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Bibliometric Analysis of Research Trends in Sustainable Fashion: A Quantitative Study of Publications, Citations, and Collaborations

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Abstract

This study conducts a comprehensive bibliometric analysis of research trends in sustainable fashion, examining the growth and dynamics of publications, citations, and collaborations in this emerging field. Utilizing bibliometric data from prominent academic database i.e., Scopus, the study identifies key patterns in the publication volume, influential authors, and the geographical distribution of research activity. The analysis highlights the exponential growth of scholarly output in sustainable fashion, driven by increasing global awareness of environmental and ethical concerns in the textile and apparel industry. Citation network analysis reveals pivotal works that have shaped the field, while co-authorship trends underscore the importance of international collaborations in advancing sustainable fashion research. The study also maps thematic clusters, showcasing the evolution of research topics such as circular economy practices, eco-design strategies, and consumer behavior in sustainable fashion. By providing an empirical overview of the field's development, this study offers valuable insights for researchers, policymakers, and industry stakeholders seeking to foster innovation and interdisciplinary collaboration in sustainable fashion.

Keywords: Sustainable Fashion, Bibliometric Analysis, Sustainability, VOSviewer

Introduction

Sustainable fashion has emerged as a critical discourse within the broader context of environmental sustainability and ethical consumerism. This concept encompasses a multifaceted approach to fashion that prioritizes ecological integrity, social equity, and economic viability throughout the lifecycle of clothing products. The fashion industry, notorious for its significant environmental footprint, is increasingly scrutinized for its practices, which often lead to pollution, waste, and exploitation of labor. As consumers become more aware of these issues, the demand for sustainable fashion options has surged, prompting brands to rethink their production methods and marketing strategies (Busalim et al., 2022; McKeown & Shearer, 2019). While sustainable fashion has attracted increasing

scholarly attention, existing studies remain fragmented across disciplines, regions, and thematic priorities, limiting their cumulative impact and practical applicability. By employing a comprehensive bibliometric approach, this research demonstrates the utility and effectiveness of the chosen research area by identifying influential contributions, dominant research clusters, geographic disparities, and emerging themes. The findings are particularly relevant to multiple stakeholders, including academics seeking to advance theory, policymakers aiming to design evidence-based sustainability regulations, and industry practitioners striving to implement transparent and impactful sustainability strategies.

Historically, the roots of sustainable fashion can be traced back to the 1960s when consumers began to recognize the detrimental effects of the fashion industry on the environment. This awareness was further amplified in the 1980s and 1990s through campaigns against practices such as fur farming, which catalyzed a broader conversation about ethical consumption and animal rights (Mandarić et al., 2022). As the fashion industry evolved, so too did the definitions and frameworks surrounding sustainable fashion. Scholars have noted that a consistent and universally accepted definition remains elusive, complicating efforts to promote sustainability within the industry (Sinha et al., 2022; Brandão & Costa, 2021). Different stakeholders—ranging from consumers to manufacturers—interpret sustainability in various ways, often leading to confusion and skepticism regarding claims made by fashion brands. For instance, some consumers perceive the term as incompatible with the fast-paced nature of the fashion industry, which is characterized by rapid turnover and disposability (Bly et al., 2015; Sinha et al., 2022). This inconsistency in understanding sustainable fashion can hinder its adoption, as consumers may struggle to identify genuinely sustainable practices amidst a sea of greenwashing (Brandão & Costa, 2021).

The fashion industry is notorious for its significant environmental footprint, being the second-largest polluter globally, following the oil industry. The production processes involved in creating garments contribute to extensive water pollution, high carbon emissions, and excessive waste generation (Ho et al., 2020; Sailer et al., 2022). In response to these challenges, sustainable fashion seeks to address the lifecycle of clothing—from design and production to consumption and disposal—by advocating for practices that are environmentally friendly and socially responsible (Hassan et al., 2022). This includes the use of organic materials, ethical labor practices, and the promotion of circular economy principles, which emphasize recycling and upcycling to extend the life of garments (Shim et al., 2018).

Consumer behavior plays a pivotal role in the sustainable fashion movement. Research indicates that factors such as perceived value, commitment to sustainability, and lifestyle changes significantly influence young consumers' engagement with sustainable clothing (Busalim et al., 2022; Hwang et al., 2024). However, barriers such as budget constraints, lack of variety, and insufficient knowledge about sustainable options often deter consumers from making environmentally friendly choices (Busalim et al., 2022; Sinha et al., 2022). The pro-environmental attitude-behavior gap is particularly pronounced among trend-conscious consumers, who may compartmentalize their sustainability concerns while continuing to engage in fast fashion consumption (Cavender & Lee, 2018). The COVID-19 pandemic has further complicated the landscape of sustainable fashion. It has not only highlighted the

vulnerabilities of the global supply chain but also fostered a shift in consumer attitudes towards sustainability. Many consumers have reported a heightened awareness of environmental issues and a desire to support brands that demonstrate ethical practices (Strübel et al., 2023). This shift presents an opportunity for the fashion industry to align itself more closely with sustainable principles, as consumers increasingly prioritize brands that reflect their values (Hwang et al., 2024; Strübel et al., 2023).

Moreover, the rise of slow fashion as a counter-movement to fast fashion has gained traction, promoting a more thoughtful approach to consumption that values quality over quantity. Slow fashion advocates for the production of garments that are durable, timeless, and ethically made, encouraging consumers to invest in fewer, high-quality pieces rather than succumbing to the rapid turnover of trends characteristic of fast fashion (Silva et al., 2022). This shift in consumer mindset is essential for fostering a sustainable fashion ecosystem that prioritizes environmental stewardship and social equity. Furthermore, the role of transparency in fostering consumer trust cannot be overstated. Brands that adopt transparent practices regarding their supply chains and sustainability claims are more likely to gain consumer confidence and loyalty (Brandão & Costa, 2021). Policymakers also have a crucial role in demanding transparency and establishing regulations that prevent misleading environmental claims, thereby mitigating consumer skepticism and promoting genuine sustainable practices within the industry (Brandão & Costa, 2021; Duong, 2024).

