumers' environmental values. However, limited bibliometric evidence exists linking ESD research with behavioural outcomes such as sustainable consumption. This study maps global research trends connecting ESD and consumer behaviour. Bibliometric technique of review is used to understand scholarly trajectories in the field linking SDG 04 with SDG 12. Web of Science and Scopus databases were utilised in the study. 3737 articles were extracted and analysed using PRISMA criteria and bibliometric tools such as VOS viewer and Biblioshiny (an R studio bibliometric package). Results reveal three distinct research phases, with a sharp growth after the launch of the SDGs. Eight thematic clusters emerged ranging from sustainability education to consumer decision-making and circular economy showing an expanding multidisciplinary engagement. China, the USA, and the UK lead in productivity and collaboration, while South Asian countries continued to be underrepresented. This study contributes by bridging two domains sustainability education and consumer behaviour and identifying underexplored research directions for future scholars.

Keywords: bibliometric, behavioral change, sustainability, impact, ESD, education for sustainable development, consumer behaviour

1. INTRODUCTION

Sustainability is seen as a strategic instrument for leveraging company performance in terms of profit and corporate social responsibility. However, it is disputable in the education sector (Eustachio et al, 2024). Educational institutions (EIs) are the knowledge centers whose responsibility is to create a positive shift in the learner's behavior & attitude with a liability of the encouragement of moral and ethical behavior in the society. Thus, various subject and courses taught have certain specific course outcomes.

The strategies of ESD integration aim to generate long-term positive effects on society and the environment (Maiorescu et al., 2020). The implication of such integration is evident in practical, real-life situations. Hence, this study attempts to know the pattern and trends in research that explain how sustainability practices in EIs influence students' attitudes and behaviours.

Students' sustainability attitudes are deeply influenced by their cultural, regional, and environmental backgrounds. For example, Italian students link sustainability mainly to environmental aspects, while Portuguese students associate it more with social concerns (Massaglia et al., 2022). Developing sustainable behaviour is serving students' personal growth as well as career growth for building professional competencies that promote responsible business practices (Terán-Yépez et al., 2024). Yet, these goals cannot be achieved without genuine stakeholder participation. Many institutions continue to depend on rote learning, limiting student involvement in sustainability initiatives which is the most significant obstacle to raising awareness and shaping behaviour (Maiorescu et al., 2020). Evidence from earlier research suggest that exposure to sustainability education can influence students' decision-making and consumption habits.

Therefore, the study aims at identification and visualization of the research trend/ academic interest on sustainability initiatives of EIs and its influence on consumer behaviour.

Research questions

- What is the development in the studies on the sustainability in educational institute and consumer behaviour (EI & CB)?

- What are the most frequently used words in association with sustainability in EI & CB?

- What are the leading research constituents (authors, countries, institutions) in the area of sustainability in EI & CB?

- What are the most cited sources & documents?

- What are the distinct themes in relation with sustainability in EI & CB?

2. LITERATURE REVIEW

Bibliometrics/scientometrics provide systematic, quantitative tools to evaluate scientific research output and intellectual influence (Lim et al., 2024). Through publication and citation analysis, bibliometric studies identify patterns, collaborations, and thematic developments within a field (Passas, 2024).

Researchers have increasingly used bibliometric approach on ESD. Grosseck et al. (2019) analyzed 1,813 WoS publications (1992–2018), mapping theoretical frameworks, leading authors, and research trends, highlighting steady growth in the field. Yang and Xiu (2023) extended this approach to 2,779 SSCI-indexed articles (1992–2022), revealing dominant research themes and an overrepresentation of studies from developed nations. Similarly, Côrtes and Rodrigues (2016) analyzed 294 articles from Scopus and WoS (1993–2015), noting limited research momentum following the introduction of SDG 4 on quality education.

Other bibliometric studies further illustrate global patterns and methodological diversity. Hallinger and Chatpinyakoop (2019) reviewed 1,459 Scopus-indexed papers, highlighting contributions from developed countries and the emphasis on competency-based higher education. Gorski et al. (2023), analyzing 2,827 documents with Bibliometrix and Biblioshiny, emphasized the integration of ESD into higher education systems and the need to link sustainability learning with technological innovation. More recently, Dönmez (2024) applied the PRISMA framework to 879 studies (1998–2023), documenting a shift from environmental education toward broader sustainability education, though the reliance on a single database limited coverage.

Despite these contributions, existing bibliometric analyses share notable limitations. Most focus on mapping productivity, collaborations, and thematic patterns but rarely examine the translation of ESD into tangible behavioural outcomes. Furthermore, methodological and temporal overlaps across studies (Rohrich & Takahashi, 2019; Prieto-Jiménez et al., 2021; Zhang & Wang, 2022; Raman et al., 2024; Machado & Davim, 2022; Jamali et al., 2022; Kusumaningrum et al., 2023; Chusniyah & Makruf, 2025) constrain the ability to capture recent developments or uncover novel thematic connections. Another limitation is the narrow disciplinary focus of some studies, spanning STEM (Jamali et al., 2022), environmental education (Arya et al., 2024), tourism (León-Gómez et al., 2023), business management (Cullen, 2017), sustainable technology (Akbari et al., 2020), science education (Kadirhanogullari et al., 2024), physical education (Xu et al., 2021), and library management (Ensslin et al., 2022). While insightful, such domain-specific analyses do not provide a holistic, global perspective on ESD research.

Overall, these studies underscore the evolving intellectual structure of ESD research while highlighting the need for updated, integrative bibliometric analyses that examine both global trends and their consequences for innovative pedagogical approaches and sustainability outcomes.

