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Can Online Voices Shape a Greener Future? Strategic Bibliometric Insights into User-Generated Content and Sustainability

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Abstract

User-Generated Content (UGC), facilitated by the popularity of social media and online platforms has emerged as a powerful tool influencing public perception and decision-making toward sustainability, which has become a central concern across industries. This study conducts a bibliometric analysis of this contemporary nexus by analyzing a dataset of 411 articles extracted from the Scopus database. Bibliographic indicators such as co-authorship analysis and co-occurrence of keywords are employed to map recent trends, emerging themes and future directions. The findings shed light on the growing influence of social media voices in fostering sustainability, with the emergence of four major areas. Key findings include sustainable tourism practices driven by online voices & focus on corporate responsibility initiatives, insights on customer satisfaction & experience, behavioral psychology influenced by UGC and leveraging technology & analytics such as sentiment analysis in driving business growth. The study also uncovers budding research directions, including UGC's role in urban planning and climate change discussions. This research provides valuable insights into how shared consumer experiences influence sustainable behavior, awareness and decision-making, thus offering practical implications for businesses and policymakers to leverage digital engagement for promoting sustainability.

Keywords: Sustainability, User-generated Content, eWOM, Online Reviews, Bibliometric, Sustainable Development, Scopus

1. Introduction

In the recent trajectory, the interplay of User-generated content (UGC) and sustainability has garnered highly scholarly attention. UGC is the term used to describe a wide array of social media content that takes place in the form of online reviews and blog postings, which has increased dramatically as a result of the widespread usage of smartphones and social media platforms (López, M., and Sicilia, 2014). These reviews represent a short account of the experiences of customers, usually shared voluntarily without any external compulsion or encouragement and generally termed electronic word of mouth (eWOM). According to Mukhopadhyay *et al.* (2023), eWOM is an effective and powerful means of information dissemination associated with firms and their offerings that may assist customers in making buying decisions. Presently, consumers do not simply expect products and services to meet their functional requirements only, but also to resonate with their values of social and environmental justice (Ban *et al.*, 2019). This fundamental change reflects a broader norm where sustainability, social responsibility, and environmental consciousness are at the forefront of consumer decision-making; moreover, users even express and share their opinions with other users through online platforms (Saura *et al.*, 2018). Research has shown that UGC has become a crucial component in shaping perceptions, informing decisions and reflecting the changing nature of societal engagement by fostering a focus on sustainable practices across diverse industries (Panopoulos *et al.*, 2022). For instance, UGC shared on social media platforms enables one to share their personal experiences, thereby promoting sustainable luxury fashion consumption by fostering trust and community engagement (Naeem and Ozuem, 2022). The level of engagement in pro-environmental social media activity is heightened when exposed to UGC-linked pro-environmental knowledge and awareness, specifically in the hospitality and tourism industry, which, in turn, plays a major role in establishing pro-environment online communities (Han *et al.*, 2018; Wei *et al.*, 2017). The specific information posted by customers in online travel reviews raises its credibility and usefulness concerning consumers' attitudes toward Corporate Social Responsibility and purchase intentions (Sparks *et al.,* 2013). The analysis of online reviews can be used as a marketing tool by managers, as it can provide the key attributes of an offering, which would help to allocate resources accordingly. Ban *et al.* (2019) emphasized the importance of comprehending customer experience reflected in online reviews to maintain sustainable customer satisfaction and loyalty. Moreover, these reviews can be used for making sustainable strategic decisions against competitors. For this reason, many organizations are leveraging content generated by users online using smart technologies like deep learning and sentiment analysis to improve their knowledge regarding consumer preferences and behaviors towards sustainability. For instance, Philips *et al.* (2015) applied an artificial neural network (ANN) analysis over 59,688 online reviews to identify indicators related to the environmental

management of Swiss hotels. In the same way, Londoño and Hernandez-Maskivker (2016) employed a sentiment analysis on reviews posted on TripAdvisor to determine environmental sustainability practices in hotels. Fisher *et al.* (2019) utilized user-generated geographic content, such as geotagged photos, tweets, and mobile phone traffic data to map tourism trends and preferences. The effectiveness of user-generated data was indicated through the correlation between social media posts, mobile phone traffic, and actual ticket sales. Content-sharing behavior on social media positively contributes to sustainable coastal tourism practices; thus, reflecting how social media fosters knowledge-sharing and pro-environmental behavioral changes. This dynamic process allows businesses to address and adapt to changing consumer preferences, thus fostering sustainable operations and long-term viability (Saura *et al.*, 2018).

Despite the growing importance, an overarching and integrative literature that examines UGC in the context of sustainable development appears to be absent. In the era when consumers are discerning about brands that align sustainability with their values, the role of UGC cannot be overlooked. To fill this gap, this study aims to conduct a rigorous bibliometric analysis in order to map the existing body of literature on how UGC influences sustainable behaviors, intentions, and community awareness. Thus, this research aims to shed light on the multifaceted role of UGC in emphasizing the principles of sustainability by exploring trends and productivity, influential works and countries, key themes, and emerging areas. Moreover, the implications of this study do not have ramifications in academia only, but also for policymakers, practitioners and stakeholders engaged in sustainability initiatives. The study offers useful contributions and insights for informed communication strategies and strategic decision-making by outlining effective practices for incorporating UGC into branding strategies, improving customer engagement, and amplifying messages related to sustainability.

In order to understand the role of social media content generated by users in sustainable development, the present study attempts to address the following research questions:

RQ1. How has the trend of scholarly literature on UGC in the context of sustainability evolved over time?

RQ2. Who are the leading authors, institutions and countries in the field linking UGC and sustainability?

RQ3. What are the most frequently cited papers and sources contributing to the domain of UGC and sustainability?

RQ4. What prominent emerging research themes in the UGC and sustainability field can be identified in the academic literature?

The structure of the article is given as follows: In Section 1, the introduction and research questions are covered. Section 2 talks about the study's methodology. In Section 3, the results of the bibliometric analysis are presented. Section 4 provides the practical implications of the research. The conclusion of the study is discussed in Section 5, whereas Section 6 shows the limitations and future research directions.