The sustainable fashion movement is not merely a trend but a necessary evolution in response to the pressing environmental challenges posed by the fashion industry. The integration of sustainable practices into the fashion supply chain can significantly reduce pollution and improve working conditions, thereby addressing both ecological and social issues (Roozen et al., 2021). As the market for sustainable fashion continues to grow, it is essential for brands to engage in meaningful dialogue with consumers, educating them about the benefits of sustainable practices and the importance of conscious consumption (Hassan et al., 2022; Silva et al., 2022). Therefore, sustainable fashion represents a complex interplay of consumer behavior, industry practices, and societal values. As awareness of environmental issues increases, the fashion industry must adapt to meet the changing expectations of consumers who are increasingly seeking sustainable options. By fostering transparency, addressing barriers to sustainable consumption, and promoting ethical practices, the fashion industry can contribute to a more sustainable future while simultaneously appealing to a growing demographic of environmentally conscious consumers (Busalim et al., 2022; Hwang et al., 2024; Brandão & Costa, 2021; Strübel et al., 2023).

The application of bibliometrics to map and quantify research in sustainable fashion is vital for several reasons. Firstly, it allows for a comprehensive understanding of the current landscape of sustainable fashion research, identifying key trends, influential authors, and significant publications. A bibliometric analysis has highlighted the importance of mapping scientific literature to characterize existing research and achievements in sustainability within the fashion industry, revealing how stakeholders utilize sustainable approaches to address industry challenges (Shuangxi, 2022). This mapping not only aids in recognizing the evolution of sustainable practices but also helps in pinpointing gaps in the literature that require further exploration.

Furthermore, the application of bibliometrics can enhance the visibility and dissemination of sustainable fashion research. By analyzing citation trends and publication patterns, researchers can identify influential works that shape the discourse on sustainable fashion, thereby guiding future research directions (Putri & Irfany, 2023). This visibility is essential for promoting awareness among industry stakeholders and consumers, ultimately driving the adoption of sustainable practices in fashion.

Methodology

The workflow for bibliometric research is a systematic process that enables researchers to quantitatively analyze scientific literature and derive insights regarding trends, collaborations, and the evolution of research fields. This process typically consists of several key steps, which can be synthesized from various scholarly sources (Zupic & Cater, 2015). These steps have been identified as Research Design, Data Collection, Data Analysis, Data Visualization and Data Interpretation

Figure 1. Steps in Bibliometric Research

Study Design

The study design in bibliometrics research is a systematic approach that employs quantitative methods to analyze scientific literature, revealing patterns, trends, and relationships within a specific field. The design typically involves several key steps, including data collection, data cleaning, analysis, visualization, and interpretation of results. This structured methodology is crucial for ensuring the reliability and validity of bibliometric studies. The bibliometric field has gained appeal in business research (Donthu et al., 2021; Li et al., 2021). To analyze these tendencies and current studies on sustainable consumer behavior in sustainable fashion, researchers employed bibliometrics. This was achieved with bibliometric software (VOSviewer 1.6. 20). This study performs a comprehensive analysis of the entire field and its specific domains to identify leading scientists and significant academic articles, while examining their connections and deficiencies.

This study aims to address the knowledge gap and offer valuable insights by answering several critical research questions that elucidate existing trends and inspire future research directions. To further these research objectives, the following research questions have been identified for examination in this study:

RQ1: What are the prevailing trends and key concepts in Sustainable Fashion literature?
RQ2: What overarching lessons can be extracted from previous publications to prepare us for the future?

Data Collection

Data collection is a foundational phase in bibliometric analysis, significantly influencing the validity, reliability, and scope of subsequent findings. Data collection in bibliometric research often utilizes databases such as Scopus, Web of Science, or Google Scholar to gather relevant publications. Constructing a well-defined search strategy is critical for ensuring the inclusion of relevant publications. (Muritala et al., 2020). In bibliometric studies, the data collection process typically includes not only the selection of relevant articles but also the application of specific inclusion or exclusion criteria to ensure that the data is pertinent to the research questions being addressed (Passas, 2024).

Moreover, the use of frameworks such as PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) is also noted as a best practice for ensuring comprehensive data gathering (Gronthy et al., 2023). Consequently, Figure 2 depicts the steps in data collection process for this study in accordance with the PRISMA framework. Bibiliometric methodology has been applied to various fields in business including marketing (Ellegaard & Wallin, 2015; Backhaus et al., 2011). Many researchers have used the Scopus database as it is the trustworthy and substantial database that contain information on range of social sciences, including business and marketing (Dash et al., 2023; Agustina, 2021; Patrick & Hee, 2020).