Table 1: Overview of previous studies and gaps

Author & Year	Objective	Data source & Time span	No. of Articles	Analysis Technique	Findings	Limitation/Gap
Abubassna et al., 2022	To examine the existing trends and the sustainability strategy for education in the future.	Scopus 2011-2020	112	Content analysis with the help of PRISMA framework	The study found striking increase in the publication on education for sustainability and pointed the need to change HEIs role in ESD.	• The study was limited to scopus database only which might have overlooked some valuable studies • The chosen time period was 2011-2020. It does not show the early studies and how the topic has been evolving • It does not address any association of ESD with consumer behaviour
Hallinger & Nguyen (2020)	To visualize the development and research landscape on ESD in K-12 schooling	Scopus 1990-2018	1842	Science mapping technique, citation analysis, Author co-citation analysis, content analysis, bibliometric analysis	Increasing trend & interest in the field. Identified major clusters of the sub topic under ESD which are: Managing for sustainability in HE, Higher Education for Sustainable Development Competencies and Implementation of HESD. All these clusters form the basis for research in the field of ESD.	• The study relied on single database hence it lacks comprehensive inclusion of papers. • The study has not included the data after 2018 thus suffers from the lack of recent publication which may change the pattern of visualization. • the study is simply focused on visualization of data related to ESD. It lacks specific details about the behavioral change that ESD brings in students. Moreover, it talks about ESD integration in K-12 schooling thus ignoring higher education institutions.
Gorski et al., (2023)	To examine current trends and the status of the current study on Education for sustainability or education for sustainability.	Web of Science 1989-2323	2827	The study utilized biblioshiny and excel to analyze and visualize the data obtained.	The study identified most prominent themes of research and categorized into four quadrants basic, motor, niche and emerging or declining themes.	• The study has utilized single database that may not have fully represent the literature on ESD. • It misses the publications after 2023. • Does not talk about impact of ESD integration ion consumer behaviour.
Gavinolla et. al., (2022)	To identify trends and patterns of the studies pertaining to teacher education for sustainability	Scopus 1991 to 2020	1782 documents	The data was analyzed and visualized through Tableau and VOSviewer. The prominent research constituents used as a parameter for analysis.	The study identified Australia as a leading country to produce literary work on ESD. During evolution the early themes were focused on education for sustainability, Agenda 21, SD education, & environmental education. Later themes identified are: teacher training, teachers' education, sustainability competencies, teaching & education policies and values	• Rely on single database therefore may have overlooked important papers published in other journals. • New trends are missing as the study covers data upto 2020 only. • Does not address the impact of ESD on students' behaviour.
Rukmana et al., 2023	To provide a holistic review of the studies on environmental education with special attention on teaching technique and curriculum construction	Scopus, web of science, ERIC and google scholar 1961-2023	980 articles	Employed VOSviewer to analyze bibliometric data	The study identified key research constituents which can provide foundation for further studies also findings can be used by policymakers or institutions to effectively integrate sustainability into the campus.	This bibliometric study provides holistic landscape of studies in ESD. Lots main emphasis is on pedagogy and curriculum designing however, it fails to incorporate the behavioural change that ESD integration brings in students.

Given these gaps, there remains a pressing need to integrate updated datasets and adopt a more comprehensive bibliometric approach. To address this need the study examines data retrieved from WoS and Scopus as of March 27, 2025.

3. MATERIALS & METHODS

This study adopted and modified the PRISMA 2009 framework (Moher et al., 2009) to ensure a transparent and structured research process. Originally developed by David Moher and colleagues, the PRISMA model is among the predominant framework for conducting and reporting systematic reviews, with over 134,000 citations to date. The framework comprises four sequential stages: Identification, Screening, Eligibility, and Inclusion which collectively guide the article selection and refinement.

STEP 1: IDENTIFICATION: Data for this study were obtained from WoS and Scopus, chosen for their broad coverage of documents. Both databases offers broad and credible coverage for social science studies. Previous bibliometric reviews often relied on a single database, whereas the present study used both to ensure inclusiveness and minimize database bias. The following search string was applied to the Title, Abstract,

and Keyword (TITLE-ABS-KEY) fields in both databases. Data were extracted on 27 March 2025, ensuring the inclusion of the most recent publications.

Search string: **(education for sustainability) OR (sustainab* education) OR ("sustainab*" AND "universities") OR ("higher education sustainab*") OR ("green campus*") AND "consumer behavio*r" OR "green consumerism" OR "consumer attitude"**

STEP 2: ELIGIBILITY: According to the PRISMA framework, the second stage typically involves *Screening*, the removal of duplicates and incomplete records. However, as this study used two databases, overlapping entries were expected. To address this, the inclusion and exclusion criteria were first used on each dataset separately before merging, thereby ensuring that only relevant and high-quality records were retained.

STEP 3: SCREENING

In this stage, datasets were downloaded from WoS (in plain text format) and Scopus (in BibTeX format). The datasets were imported into Biblioshiny (a web interface for the Bibliometrix package in RStudio) to facilitate analysis and identify & remove duplicate records. This method prevented duplicate counting of articles, maintaining the integrity of the combined dataset.