2. Materials and Methods

This study aims to conduct a bibliometric analysis of literature related to “UGC and Sustainability” to provide a scientific structure and thematic evolution of this intersection. To conduct a bibliometric review, a structured methodology has been employed, encompassing the following phases: database search, scholarly filtration, data extraction, data cleaning, and reporting results, as illustrated in Figure 1 (Donthu *et al.,* 2021). The initial stage involves identifying and extracting relevant data from academic databases, which were retrieved from the Scopus Database, as it contains a wide number of unique documents and could be used as an alternative to other databases to assess the impact of research in the social sciences (Norris and Oppenheim, 2007). In the second stage, scholarly filtration ensured the selection of high-quality and impactful studies by applying specific criteria such as document types and publication stage. This stage also focuses on language filtration, where the retrieved data is refined by including studies published in the English language for broader accessibility and understanding. Finally, the last stage analyzed the filtered dataset using tools and techniques to visualize patterns, trends, and relationships within the literature.

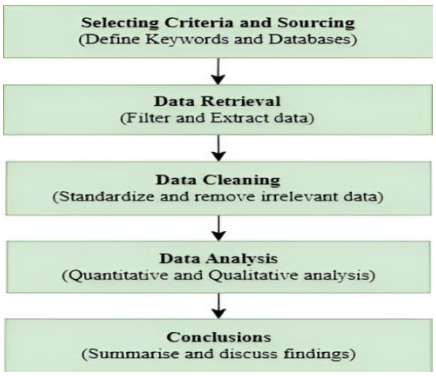

Figure 1: Stages of Conducting Bibliometric Analysis

The search procedure for collecting data from the Scopus database is presented in **Figure 2**. To extract the documents on the stated domain, the most frequently used keywords were selected after reviewing existing literature (Nobanee *et al.*, 2021; Mukhopadhyay *et al.*, 2023).

The keywords used for the data collection include *"User generated content"* ***OR*** *"social media post"* ***OR*** *"User-generated content"* ***OR*** *"Online reviews"* ***OR*** *"e-wom"* ***OR*** *"eWOM"* ***OR*** *"Electronic WOM"* ***OR*** *"Electronic word of mouth"* ***AND*** *"sustainability"* ***OR*** *"Sustainable development"* ***OR*** *"Sustainab*"*. The range of data extraction was not limited to any specific time period. As shown, the search was restricted to the topic (including title, abstract, and keywords).

The initial search using a combination of keywords (on March 5, 2025) compiled 691 documents, which were further delimited on the basis of document type (articles), publication stage (final) and language (English) to filter the set of most relevant articles related to the domain. This process extracted 444 articles in total, which were further refined by removing irrelevant articles (33) and thereby including 411 records for conducting bibliometric analysis. The study employs three analysis tools for conducting bibliometric analysis, namely Microsoft Excel, Vosviewer and the Biblioshiny package of RStudio.

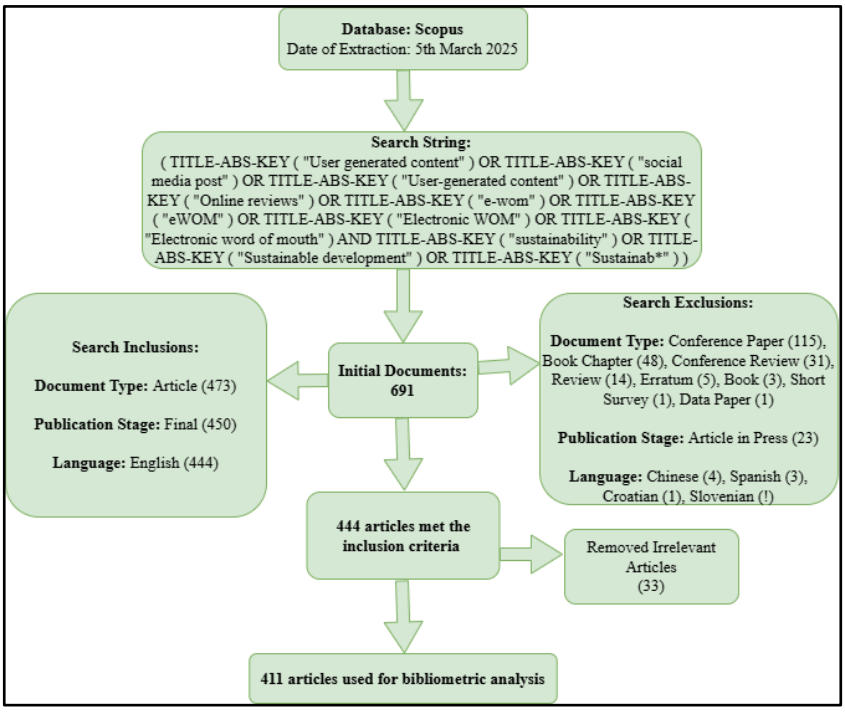

Figure 2: Search process of data collection from Scopus

Source: Created by Author

To provide a comprehensive overview of the research landscape in this dynamic domain, the present study analyzed the data in two stages, with the first stage as quantitative analysis which presented the fundamental information regarding the volume and impact of research in terms of journals, geographical area and contributors. The second stage was qualitative assessment, which provided a spatial representation of how different elements relate to one another using co-authorship, thematic evolution and co-keyword techniques (Afriliana and Iswari, 2022).

3. Results and Findings

3.1 Descriptive Analysis

As shown in Table 1, the data set consists of 441 articles published in 221 sources over more than 15 years. The majority of the articles have an average time of 3.48 years with an average growth rate of 19.03%, indicating the recency and relevancy of the research area. The reporting of 26614 references reflects the interdisciplinary nature of the domain. A 32.85% of international co-authorship suggests that authors in the stated domain are actively engaging globally.