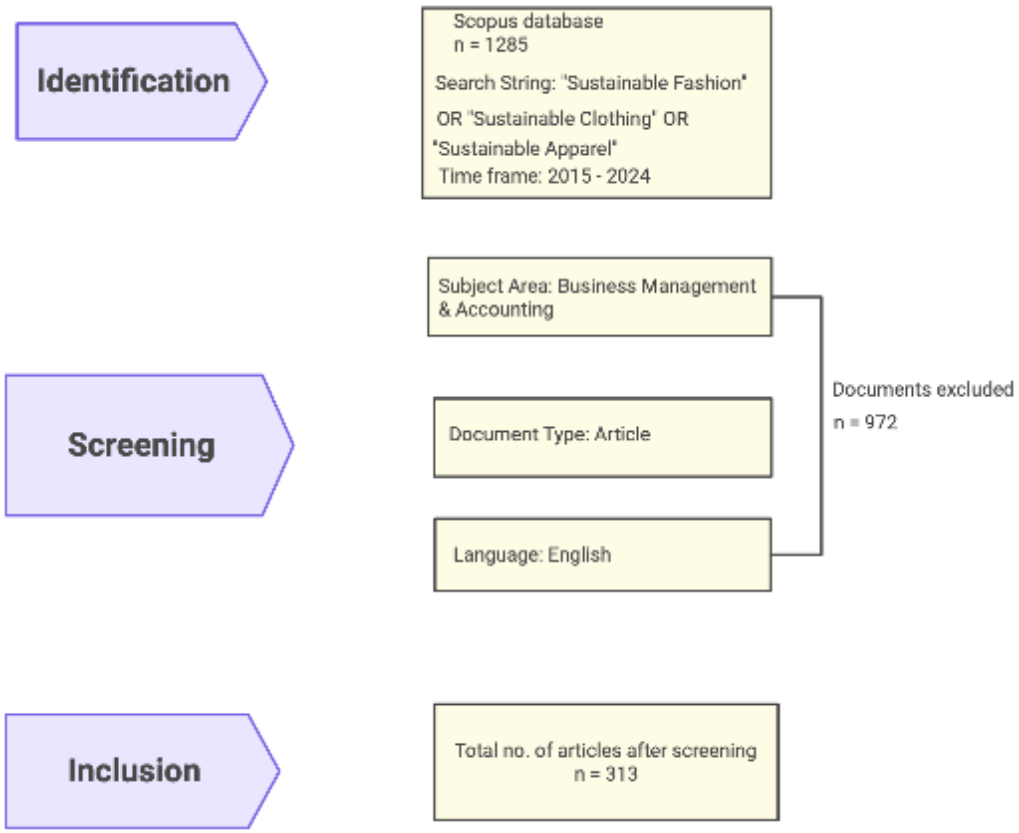

Figure 2. PRISMA framework for this study

Table 1
Inclusion criteria of this study (Scopus database)

Category	***Criteria***
Database	Scopus
Search String	"Sustainable Fashion" OR "Sustainable Clothing" OR "Sustainable apparel"
Time Frame	2015 - 2024
Subject Area	Business Management & Accounting
Document Type	Article
Language	English
Total number of articles	313

Data Analysis
Once data is collected, the next phase involves data cleaning and refining, which is essential to eliminate duplicates and irrelevant entries, thereby enhancing the quality of the analysis. This step is often overlooked but is vital for maintaining the integrity of the bibliometric analysis (Passas, 2024). Following data preparation, researchers apply various bibliometric methods, including citation analysis, co-citation analysis, and bibliographic coupling, to explore the interconnections among publications (Župič & Čater, 2014; Smith & Sarabi, 2020). These methods allow researchers to identify influential works, prominent authors, and emerging trends within the literature.

Data Visualisation
Visualization is another critical aspect of bibliometric research design. In this study, VOSviewer (v1.6.20) was employed to create visual representations of data, facilitating the identification of clusters and patterns in the literature (Ragazou et al., 2022; Landry & Furrer, 2023). Also, the emphasis on the use of statistical and mathematical methods to analyze interconnections in research fields can be effectively visualized to enhance understanding (Gronthy et al., 2023). Visualization not only aids in the interpretation of results but also communicates findings to a broader audience, making complex data more accessible.

Data Interpretation
Finally, the interpretation of results is where researchers synthesize their findings to draw meaningful conclusions about the state of research in a particular field. This involves contextualizing the data within existing literature and identifying gaps or future directions for research (Thomas & Gupta, 2021).

In this study, the results were meticulously analyzed and evaluated. Bibliometric analysis, considered a delineation of fundamental bibliometric statistics, is thereafter employed to evaluate the outcomes. The authors' metrics and information are then employed to advance the investigation. The subsequent information was meticulously

assessed across the following principal categories: Key Data, Significant Authors, Most Impactful Nations, Co-Citation Analysis, Co-Occurrence Network, Bibliographic Coupling Analysis, and Keyword Clustering for Authors, along with prospective research directions.

Results

Evolution of publications

The evolution in the number of research publications from year 2015 to year 2024 is shown in Figure 2. The rise in the number of publications in sustainable fashion literature can be attributed to the creation of Sustainable Development Goals (SDGs) by the United Nations in 2015 (Thakker & Sun, 2023), where SDG 12 directly links to sustainable fashion consumption and production. Hence, the increase in research publications from 9 articles published in year 2015 to 78 research articles in the year 2024.