STEP 4: INCLUDED

The combined dataset from WoS and Scopus initially contained 217,334 documents. After applying the defined inclusion and exclusion criteria, the dataset was reduced to 3,761 records, including 25 duplicates. Following the removal of duplicates, a final set of 3,737 unique documents was retained for bibliometric analysis.
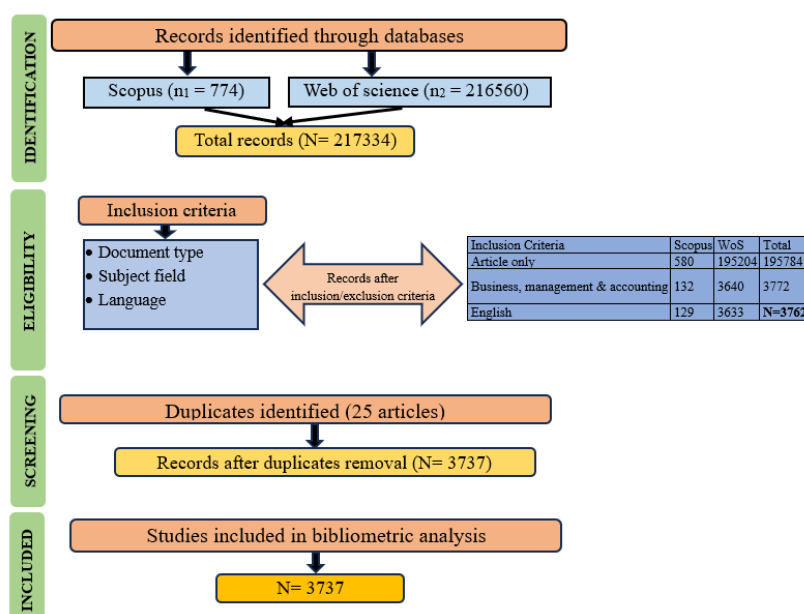

Figure 1 Research approach (adapted PRISMA)

While in original PRISMA framework screening comes before eligibility but in our study the inclusion criteria were applied directly within the database search. As a result, eligibility was considered before duplicate removal.

4. RESULTS & DISCUSSION

Figure 2 presents snapshot of information created through biblioshiny. It highlights the summary of provided dataset. As mentioned in methodology, no specific year was selected. The dataset was based on provided keywords and processed accordingly. The results indicated that the dataset has articles from 1992 to 2025 published in 343 sources. Total number of documents on association of ESD and consumer behaviour stands at 3737 with an annual growth rate of 18.54% indicating increasing interest of researchers in the domain exploring the role of ESD in sustainable consumption. These documents were produced by 8,785 authors, many of whom are single authors (only 284), indicating higher collaboration among researchers. International Co-Authorship is 41.02%, reflecting a strong collaborative research culture and makes this association between ESD and consumer behaviour an issue of global concern. The figure below (2) highlights an average of 30.4 citations per document implying Scholars focus not only on reading but also citing them. The Author's keywords are 11038 representing the strong coverage of the wide and growing field of study.

Figure 2 Main Information

RQ 1: *What is the development in the studies/literature on the sustainability in educational institute and consumer behaviour?*

ANNUAL DOCUMENTS PUBLISHED ON ESD AND CONSUMER BEHAVIOUR
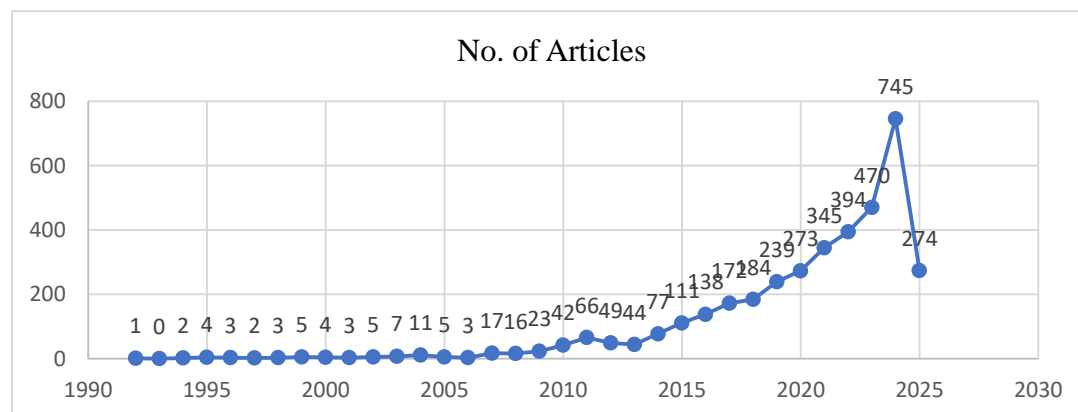

Figure 3 Annual Publication Trends

Figure 3 presents the annual publication trend on the intersection of sustainability in education and consumer behaviour from 1992 to 2024. The trajectory reflects a steady expansion of scholarly engagement, indicating the topic's transition from a marginal theme in early sustainability discourse to a recognized subfield within education and behavioural studies. The compound annual growth rate (CAGR) of publications during this period underscores the field's progressive maturation and its integration with global sustainability agendas.

i. **Early years (1992 to 2008):** The formative phase (1992–2008) accounted for only 2.4 percent of the total publications, reflecting the field's exploratory stage. During this period, research mainly revolved around conceptual and theoretical discussions that sought to define sustainability within educational contexts and examine its societal relevance. The scarcity of empirical work indicates that sustainability had not yet been institutionalized within educational policy or research frameworks.

ii. **Growth years (2009 to 2013):** The subsequent phase (2009–2013) witnessed a gradual rise in scholarly output, corresponding with the global emphasis on the United Nations' Decade of Education for Sustainable Development (2005–2014). Researchers increasingly examined how EIs could influence environmental attitudes, ethical consumption, and behavioural intentions. This period laid the groundwork for integrating behavioural theories such as the Theory of Planned Behaviour into sustainability education studies, bridging educational outcomes with consumer decision-making frameworks.

iii. **Period of Sharp growth (2014 to 2024):** The period between 2014 and 2024 represents a phase of exponential growth, contributing nearly 92 percent of the total publications. The rise in publications closely follows the adoption of the SDGs in 2015, which placed sustainability at the heart of educational research and policy discussions worldwide. This momentum has been supported by stronger cross-disciplinary partnerships, the growth of open-access publishing, and new journals focusing on environmental and educational themes. Since 2018, more studies have relied on real-world data and behavioural models to link education, awareness, and sustainable consumption. The small dip recorded in 2025 most likely reflects indexing delays instead of a genuine slowdown in research.