Table 1: Data Characteristics

Timespan	2007:2025
Sources (Journals, Books, etc)	221
Documents	411
Annual Growth Rate	19.03%
Document Average Age	3.48
Average citations per doc	17.45
References	26614
International co-authorships %	32.85

Source: Biblioshiny

3.2 Publications and Citation Trend by Year

Figure 3 demonstrates the trend in year-wise publications and citation count in the domain of UGC and sustainability. With a few articles up to 2017, the rise in publications can be seen thereafter, with over 80% of publications in the last five years. It indicates that sustainability research in UGC has proliferated in recent years following the emergence of the Sustainable Development Goals (SDGs) to achieve a sustainable future. Furthermore, in the post-COVID pandemic era, people have become more inclined towards healthier and sustainable lifestyles and even actively participate in the co-creation of green value by posting and sharing their experiences of using eco-friendly products (Yu *et al.*, 2021). Nonetheless, a slight drop can be observed in 2020 and 2022, followed by 2024 being the most productive year. Reflecting on the count illustrated in the figure, it appears this domain has yet to achieve the attention it deserves. Since the research was done in March 2025, the dataset has not been fully aggregated on this topic. However, the citations per year are growing continuously in contrast to prior years, with articles published in 2024 having received the maximum count in total, highlighting the exponentially growing interest among researchers.

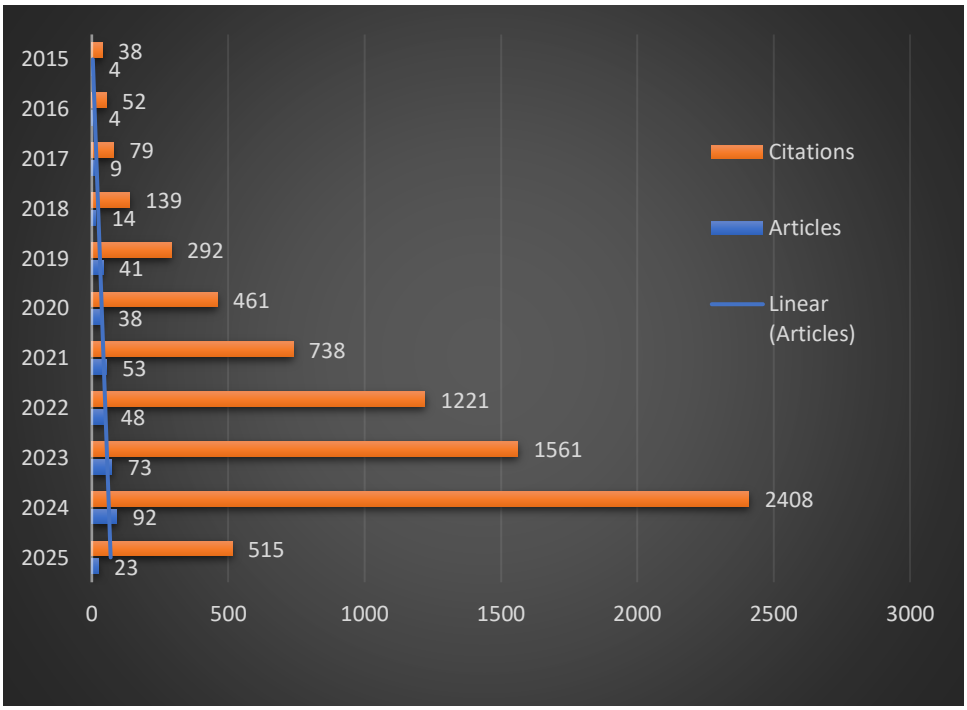

Figure 3: Year-wise Publications and Citations

Building upon the observed growth in research focus after 2017, the Sankey diagram in Figure 4 graphically illustrates a thematic shift in research emphasis. In the initial phase (2007-2017), keywords like "analysis," "data," "network," "business," "user-generated," "content," and "social" dominated, implying themes existed in isolation. "Sustainable" was present but less prominent. However, the 2018-2025 phase has "Sustainable" as the major topic, indicating a greater emphasis on ecologically and socially sustainable activities. In addition to this, "online" becomes a leading keyword, symbolizing the ubiquitous power of digital technologies and platforms. "Social" remains significant, signaling ongoing interest in social dynamics and interactions within online environments.