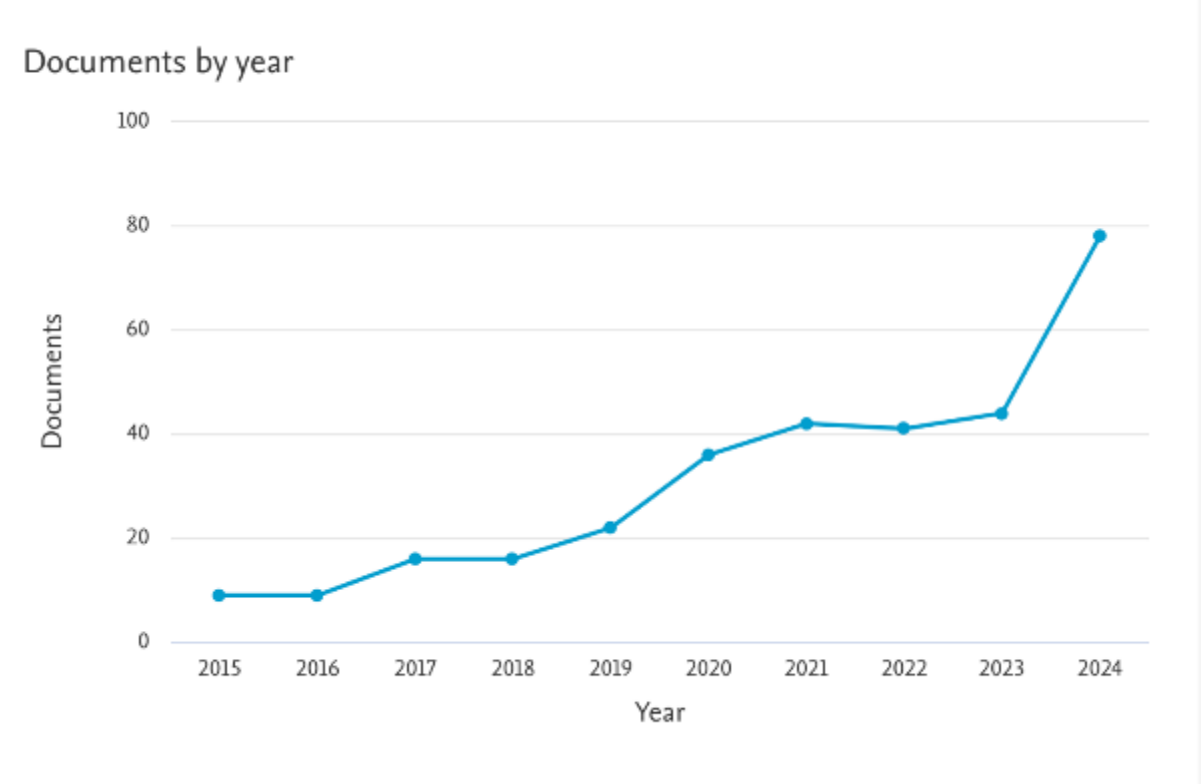

Figure 3. Research publications over time Source: Scopus

Geographic Distribution

In bibliometric analysis, geographic distribution refers to the study of the geographical sources of scholarly output, including countries, regions, or academic institutions where research is carried out and published. It offers information about regional or worldwide contributions to a certain topic of study (Shi et al., 2021). Understanding regional distribution is crucial for bibliometric analysis in order to pinpoint top research centers, analyze trends in international collaboration, and gauge the worldwide influence of research projects (Purnell, 2024). It facilitates efficient resource allocation by funding organizations and governments and promotes international collaboration. Furthermore, geographic distribution analysis reveals differences in research access and production, providing a foundation for programs that support more equal scientific advancement globally (Boshoff et al., 2024).

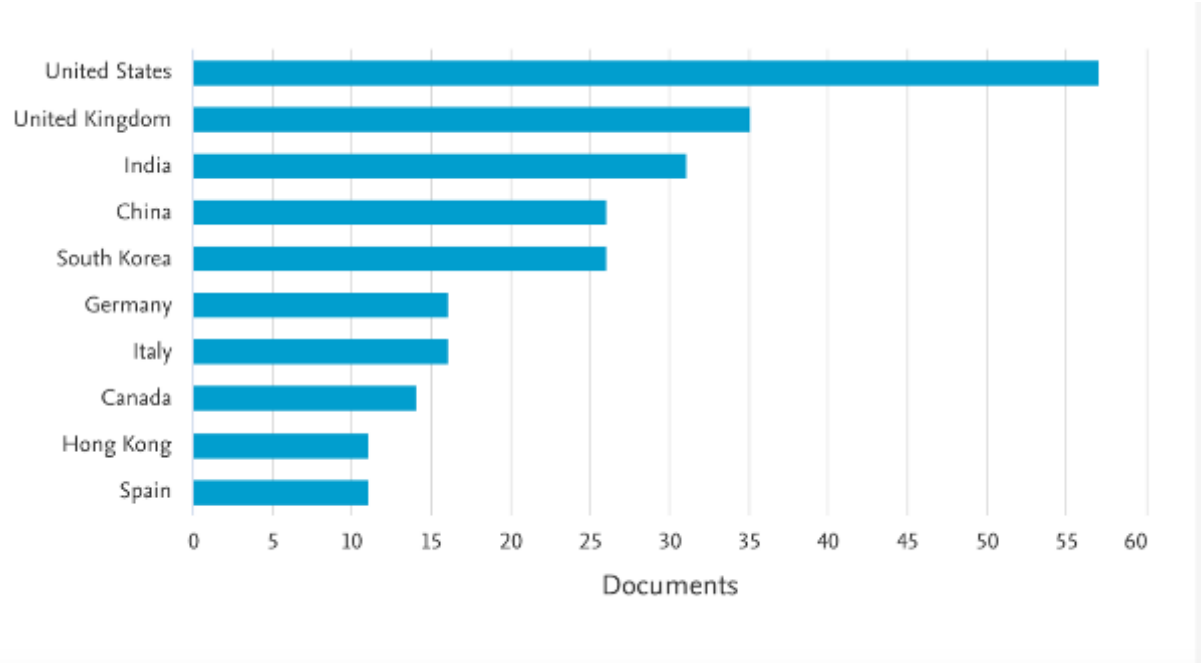

Figure 4. Country impact Source: Scopus

In bibliographic analysis, *Total Link Strength* (TLS) is a metric used to assess the overall connectedness or influence of a given item. It reflects the strength of connections between items based on shared citations, co-authorship, or keyword similarities. Table 2 shows the contribution of top 10 countries in sustainable fashion research, with China being the most impactful followed by the United States and Hong Kong.

Table 2
Contribution of top 10 countries Source: VOSviewer

Country	Documents	Citations	Total Link Strength
China	26	895	18
United States	57	1426	17
Hong Kong	11	660	13
United Kingdom	35	1145	13
South Korea	26	756	11
Germany	16	1005	6
Canada	14	554	5
India	31	316	3
Italy	16	647	3
Spain	11	98	1

Most influential articles

Out of 313 articles, only 8 articles are cited more than 200 times, 2.5% of the total documents.

Table 3

Most influential (cited) articles in sustainable fashion domain. Source: Scopus

No.	Title	Author(s)	Source	Citations
1	Innovative and sustainable business models in the fashion industry: Entrepreneurial drivers, opportunities, and challenges	Todeschini et al. (2017)	*Business Horizons*	347
2	Sustainable fashion consumption and the fast fashion conundrum: Fashionable consumers and attitudes to sustainability in clothing choice	Mcneill & Moore (2015)	*International Journal of Consumer Studies*	328
3	Data quality challenges for sustainable fashion supply chain operations in emerging markets: Roles of blockchain, government sponsors and environment taxes	Choi & Luo (2019)	*Transportation Research Part E: Logistics and Transportation Review*	297
4	What is sustainable fashion?	Henninger et al. (2016)	*Journal of Fashion Marketing and Management*	275
5	Bridge the gap: Consumers' purchase intention and behavior regarding sustainable clothing	Rausch & Kopplin (2021)	*Journal of Cleaner Production*	273
6	Ethical consumer behaviour in Germany: The attitude-behaviour gap in the green apparel industry	Weiderhold & Martinez (2018)	*International Journal of Consumer Studies*	217
7	Green thinking but thoughtless buying? An empirical extension of the value-attitude-behaviour hierarchy in sustainable clothing	Jacobs et al. (2018)	*Journal of Cleaner Production*	208
8	Sustainable clothing: Challenges, barriers and interventions for encouraging more sustainable consumer behaviour	Harris et al. (2016)	*International Journal of Consumer Studies*	205
9	Sustainable Markets: Motivating Factors, Barriers, and Remedies for Mobilization of Slow Fashion	Ozdamar Ertekin & Atik (2015)	*Journal of Macromarketing*	193
10	Exit from the high street: An exploratory study of sustainable fashion consumption pioneers	Bly et al. (2015)	*International Journal of Consumer Studies*	141