Overall, the publication trajectory demonstrates a clear epistemological shift from defining sustainability conceptually to empirically examining its behavioural implications. Early studies established theoretical underpinnings,

while contemporary research increasingly applies behavioural frameworks and institutional analyses to assess measurable impacts of Education for Sustainable Development (ESD). This transition signifies the field's maturation and its recognition as a global research frontier connecting educational reform with sustainable consumption behaviour. Future scholarship is expected to deepen this linkage through longitudinal, cross-regional, and experimental designs that evaluate real-world behavioural transformations.

RQ 2: What are the most frequently used words in association with sustainability in educational institute and consumer behaviour?
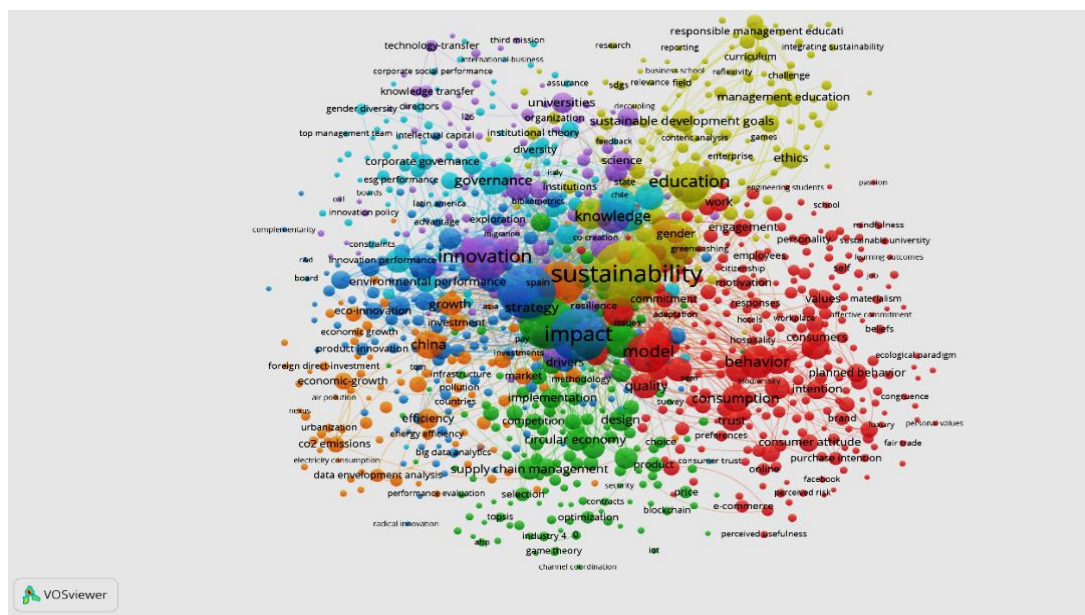

Figure 4 Keyword Co-occurrence Network Map

A keyword co-occurrence analysis using VOSviewer (Figure 4) identified eight major thematic clusters that reflect the intellectual structure of research linking sustainability in education and consumer behaviour. These clusters reveal a multidisciplinary convergence, bringing together concepts from psychology, management, environmental studies, and education to form a cohesive research domain.

Table 2: Summary of Cluster Interpretations

Cluster colour	No. of items (out of 1000)	Core theme	Key keywords	Focus	Gaps
Red	266	Consumer behaviour & sustainabl	Quality, trust, planned behaviour,	This cluster is about exploring factors affecting sustainable purchase intention	Excessively relied on purchase intention rather than actual

		e consumption	motivation, work, purchase intention	and consumer decision making process and the foundation theory is theory of panned behaviour (TPB)	buying behaviour. Varying consumer behaviour based on regional and cultural variation is under researched.
Green	156	Circular economy & supply chain	Competition, product, choice, design, price, selection	Prioritizes integration of digital technologies (AI, blockchain), operational effectiveness and business models for sustainability in the context of circular economy.	Theory of circular economy and digital applications in real-time are not well adopted. Lack of enough empirical studies on SMEs and emerging economies.
Blue	134	Innovation & sustainability, organizational capabilities	dynamic capabilities, performance, R&D, RBV theory, impact	Prioritizes how enterprises promote sustainable development through innovation, research & development, and knowledge management. To enhance business performance, it prioritizes building internal competences such as eco-innovation and dynamic strategies.	There's not a lot of research on how businesses in different industries are using sustainability in their innovation plans. Also, little is known about how these strategies impact long-term success in actual companies.
Yellow	128	Sustainability in education	Education, ethics, SDGs, management education, curriculum, greenwashing	Looks at how to include sustainability and ethics in management education, while also pointing out the challenges that come with it.	There isn't much research on how sustainability education impacts student behavior, and there's a lack of solid ways to measure what students learn.
Purple	115	Innovation & performance	Innovation, entrepreneurship, knowledge, institutional theory	Looks at how knowledge and support from institutions can help create sustainable innovation and business growth.	There's not much research on changing institutions, particularly in developing countries, when it comes to encouraging digital and sustainable business ideas.