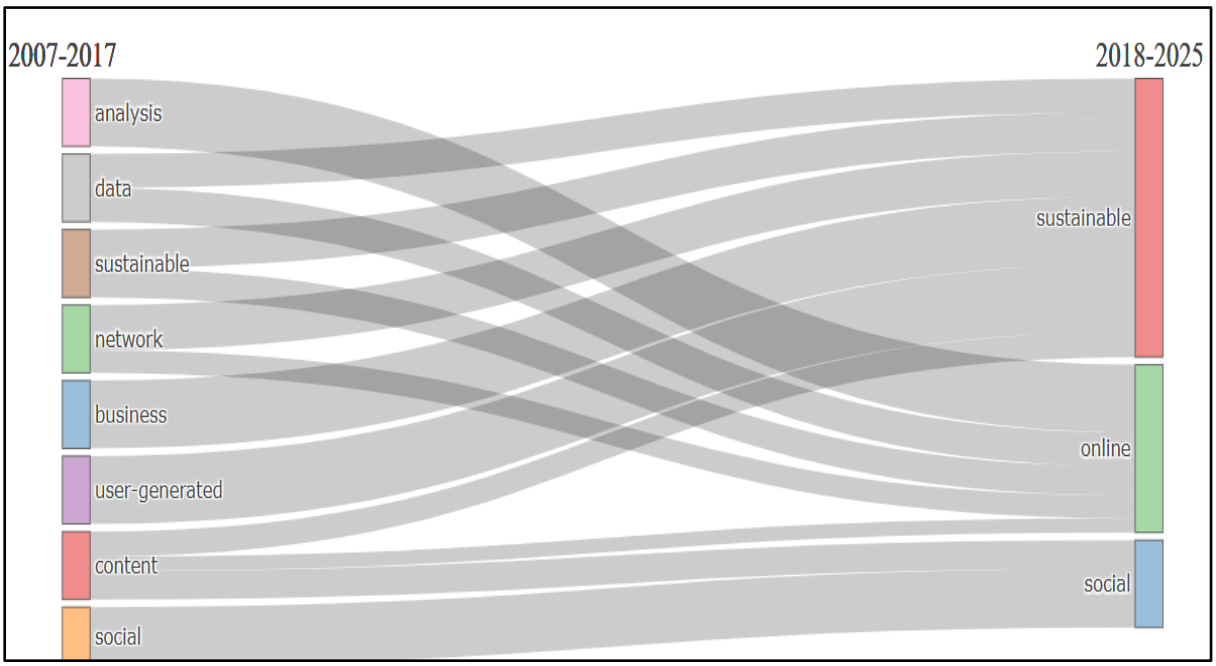

Figure 4: Thematic Shifts in UGC and Sustainability before and after 2017

3.3 Leading Countries

The research field exhibits a global scope, with the 411 articles in the dataset originating from 77 diverse countries with a minimum of one article per country. Table 2 delineates the most influential countries, elucidating their respective publications on the subject area. Evidently, China and the United States occupy the top positions, having 109 and 54 articles, respectively. The citation counts of articles on a per-country basis denote the recognition of a research domain within a specific geographic region. China has garnered the highest number of citations (1584), thereby emerging as the leading contributor. The geographic location indicates Asia remains an important region accounting for half of the top countries with China, South Korea, and India at the forefront of leveraging social media and eWOM for sustainable practices, marketing, and decision-making.

Table 2: Influential Countries

Sr. No.	Country	Geographic Location	NP	Citations	Citations/NP
1	China	Asia	109	1584	14.53
2	United States	North America	54	1007	18.65
3	South Korea	Asia	42	878	20.90
4	Spain	Europe	35	1098	31.37
5	United Kingdom	Europe	31	723	23.32
6	India	Asia	27	548	20.30
7	Indonesia	Asia	19	138	7.26
8	Italy	Europe	19	316	16.63
9	Malaysia	Asia	16	214	13.38
10	Australia	Australia	14	630	45.00

NP: No. of Publications

Source: Vosviewer

3.4 Most Influential Authors

A total of 406 authors have contributed to the realm of UGC and sustainability. Table 3 delineates the top ten most prolific authors based on their publications (at least four or more articles per author). Notably, Kim H-S stands out as the principal author with a maximum of 8 publications, followed by Saura JR, Wang J and Wang Y having six publications each. Based on the citations, Saura JR has received the highest citation count and is immersed in investigating the role of travelers in hotel sustainability through social media analysis and in understanding environmental management in hotels through travelers' sentiments.

Table 3: Leading authors

Sr. No.	Authors	Articles	Total Citations	Articles Fractionalized
1	KIM H-S	8	209	2.95
2	SAURA JR	6	369	1.92
3	WANG J	6	74	1.82
4	WANG Y	6	262	1.48
5	WANG X	5	18	1.48

6	CHEN Y	4	12	0.98
7	LI Y	4	12	0.9
8	LIU C	4	43	1.12
9	LIU J	4	38	0.78
10	ZHANG J	4	93	0.98

Source: Biblioshiny

The "Authors' Production over Time" visualization (Figure 5) represents authors who have been part of the stated research area in terms of their productivity and impact from 2010 to 2025. As depicted, Kim H.-S., Saura J.R., Wang J and Wang Y are the most consistent authors. Moreover, Liu J has an extended publication period from 2010 onward, but appears to have fewer recent publications compared to other authors, including Kim HS, Wang Y, and Wang X, who have been more active since 2018.