Main Keywords

The analysis of main keywords in academic literature serves as a crucial method for understanding research trends, interdisciplinary connections, and the evolution of knowledge across various fields. Keywords are not merely labels; they encapsulate the core themes and concepts of research papers, significantly influencing discoverability and the impact of scholarly work (Pottier, 2023).

One of the primary functions of keywords is to summarize the content of academic papers effectively. The keywords selected by authors are intended to accurately represent the main themes of their work, thereby facilitating easier retrieval and categorization in databases (Ni et al., 2021). Furthermore, selecting appropriate keywords enhances the visibility and impact of academic articles, and poorly chosen keywords can hinder a paper's discoverability (Fengnian, 2019; Blank et al., 2016). Main keywords in sustainable fashion domain are shown in Figure 5 and Table 4.

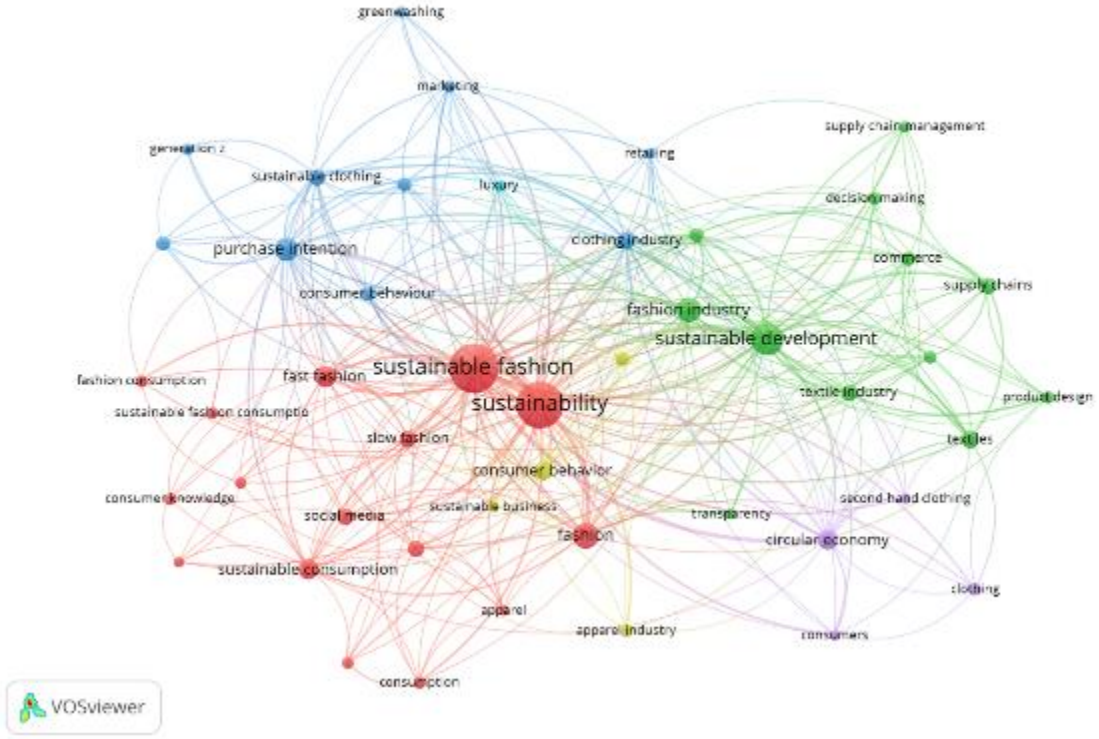

Figure 5. Main Keywords Source: VOSviewer

Table 4
Ten (10) main keywords in sustainable fashion domain. Source: VOSviewer

No.	Keywords	Occurrences
1	Sustainable Fashion	101
2	Sustainability	92
3	Sustainable Development	44
4	Fashion	29
5	Fashion Industry	25
6	Purchase Intention	24
7	Fast Fashion	19
8	Sustainable Consumption	17
9	Circular economy	17
10	Consumer Behaviour	15

Co-occurrence Analysis

Co-occurrence analysis looks at how frequently particular phrases, keywords, or entities (such authors, organizations, or ideas) occur together in a collection of documents (Rao & Shukla, 2022). This approach uncovers the theme structure of a research field and establishes

linkages between concepts by examining the co-occurrence of keywords or subject phrases. Co-occurrence analysis is used in bibliometric analysis to map research patterns, identify new subjects, and comprehend the connections between concepts within a domain (Zeng & Hengsadeekul, 2020). It is especially useful for keyword analysis, which allows researchers to see networks of connected ideas and discover a discipline's cognitive structure. This aids in determining central subjects, interdisciplinary connections, and potential research areas (Li et al., 2021; Guo et al., 2020).

The process of co-occurrence analysis involves quantifying how often specific keywords appear together across a set of documents. This is often achieved through bibliometric tools such as CiteSpace and VOSviewer, which help visualize the co-occurrence networks and identify clusters of related keywords (Li et al., 2021; Guo et al., 2020). This study uses VOSviewer for co-occurrence analysis. Moreover, co-occurrence analysis can extend beyond mere frequency counts to include more sophisticated statistical models that account for the probabilistic nature of keyword associations. For example, Veech (2012) discusses a probabilistic model that enhances the understanding of specific co-occurrence patterns, which can be analogously applied to bibliometric studies to infer relationships between keywords. This approach allows researchers to discern not only the presence of associations but also the strength and significance of these relationships, thereby enriching the analysis.