Light blue	102	CSR & reporting	CSR, performance, governance,	Looks at how new ideas, rules, and government policies shape corporate social responsibility and how companies report on their environmental efforts.	There's not enough research to compare countries, and there's often a disconnect between what governments do and the real environmental outcomes.
Oran-ge	97	Economic growth & environment	Eco-innovation, market, efficiency, investments, FDI, growth	discusses how countries maintain an appropriate equilibrium between resource effectiveness, development, and reducing emissions.	focuses more on macroeconomic data and less on sector-specific or micro-level applications. Insufficient incorporation of behavioral economics
Brown	02	Performance measurement & methodology	Balanced score card and structural equation modelling	emphasizes the use of quantitative techniques like Structural Equation Modelling (SEM) and performance evaluation tools like the Balanced Scorecard to assess the efficacy of sustainability programs in businesses.	less research studies available on the robust framework for measuring sustainability outcomes.

The co-occurrence results indicate an evolution from isolated discussions of sustainability to a more integrated research framework connecting education, innovation, and consumer decision-making. Theoretical models such as the Theory of Planned Behaviour (TPB) and Resource-Based View (RBV) remain central, yet recent trends point toward stronger empirical linkages between sustainability education and behavioural outcomes, particularly sustainable consumption and lifestyle adoption.

Table 3: Top 10 Author Keywords in Research on Sustainability in Educational Institutions and Consumer Behaviour (1992–2025)

Rank	Author Keyword	Frequency	Interpretation
1	Sustainability	439	Core construct anchoring most research themes.
2	Sustainable Development	271	Broad policy-driven orientation linking SDGs and education.
3	Corporate Social Responsibility	144	Institutional accountability and ethical engagement.
4	Higher Education	88	Integration of sustainability principles in universities.
5	Innovation	87	Role of innovation and technology in advancing sustainability.
6	Circular Economy	85	Emerging paradigm connecting production, consumption, and waste reduction.
7	Education	81	Pedagogical focus on sustainability competencies.
8	Sustainable Development Goals (SDGs)	69	Alignment of research agendas with UN 2030 framework.
9	Consumer Attitude	53	Behavioural orientation grounded in the Theory of Planned Behaviour.
10	Sustainable Consumption	42	Outcome focus—translating awareness into responsible action.

Table 3 highlights that "sustainability," "sustainable development," "innovation," and "education" dominate the field, underscoring a shared focus on embedding sustainability principles into educational frameworks and behavioural research. Behaviour-oriented terms such as "consumer attitude" and "sustainable consumption" further reveal the application of behavioural theories, especially TPB, to understand how educational exposure shapes consumption choices. The growing prominence of terms like "circular economy" and "SDGs" signals a transition toward system-level and policy-oriented perspectives, emphasizing education's role as a catalyst for sustainable societal transformation.

RQ3: What are the leading research constituents (authors, countries, institutions) in the area of sustainability in educational institute and consumer behaviour?

Leading authors: -

Table: 4 Top 10 Leading authors by articles published

The author productivity analysis reveals that Wang Y, Liu Y, and Chen Y are the most prolific contributors to the literature on sustainability, education, and consumer behaviour. However, publication volume alone does not reflect research influence. Citation-based indicators highlight Wu H and Hao Y as the most impactful scholars, with Wu H demonstrating a high *m*-index (2.667) due to rapid citation growth since 2020, and Hao Y leading in total citations (1,743) and *h*-index (16). This suggests that while Wang Y is quantitatively dominant, Wu H and Hao Y contribute work of higher qualitative impact.

Authors	Articles	Articles Fractionalized
WANG Y	49	14.21
LIU Y	42	10.88
WANG J	34	9.40
CHEN Y	33	9.55
LI Y	33	8.23
ZHANG J	32	8.54
ZHANG Y	30	8.66
LI J	28	6.99
WU H	26	6.63
LI X	24	5.91

Table 4: Top 10 Leading Authors

The dominance of these authors most of whom are affiliated with Chinese and East Asian institutions reveals a regional concentration of scholarly productivity. This pattern mirrors the global trend of expanding sustainability research within Asia, supported by strong policy mandates and institutional funding. Nonetheless, the field remains open for broader international participation, particularly from South Asia, Latin America, and Africa, where sustainability education and consumer awareness initiatives are rapidly evolving but underrepresented in global literature.

Most leading authors are affiliated with Chinese and East Asian institutions, reflecting a regional concentration of scholarly activity. This trend aligns with Asia's growing emphasis on sustainability research, supported by strong policy incentives and institutional funding. Nevertheless, participation from South Asia, Latin America, and Africa remains limited, suggesting opportunities for broader global engagement in sustainability education and consumer research.
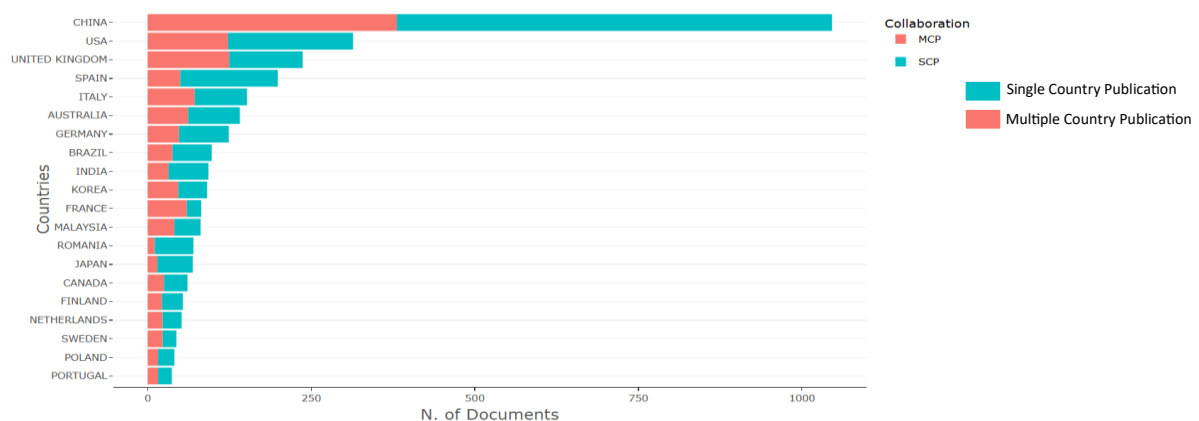
Corresponding Author's Countries

Figure 6: Corresponding Author's Countries

Country-level analysis (Table 7) reveals China as the leading contributor (2,740 publications), followed by the United States and the United Kingdom. Together, these nations account for nearly half of global output. While China demonstrates strong research productivity, its lower average citation rate compared to the USA and Malaysia suggests greater volume but moderate impact per paper. International collaborations, particularly between China–USA and China–UK, highlight robust North–South partnerships, while emerging linkages with Pakistan, Korea, and Australia signal growing Asia–Pacific research integration.