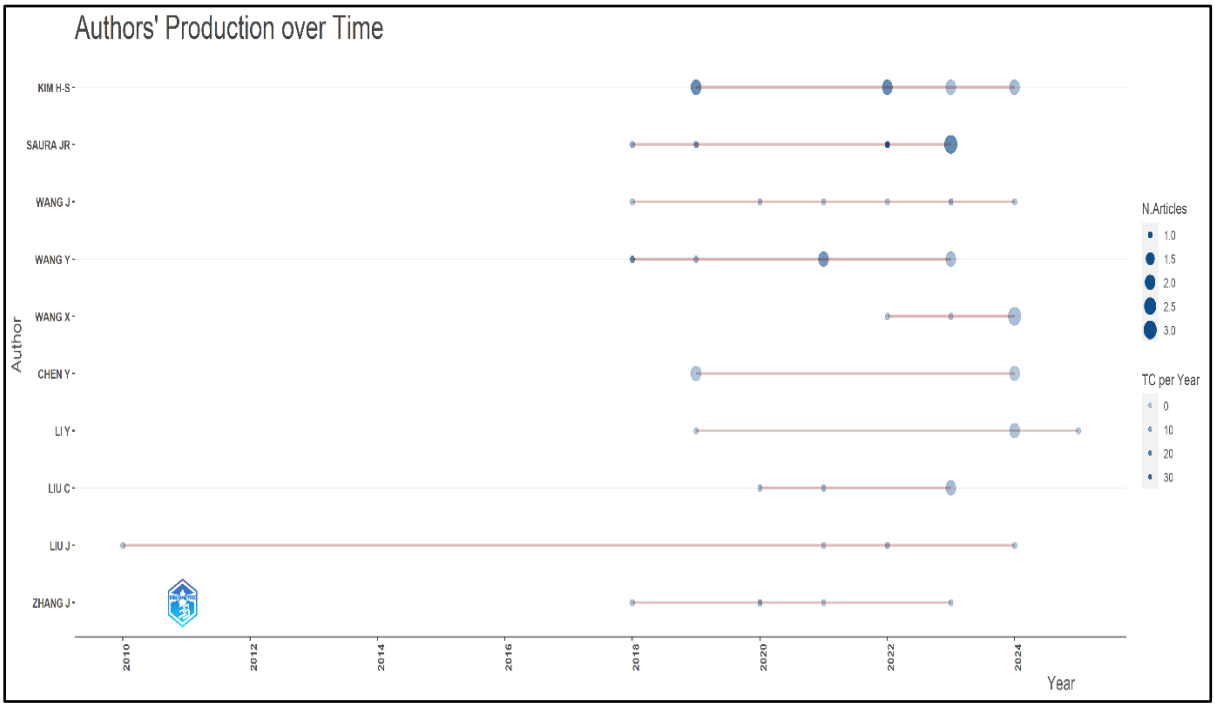

Figure 5: Author Production over time

3.5 Most Relevant Affiliations

Figure 6 illustrates the growth of prominent institutions with the highest volume of academic papers in the domain of social media posts and their role in promoting sustainability. Kyungsung University in South Korea emerged as the most influential affiliation with 20 publications and exhibited rapid acceleration post-2019. Following Graz University in Austria, with 12 publications that have surpassed many organisations in recent years. The Wuhan University in China, the University of Texas Health Science Center in the United States and the Hong Kong Polytechnic University in Hong Kong (China) have 10 publications each, indicating the dominance of Asian countries. Their research output has surged after 2018 and 2019, in line with the overall increasing trend within the field.

Figure 7 depicts a co-authorship map for organisations with at least one citation. It displays a network map of related affiliations. The affiliations on the network map are grouped together into a single cluster (red), indicating that they have collaborated on similar topics within the UGC and sustainability research.