Out of the 1434 keywords examined, only 18 (Figure 6) satisfied the predefined criterion of appearing at least 10 times. Sustainability and sustainable fashion emerge as a central and prevalent theme, with the highest number of links (16 & 17 respectively) and total link strength of 118 & 104 respectively; followed by sustainable development and fashion industry.

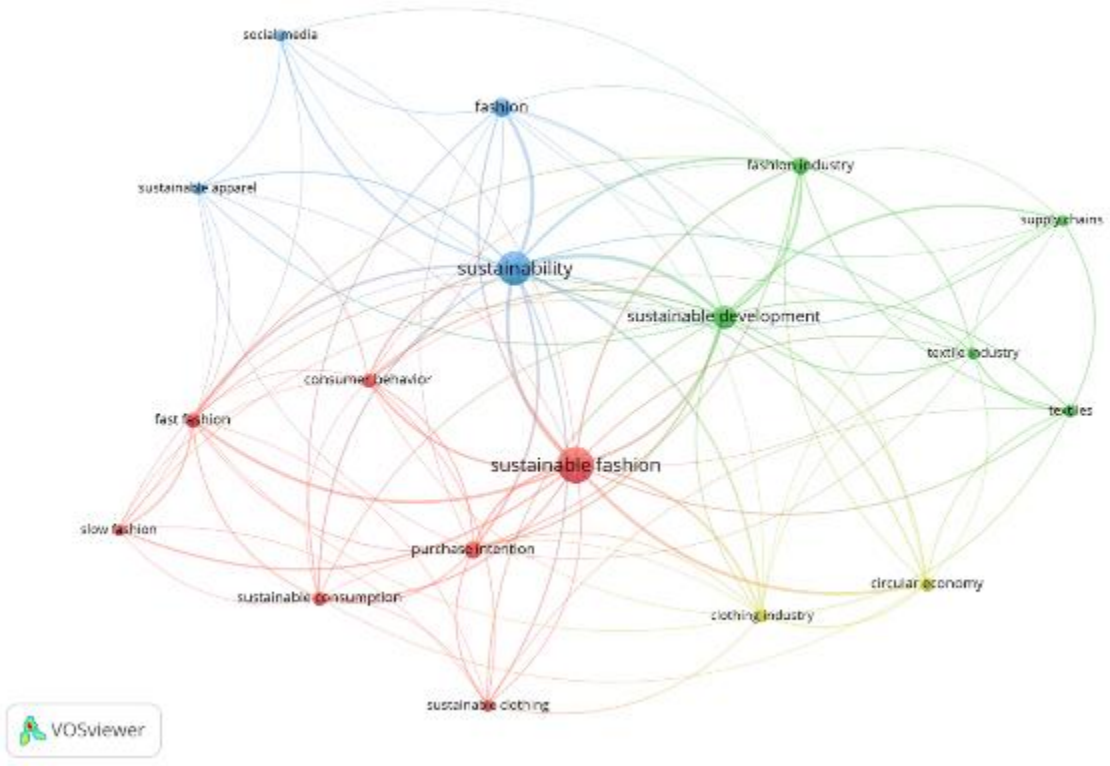

Figure 6. Co-occurrence of main Keywords Source: VOSviewer

Co-citation Analysis

Co-citation analysis is a bibliometric technique that examines the frequency with which two documents are cited together by subsequent publications. This method serves as a valuable tool for mapping the intellectual structure of various academic fields, revealing relationships among authors, journals, and topics. The foundational work on co-citation analysis was pioneered by Henry Small in the 1970s, and it has since evolved into a critical method for understanding the dynamics of scientific literature (Yang et al., 2019; Liu et al., 2016).

The process of co-citation analysis involves constructing networks based on the co-citation frequency of documents. The resulting co-citation networks can be visualized to illustrate the relationships between different scholarly works. For example, the thickness of lines in these networks often represents the strength of the co-citation relationship, while the size of nodes indicates the citation frequency of individual documents (Hu et al., 2019; Yang et al., 2023). This visualization aids researchers in identifying influential works and understanding the foundational literature within a specific domain (Toseef et al., 2023). In this study, using VOSviewer and keeping the minimum number of cited refences as 15, 10 documents were identified as the most co-cited references. Table 5 lists the most co-cited references in the sustainable fashion domain.