TOP 10 COUNTRIES TABLE WITH PUBLICATION AND CITATION NUMBERS

Country	Publication	TC	Average Article Citations
CHINA	2740	29918	28.60
USA	910	16816	53.60
UK	718	10212	43.10
SPAIN	507	6367	32.00
AUSTRALIA	421	3671	26.00
ITALY	396	3846	25.30
GERMANY	391	3892	31.40
INDIA	307	1956	21.00
FRANCE	283	2465	30.10
BRAZIL	267	2231	22.80

Table: 7

Top Institutions:

Institutional analysis (Table 8) reveals that the Beijing Institute of Technology leads with 118 publications, followed by the Bucharest University of Economic Studies (Romania) and Hong Kong Polytechnic University (China). Notably, seven of the top fifteen contributing institutions are based in China, underscoring the nation's concentrated research infrastructure in sustainability and consumer behaviour. Outside Asia, institutions from the UK, USA, and Sweden also appear prominently, signaling the global academic engagement with this topic. However, representation from South Asian institutions such as those in India, Nepal, and Bangladesh remains minimal. This imbalance suggests potential for new academic collaborations and capacity-building initiatives to strengthen sustainability research in developing regions. Encouragingly, countries like India with 307 publications but relatively low citation averages are showing increasing participation, hinting at an evolving research ecosystem that may mature in the coming years.

Affiliation	Country of Origin	Articles
BEIJING INSTITUTE OF TECHNOLOGY	China	118
BUCHAREST UNIVERSITY OF ECONOMIC STUDIES	Romania	59
HONG KONG POLYTECHNIC UNIVERSITY	Hong Kong, China	56
CHINESE ACADEMY OF SCIENCES	China	50
HARBIN INSTITUTE OF TECHNOLOGY	China	50
ZHEJIANG GONGSHANG UNIVERSITY	China	47
CHONGQING UNIVERSITY	China	46
UNIVERSITY OF LONDON	UK	42
STATE UNIVERSITY SYSTEM OF FLORIDA	USA	41
KYUSHU UNIVERSITY	Japan	37

Table 8: Top 10 institutions

Beijing Institute of Technology in China is leading the list with 118 articles. Among the top 15 institutions, seven are from China, contributing a total of 401 articles. The highest contributing among them is Beijing Institute of Technology with 118 articles. China's strong presence in this list highlights its significant research capacity and institutional support. Apart from China, the second & third highest contributing institution is the Bucharest University of Economic Studies in Romania, with a total of 59 articles and Hong Kong Polytechnic University in China with a total of 56 articles respectively. However, table: 8 also highlight significant gap of limited presence of institutions from South Asian countries like India, Pakistan, Bhutan, Nepal etc. The UK, Sweden, and Romania are the main representatives of Europe; many other European nations are absent. There is huge regional disbalance between the institutions' nation as well as within the institutions also.

In summary, the analysis of authors, institutions, and countries underscores a geographically asymmetric yet rapidly globalizing research landscape. The field is led by a small but highly influential group of scholars, predominantly from East Asia, who collaborate extensively with Western counterparts. The growing international co-authorship rate (41%) reflects a positive shift toward global cooperation in addressing sustainability and behavioural challenges. Future research can benefit from expanding this collaboration to include underrepresented regions, ensuring that diverse cultural and educational contexts are reflected in the global discourse on sustainability education and consumer behaviour.

Authors' collaboration

RQ4: What are the most cited sources & documents?

Top Sources & their Local Impact

Table 9 presents the leading sources in the field of sustainability in education and consumer behaviour. *Technological Forecasting & Social Change* emerges as the most

impactful and consistent journal, publishing 224 articles since 2001 and accumulating over 10,000 citations. With an h-index of 56 and a g-index of 93, the journal demonstrates substantial scholarly influence and sustained productivity within this research area. *Business Strategy and the Environment* followed nearly a decade later, beginning around 2010. Despite its relatively recent entry, it has published 198 papers, achieving an h-index of 53 and a g-index of 94, reflecting strong academic engagement. When compared, *Technological Forecasting and Social Change* maintains a slight edge due to its longer history, but the rapid growth and impact of *Business Strategy and the Environment* highlight its emergence as a major contributor to the field. Similarly, *The International Journal of Management Education* and *The Journal of Retailing and Consumer Services*, both introduced after 2015, are gaining recognition. Despite their newer status, these journals exhibit impressive citation metrics and have already established a presence through the publication of high-quality, widely cited research.