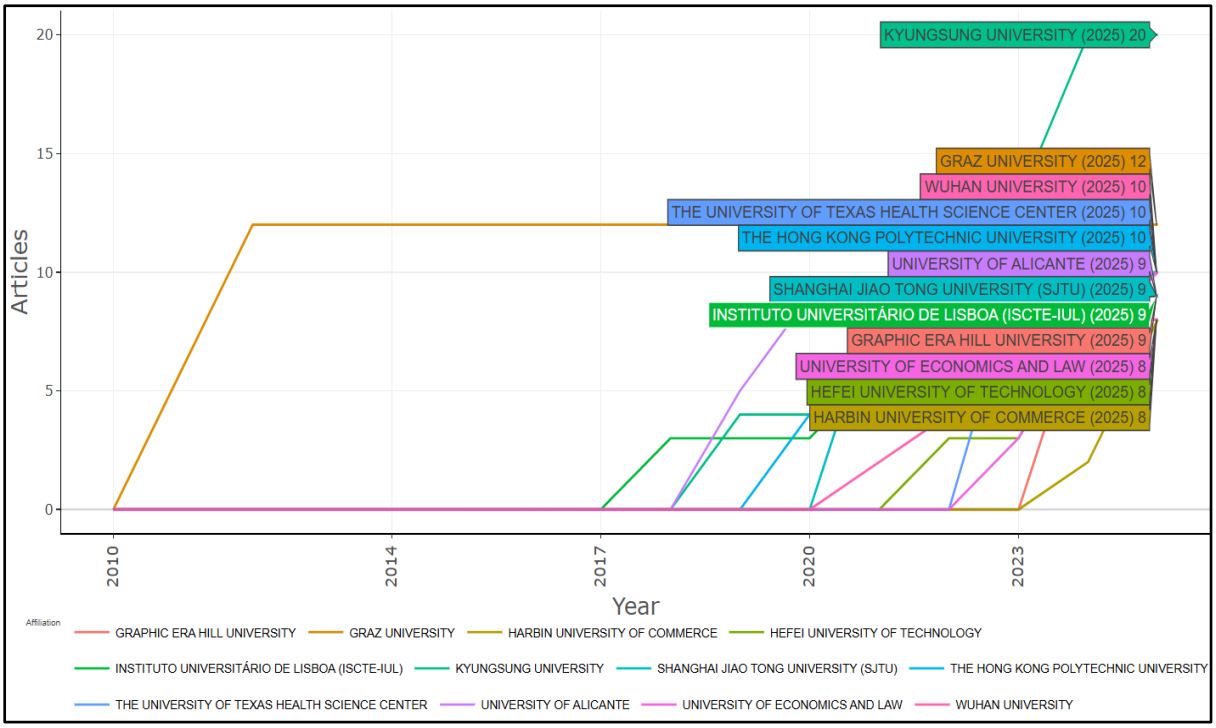

Figure 6: Affiliations' Production over time

Source: Biblioshiny

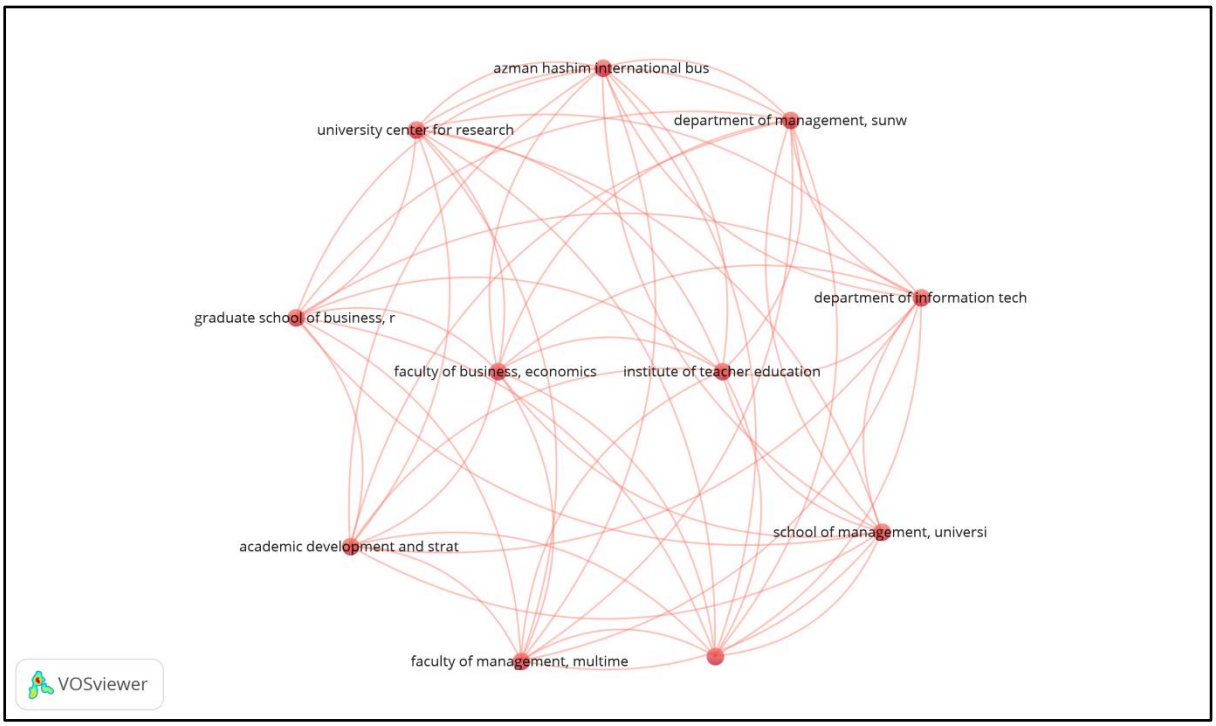

Figure 7: Co-authorship network of affiliations

3.6 Most Influential Articles

Table 4 represents the top ten most impactful articles in the area of the role of UGC on sustainability with Sparks *et al.* (2013) standing out as the most influential having 394 citations that investigated the significant role of online travel reviews on consumer behavior and examined factors such as content type, source, and certification

logos influence consumer responses. Manek *et al.* (2017), with 256 citations, ranked second, which highlighted the effectiveness of the Gini Index method in refining sentiment analysis for decision-making and predictive purposes. Kong *et al.* (2021) explored the different impacts of sustainability messaging across different cultural groups in the context of fashion brands. The findings suggest that sustainability communication is more effective for non-luxury brands in a culture with high sustainability awareness. Further, Huang *et al.* (2017) showed that TripAdvisor integration with Facebook increased review quantity and positive emotion but decreased cognitive language and negative sentiments, contributing insight into the dynamics of social network integration on online platforms. These documents reveal the persuasive role of content generated by users over digital platforms and CSR communication on pro-environment behavior and informed policy decisions.

Table 4: Top 10 most cited articles

Authors	Title	Year	Source title	Publisher	TC
Sparks B.A.; Perkins H.E.; Buckley R.	"Online travel reviews as persuasive communication: The effects of content type, source, and certification logos on consumer behavior"	2013	Tourism Management	Elsevier Ltd	409
Manek A.S.; Shenoy P.D.; Mohan M.C.; Venugopal K.R.	"Aspect term extraction for sentiment analysis in large movie reviews using Gini Index feature selection method and SVM classifier"	2017	World Wide Web	Springer New York LLC	263
Kong H.M.; Witmaier A.; Ko E.	"Sustainability and social media communication: How consumers respond to marketing efforts of luxury and non-luxury fashion brands"	2021	Journal of Business Research	Elsevier Inc.	148
Huang N.; Hong Y.; Burtch G.	"Social network integration and user content generation: Evidence from natural experiments"	2017	MIS Quarterly: Management Information Systems	University of Minnesota	148
Han W.; McCabe S.; Wang Y.; Chong A.Y.L.	"Evaluating user-generated content in social media: an effective approach to encourage greater pro-environmental behavior in tourism?"	2018	Journal of Sustainable Tourism	Routledge	147
Saura J.R.; Ribeiro-Soriano D.; Zegarra Saldaña P.	"Exploring the challenges of remote work on Twitter users' sentiments: From digital technology development to a post-pandemic era"	2022	Journal of Business Research	Elsevier Inc.	143
Gerdt S.-O.; Wagner E.; Schewe G.	"The relationship between sustainability and customer satisfaction in hospitality: An explorative investigation using eWOM as a data source"	2019	Tourism Management	Elsevier Ltd	119

Ettinger A.; Grabner-Kräuter S.; Terlutter R.	"Online CSR communication in the hotel industry: Evidence from small hotels"	2018	International Journal of Hospitality Management	Elsevier Ltd	118
Saura J.R.; Palos-Sanchez P.; Grilo A.	"Detecting indicators for startup business success: Sentiment analysis using text data mining"	2019	Sustainability (Switzerland)	MDPI	111
Marine-Roig E.	"Destination image analytics through traveller-generated content"	2019	Sustainability (Switzerland)	MDPI	105

TC: Total Citations

3.7 Most Prominent Sources

Table 5 delineates the foremost ten scholarly journals actively contributing to the domain of integration of UGC and sustainability. As evident, the list comprises many well-reputed sustainability, tourism and hospitality journals. All of them ranked in Q1 as per the latest Scopus CiteScore specifically in the category of Tourism, Leisure, and Hospitality Management reflecting high-quality research in the domain. "Sustainability (Switzerland)" published by "MDPI (Multidisciplinary Digital Publishing Institute)" is the most impactful source which accounts for more than 25% of all publications, garnering 2168 citations.

Table 5: Top Ten Sources

Sr. No	Source	Publisher	NP	TC	H_Index	PY Start	Quartile
1	Sustainability (Switzerland)	MDPI	110	2168	29	2016	Q1
2	Journal of Sustainable Tourism	Taylor & Francis	8	307	6	2017	Q1
3	Journal of Cleaner Production	Elsevier	6	121	3	2019	Q1
4	International Journal of Hospitality Management	Elsevier	5	238	4	2018	Q1
5	Journal of Hospitality and Tourism Technology	Emerald	5	161	4	2014	Q1
6	Journal of Hospitality and Tourism Insights	Emerald	4	56	4	2023	Q1
7	Journal of Hospitality Marketing and Management	Taylor & Francis	4	127	4	2018	Q1
8	Tourism Management	Elsevier	4	545	3	2013	Q1
9	International Journal of Contemporary Hospitality Management	Emerald	3	61	3	2021	Q1
10	Internet Research	Emerald	3	46	3	2021	Q1

NP: No. of Publications**, TC:** Total Citations, **PY:** Publication Year

3.8 Three-Field Plot for Authors, Keywords and Sources

Sankey diagrams illustrate quantitative information about flows, their relationships, and their transformation (Riehmann *et al.*, 2005). We created Sankey plots using Biblioshiny for three-field analyses of authors, keywords

and sources as shown in Figure 8. The graphic presentation highlights some of the most popular keywords, such as sustainability, social media, online reviews, sentiment analysis, user-generated content, customer satisfaction and so on. The authors frequently working on exploring the role of the content generated by users in enabling sustainable development are Hak-Seon Kim, Jose Ramon Saura and Hyun-Jeong Ban, with most of them publishing in Sustainability (Switzerland).