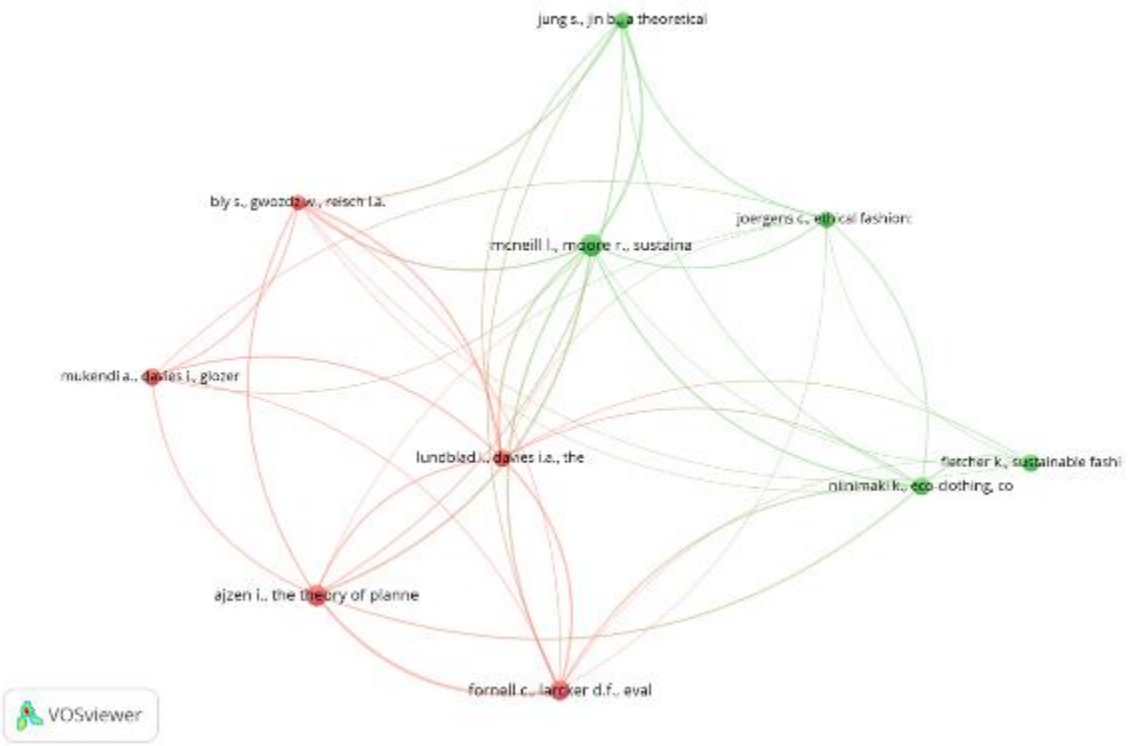

Figure 7. Co-citation analysis of references Source: VOSviewer

Table 5
Most co-cited references in sustainable fashion domain. Source: VOSviewer

No.	Author & Title	Citations	Total Link Strength
1	Mcneill & Moore (2015). Sustainable Fashion Consumption and the fast fashion conundrum: Fashionable consumers and attitudes to sustainability in clothing choice.	30	51
2	Ajzen (1991). The theory of planned behaviour.	27	45
3	Fornell & Larcker (1981). Evaluating Structural Equation models with unobservable variables and measurement error.	24	39
4	Lundblad & Davies (2016). The values and motivations behind sustainable fashion consumption.	21	39
5	Bly et al. (2015). Exit from the high street: An exploratory study of sustainable fashion consumption pioneers.	15	31
6	Jung & Jin (2014). A theoretical investigation of slow fashion: sustainable future of the apparel industry.	18	30
7	Niinimäki (2010). Eco-clothing, consumer identity and ideology.	19	26
8	Mukendi et al. (2020). Sustainable fashion: current and future research directions.	20	19
9	Joergens (2006). Ethical fashion: myth or future trend?.	17	17
10	Fletcher (2013). Sustainable fashion and textiles: design journeys.	20	9

Bibiliograhic Coupling analysis

Bibliographic coupling analysis is a bibliometric technique that identifies relationships between academic documents based on their shared references. This method has gained prominence as a means of mapping research landscapes, understanding intellectual structures, and identifying emerging trends within various fields of study. The foundational principle of bibliographic coupling is that two documents are considered coupled if they cite at least one common reference, suggesting a thematic or conceptual similarity between them (Yadav et al., 2022; Boyack & Klavans, 2010).

One of the key advantages of bibliographic coupling is its ability to reflect the production of scientific knowledge rather than merely its consumption, as is the case with co-citation analysis (Vogel & Güttel, 2012; Boyack & Klavans, 2010). While co-citation analysis examines how often two documents are cited together, bibliographic coupling focuses on the references that authors choose to include in their works. This distinction allows bibliographic coupling to serve as a more effective tool for identifying emerging research fronts, as it can reveal connections between documents that may not yet have been widely recognized or cited (Yadav et al., 2022; Boyack & Klavans, 2010). For instance, Huang & Chang (2014) demonstrated the utility of bibliographic coupling in detecting research fronts in the organic light-emitting diode (OLED) field, highlighting its effectiveness in revealing the evolution of research topics over time (Huang & Chang, 2014).

The application of bibliographic coupling extends beyond mere citation analysis; it has been utilized in various studies to map the evolution of specific research areas. For instance, Mura et al. (2018) employed bibliographic coupling to trace the development of sustainability measurement research, demonstrating its effectiveness in capturing the dynamics of a

specific research domain (Mura et al., 2018). Similarly, Zhao (2008) introduced author bibliographic coupling analysis as a method to map the research activities of authors, providing insights into the intellectual influences within information science (Zhao, 2008). For the bibliographic coupling research of journals, the minimal requirement of 5 documents per journal was considered, and the final set had 12 journals that met the standard.