Source	no. of documents	h_index	g_index	m_index	TC	NP	PY_start
TECHNOLOGICAL FORECASTING AND SOCIAL CHANGE	224	56	93	2.24	10298	224	2001
BUSINESS STRATEGY AND THE ENVIRONMENT	198	53	94	3.313	9656	198	2010
JOURNAL OF BUSINESS ETHICS	101	41	75	1.464	5829	101	1998
CORPORATE SOCIAL RESPONSIBILITY AND ENVIRONMENTAL MANAGEMENT	145	36	59	2.4	4119	145	2011
JOURNAL OF BUSINESS RESEARCH	79	35	79	2.059	6254	79	2009
TOURISM MANAGEMENT	47	32	47	1	3838	47	1994
INTERNATIONAL JOURNAL OF CONSUMER STUDIES	62	29	49	1.381	2457	62	2005
INTERNATIONAL JOURNAL OF MANAGEMENT EDUCATION	156	29	49	3.222	3071	156	2017
JOURNAL OF RETAILING AND CONSUMER SERVICES	63	27	58	2.7	3423	63	2016

Table 9: Most Relevant Sources

Overall, this journal analysis indicates a clear evolution of the field from niche studies to mainstream recognition. Sustainability-related research now appears in both disciplinary journals (such as management and education) and interdisciplinary outlets (spanning environmental policy and social sciences). This diversification underscores the growing acknowledgment of sustainability education and consumer behaviour as integral components of global sustainable development discourse.

BRADFORD'S LAW

Bradford's Law helps explain the uneven distribution of articles across journals. Table 9 highlights that *Technological Forecasting and Social Change* published 224 papers, whereas *Omega – The International Journal of Management Science* published only 24. Such variations are typical, with a small set of core journals accounting for the majority of influential publications. According to Bradford's distribution, 343 core

sources containing 3,737 papers were categorized into three zones: Zone 1 journals contain 11 sources and are highly central to the research domain and contain the most influential publications. Zone 2 sources contain 46 sources and publish fewer yet remain significant contributors, while Zone 3 contain 286 sources and includes peripheral sources with limited but relevant contributions. Zone 1 alone accounts for 33.18% of the total publications, while Zones 2 and 3 contribute 34.2% and 32.6%, respectively. This distribution aligns with Bradford's Law, confirming the presence of a concentrated core of high-impact journals supporting this field.

Table 10 shows the list of sources falling into core zone (1) source: -

Journal Name	Rank	Freq	cumFreq
TECHNOLOGICAL FORECASTING AND SOCIAL CHANGE	1	224	224
BUSINESS STRATEGY AND THE ENVIRONMENT	2	198	422
INTERNATIONAL JOURNAL OF MANAGEMENT EDUCATION	3	156	578
CORPORATE SOCIAL RESPONSIBILITY AND ENVIRONMENTAL MANAGEMENT	4	145	723
JOURNAL OF BUSINESS ETHICS	5	101	824
JOURNAL OF BUSINESS RESEARCH	6	79	903
ENGINEERING CONSTRUCTION AND ARCHITECTURAL MANAGEMENT	7	75	978
IEEE TRANSACTIONS ON ENGINEERING MANAGEMENT	8	73	1051
AMFITEATRU ECONOMIC	9	63	1114
JOURNAL OF RETAILING AND CONSUMER SERVICES	10	63	1177
SOCIO-ECONOMIC PLANNING SCIENCES	11	63	1240

Table 10: Core zone sources

It is clearly evident that zone 1 alone, that is 11 sources contributes to approximately 33.18%. whereas, 46 sources contribute to 34.2 & 286 sources to 32.6 % of papers. This confirms the dataset follows Bradford's law of distribution of the sources.

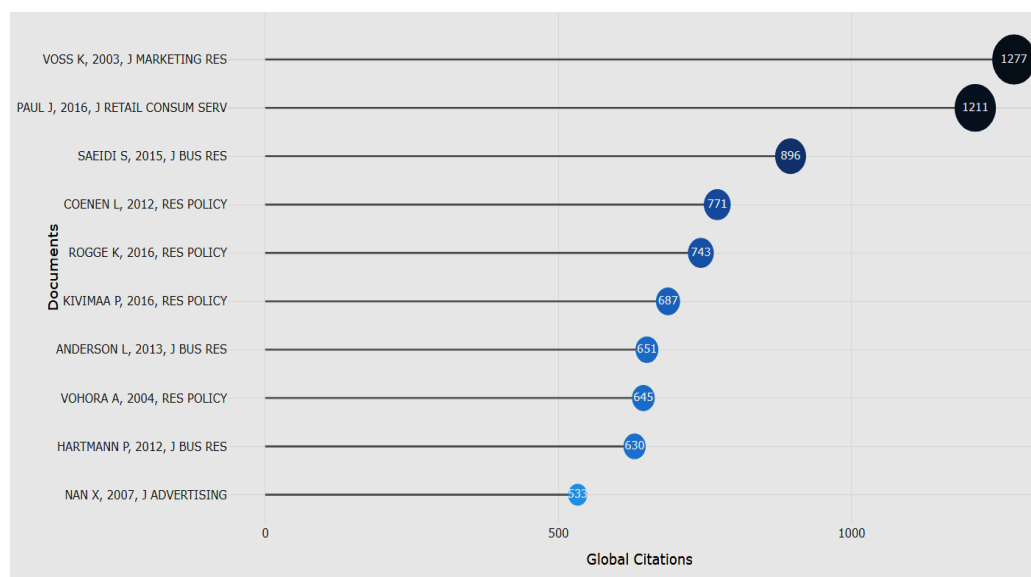**Most cited documents**

Figure 8: Most cited documents

Figure 8 displays the most cited documents in the study of the association between ESD and consumer behaviour. The most influential paper is by Voss et al. (2003), published in the *Journal of Marketing Research*, with 1,277 citations. Close behind is Paul (2016) in the *Journal of Retailing & Consumer Services*, with 1,211 citations. Both papers have made foundational contributions and continue to shape ongoing scholarly discussions in this domain. At the lower end of the citation spectrum, papers by Nan and Hartmann, with 533 and 630 citations respectively, remain notable for their focused exploration of communication, marketing, and ethical dimensions of sustainable behaviour. These works collectively demonstrate the diversity of theoretical and methodological approaches informing the literature and represent key milestones in the intellectual development of the field.