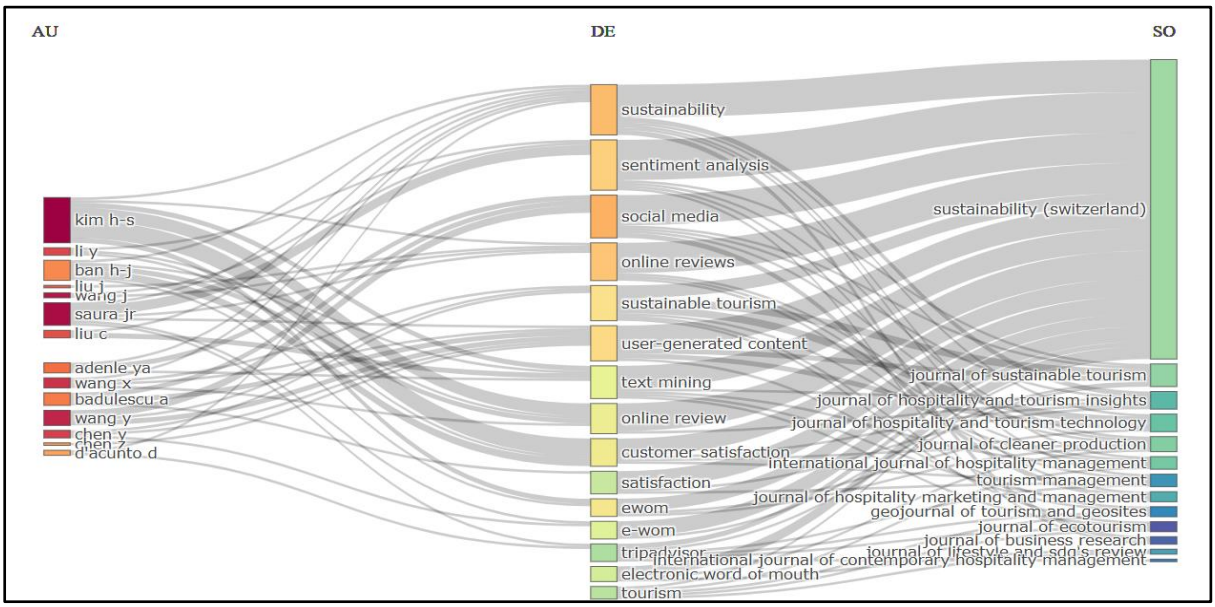

Figure 8: Three-Field Plot Diagram

Source: Biblioshiny

3.9 Co-occurrence of Keywords Analysis

Keyword co-occurrence analysis that aims to identify major research themes by analyzing the semantic relationships between keywords employed in scholarly publications (Jin *et al.*, 2019) is used in this study. The total count of keywords was 2335, which was too large to fit in the chart. Therefore, when a threshold of 5 occurrences was set, 109 met the criteria and were included in the network construction. As evident from Table 6, "Sustainability" is the most prominent keyword with an occurrence of 103 times, with the highest total link strength (447), particularly belonging to the yellow cluster. Following "social media" with 90 occurrences, with 98 total links and good connectivity strength (359), falling in the green cluster. Further, Sustainable development, perception, Online Reviews, Sentiment Analysis and User-generated Content are also frequently occurring keywords with 70, 47, 44, 37 and 36 occurrences respectively. The average publication year of the top ten keywords ranges from 2020 to 2021, signifying the relatively recent focus in the domain.

Figure 9 gives the density visualization of keywords with high frequency, which uses a color gradient from red to blue, where deeper red shades indicate higher frequency and significance of keywords, while the blue regions represent less frequent, peripheral terms. Sustainability, social media and user-generated content are key topics and are therefore positioned in the red zone, the core of the visualization. This implies that sustainability is the predominant theme in relation to UGC research, especially via social media platforms that act as main avenues of exchanging information and views regarding sustainability. Online reviews, customer satisfaction, psychology, marketing, and ecotourism are noticeable as keywords in the nearby yellow region, which shows that UGC relates closely to customer satisfaction because they reflect the experience of consumers and reactions towards sustainable services and products. Out there in the green and blue areas, less flanked keywords like machine learning, big data, urban planning, and climate change emerge. These new themes propose a growing research interest in employing advanced analytical tools to leverage strategic insights on sustainability from these reviews. Moreover, urban planning and climate change keywords imply wider societal concerns and discussions on bigger issues regarding the environment that UGC is now being used to assume.

Table 6: Top ten keywords

Sr. No.	Keyword	Occurrences	Total Link	Total Link Strength	Average Publication Year	Cluster
1	Sustainability	103	100	447	2021.40	Yellow
2	Social Media	90	98	359	2021.61	Green
3	Sustainable Development	70	95	344	2021.51	Blue
4	Perception	47	81	270	2021.74	Yellow
5	Online Reviews	44	73	178	2021.61	Blue
6	Sentiment Analysis	37	76	194	2021.24	Red
5	User-Generated Content	36	56	106	2020.06	Red
7	Internet	34	74	203	2020.41	Yellow
8	Marketing	32	74	170	2021.25	Green
9	Sustainable Tourism	29	54	115	2021.59	Green
10	Ecotourism	28	57	163	2021.64	Green

Source: Vosviewer

Figure 10 established that the network of keyword co-occurrences developed distinct colors to represent significant clusters, with each color grouping related keywords together that highlight emerging research themes within the field. The research identified four separate clusters, containing 109 items, 1,929 linkages, and a total link strength of 3,785.