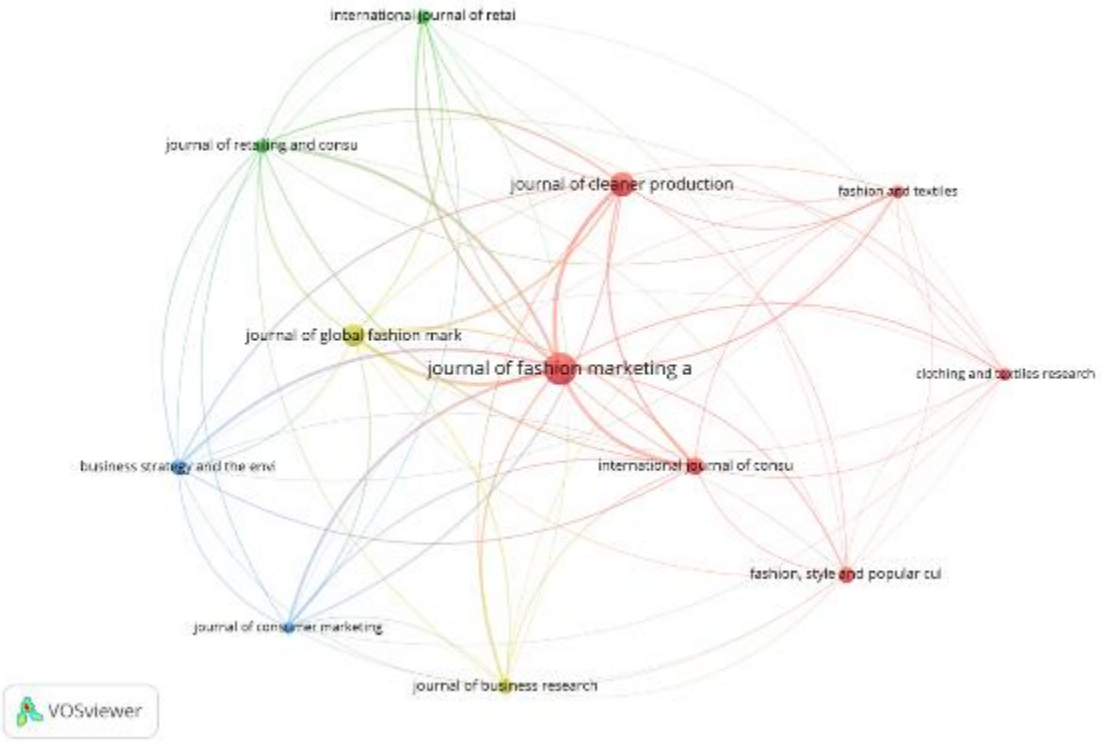

Figure 8. Bibliographic coupling of sources Source: VOSviewer

Table 6
Journals with most co-cited references

No.	Source	Documents	Citations	Total Link Strength
1	Journal of Fashion Marketing & Management	38	1135	3514
2	Journal of Cleaner Production	21	1154	1793
3	Journal of Global Fashion Marketing	18	511	1631
4	International Journal of Consumer Studies	11	1235	1339
5	Journal of Retailing and Consumer Services	7	319	1161
6	Business Strategy and Environment	8	114	879
7	Journal of Consumer Marketing	5	32	851
8	International Journal of Retail & Distribution Management	7	166	700
9	Journal of Business Research	8	451	611
10	Fashion & Textiles	6	154	446
11	Fashion, style and popular culture	10	26	299
12	Clothing and Textile Research Journal	6	85	268

Discussion

Research Trends

The bibliometric analysis reveals several prominent trends in sustainable fashion research:

1. **Exponential Growth in Publications**: Research output has surged since 2015, aligning with the adoption of the UN Sustainable Development Goals (SDGs), particularly SDG 12 (sustainable consumption and production). Annual publications grew from 9 in 2015 to 78 in 2024, reflecting heightened academic and industry focus on sustainability challenges.
2. **Geographic Dominance**: China and the United States lead in research contributions (26 and 57 documents, respectively), followed by the UK and South Korea. These regions also exhibit strong international collaboration, as evidenced by Total Link Strength metrics (Table 2).
3. **Thematic Evolution**: Keyword analysis (Table 4, Figure 5) highlights core themes such as *circular economy*, *sustainable consumption*, and *consumer behavior*. Co-occurrence networks (Figure 6) further emphasize the centrality of "sustainability" and its interplay with fast fashion, eco-design, and supply chain innovation.
4. **Influential Works**: Highly cited articles (Table 3) focus on sustainable business models (Todeschini et al., 2017), consumer attitude-behavior gaps (McNeill & Moore, 2015), and blockchain applications in supply chains (Choi & Luo, 2019). Co-citation analysis (Table 5) underscores foundational theories like Ajzen's *Theory of Planned Behavior* (1991) and Fletcher's *Sustainable Fashion and Textiles* (2013).
5. **Interdisciplinary Collaboration**: Bibliographic coupling (Figure 8) reveals clusters linking sustainable fashion with marketing, environmental science, and policy studies, indicating a multidisciplinary approach to addressing industry challenges.

Future Research Directions

The analysis identifies critical gaps and proposes the following avenues for future research:

1. **Consumer Behavior Dynamics**: Investigate the *attitude-behavior gap* in diverse cultural and economic contexts, particularly in underrepresented regions like Africa and South America. Studies could explore how socioeconomic factors, education, and digital platforms influence sustainable purchasing decisions.
2. **Technological Integration**: Examine the role of emerging technologies (e.g., blockchain, AI, IoT) in enhancing transparency, traceability, and efficiency in sustainable supply chains. Empirical studies on blockchain's impact in emerging markets are notably scarce.
3. **Standardization and Policy**: Develop unified frameworks for defining and measuring sustainability in fashion to combat greenwashing. Research should assess the efficacy of government policies, such as environmental taxes and subsidies, in promoting ethical practices.
4. **Circular Economy Innovations**: Explore scalable circular business models, including textile recycling, rental systems, and upcycling. Lifecycle assessments (LCAs) of circular practices could quantify their environmental and economic benefits.
5. **Post-Pandemic Shifts**: Analyze long-term changes in consumer priorities post-COVID-19, such as heightened demand for ethical brands and resilience in global supply chains.
6. **Interdisciplinary Approaches**: Foster collaborations between fashion studies, behavioral psychology, material science, and policy-making to address systemic challenges like overproduction and waste.

Conclusion and Limitations

Conclusions

This study provides a comprehensive overview of sustainable fashion research, demonstrating its rapid growth and evolving thematic focus. Key findings include the dominance of China and the U.S. in scholarly output, the centrality of consumer behavior and circular economy themes, and the critical role of interdisciplinary collaboration. The integration of sustainability into fashion practices is no longer niche but a necessity driven by regulatory pressures, consumer demand, and environmental imperatives. The identification of influential works and emerging clusters offers a roadmap for researchers and stakeholders to align efforts with global sustainability goals.

Limitations

Despite its contributions, this study has several limitations. Reliance on the Scopus database may exclude relevant studies from other sources, potentially skewing geographic and thematic representation. Expanding database coverage could enhance comprehensiveness. The 2015–2024 timeframe, while aligned with the SDGs, may overlook foundational pre-SDG works, limiting historical context. A broader temporal scope could provide deeper insights into the field's evolution.

Language bias, due to the exclusion of non-English publications, may underrepresent contributions from non-Western regions with rich sustainability traditions. A multilingual approach could capture diverse perspectives. Additionally, the study's reliance on quantitative metrics, such as citation analysis, may neglect qualitative insights from case studies on grassroots initiatives and artisanal practices. A mixed-methods approach could offer a more nuanced understanding.

Furthermore, this study does not assess the authenticity of sustainability claims, raising concerns about potential greenwashing. Future research should critically evaluate such claims to ensure an accurate representation of sustainability trends. Addressing these limitations would enhance the depth, inclusivity, and reliability of sustainable fashion research, fostering a more comprehensive and globally relevant understanding of the field.

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