RQ5: What are the distinct themes in relation with sustainability in educational institute and consumer behaviour?

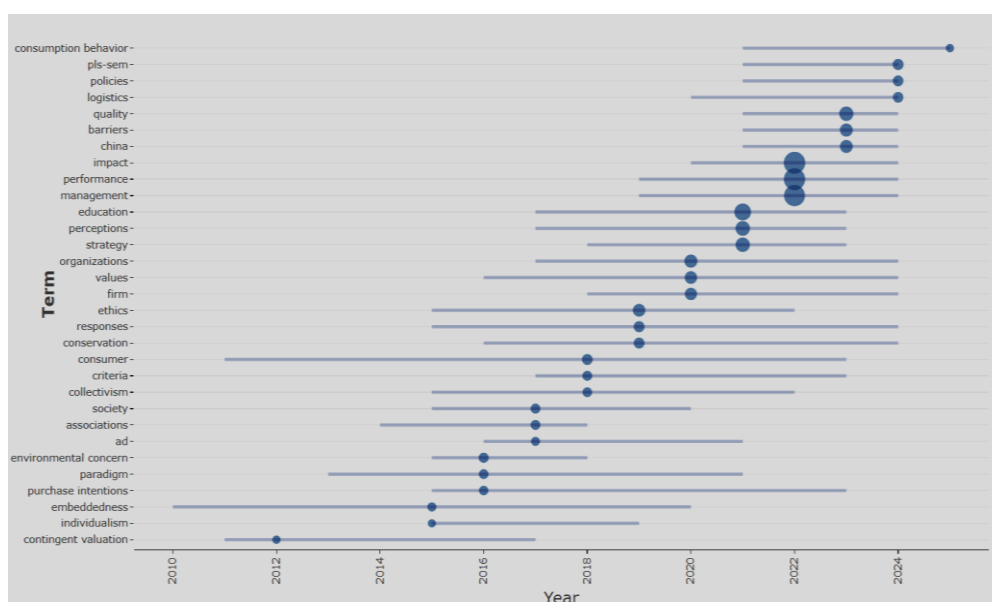**Table 11: Summary of Treemap Analysis**

Figure 11: Trend Topic

The thematic evolution map (Figure 10) visualizes how research themes emerge, peak, and decline over time. In the above graph, x-axis represent variables or themes and y-axis presents time zones. The length of the blue line on the area of the graph shows the timespan when the themes remained relevant or studied whereas the blue dot on the line marks the year of peak interest or maximum study for that theme. The size of the dot indicates the intensity or frequency of that study at its peak. From figure 11 it is clearly visible that studies on ESD and consumer behaviour has evolved over time. Some research topics have already been extensively studied and are now in their declining phase. In contrast, there are emerging areas that are still developing and offer

researchers more opportunities to explore unanswered questions and fill existing gaps in knowledge.

New & Emerging theme: consumption behaviour, logistics, PLS-SEM, barriers are key emerging, highly active & relevant themes. However, their bubble size or frequency is modest but their presence is growing. these themes are the "frontiers" of current domain, where problems remain unsolved, definitions are constantly being developed, and questions are continuously being posed. They create a space that encourages creativity and collaboration across different fields.

Established and growing: These strong themes are widely explored by researchers and sit at the heart of the field. Key topics include impact, performance, management, education, strategy, perceptions, organizations, values, ethics, and consumer behavior. These themes provide a solid base for testing out new ideas and theories.

Declining stage: Some ideas were popular in the past, but their relevance has faded due to changes in the environment. Topics like contingent valuation, embeddedness, individualism, paradigm, environmental awareness, and buying intentions fall into this category. Many of these concepts are heavy on theory or history, but they could gain new life from fresh viewpoints. This lifecycle framework helps scholars to see where the field is going and what valuable contributions can still be made.

5. GAPS & FUTURE RESEARCH

While this study has the findings of this study highlight many research gaps. Future research can explore the actual behavioural change in consumers due to exposure of sustainability initiatives perhaps through longitudinal or experimental studies. Furthermore, most of the studies are concentrated in western or developed countries hence less study is seen form South Asian countries like India, Nepal, Pakistan, Afghanistan etc. findings from these nations can help in understanding the influence of regional and cultural factors. Moreover, there is an urgent need to develop sustainability assessment framework for particular institution tailored to meet their unique need. Future studies could explore how the integration of advanced technologies like artificial intelligence, augmented & mixed reality can enhance users experience to sustainability initiatives exposures. Furthermore, a more thorough examination of the institutional culture and policy, including the involvement of administrators, may provide insightful information on what motivates or inhibits consumer's' development of sustainable mindsets.

6. CONCLUSION

This study aimed at identification and visualization of the research trend on sustainability initiatives of educational institutions and consumer behaviour. By analysing 3737 documents downloaded and merged datasets from web of science & scopus through using bibliometric tools like VOSviewer and biblioshiny, the study provides a comprehensive view of research trends, influential authors & sources, top contributing countries, collaborative patterns & current themes of the domain exploring the association between ESD & consumer behaviour.

Findings show an increase in scholarly work in sustainability education and consumer behaviour especially after the launch of SDGs. However, the domain is being dominated by major clusters of "sustainability", "impact", "performance", & "management".

This review paper highlights the progress made in the domain but also calls for more study on underexplored areas like behavioural changes, purchase & intention gap, underrepresentation from South Asian countries etc. the study highlights the need of active research from these countries.

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