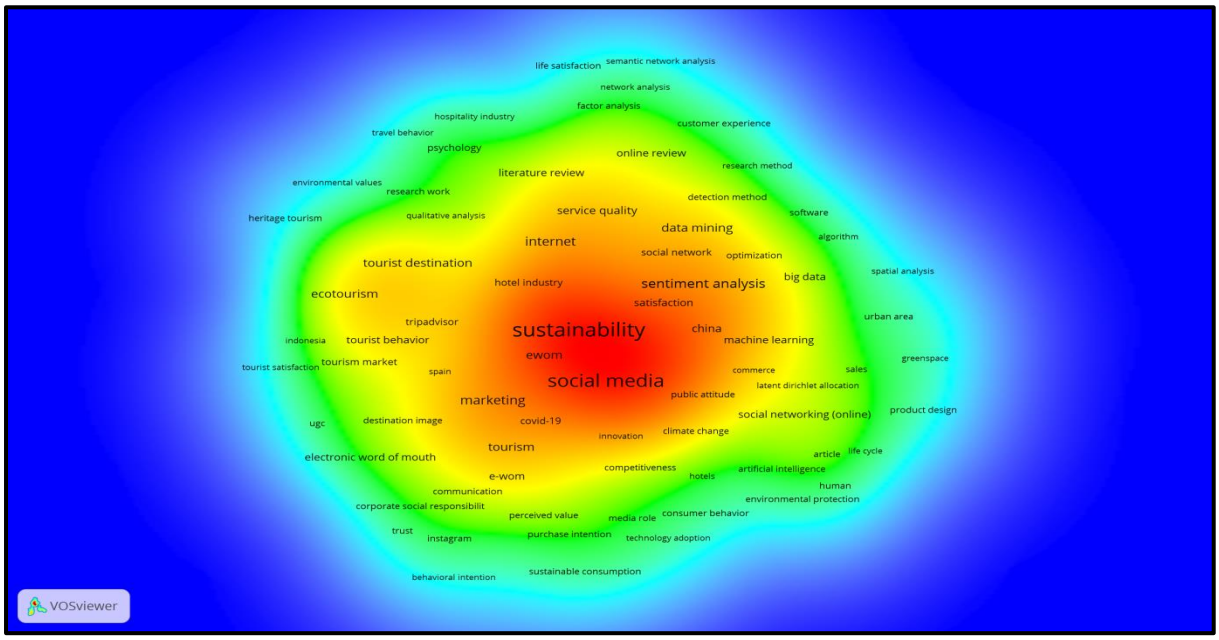

Figure 9: Keywords' Density Visualisation

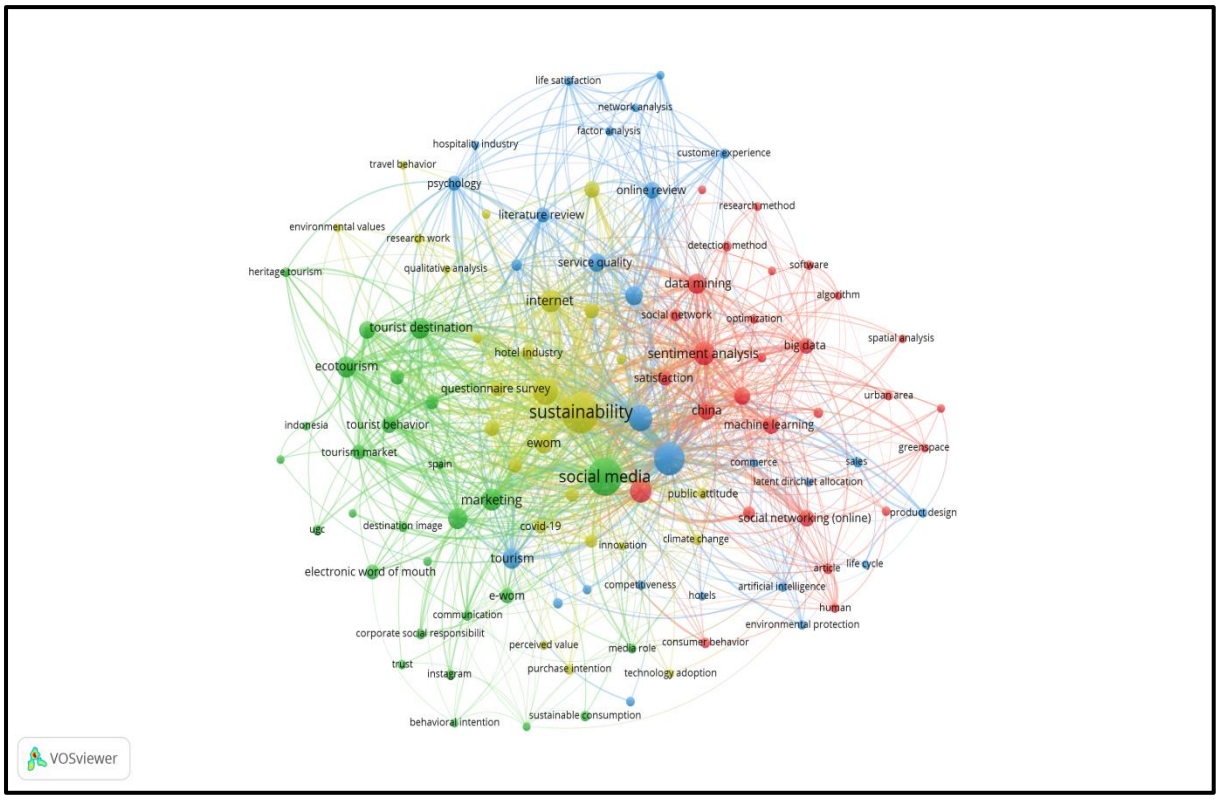

Figure 10: Keywords Co-Occurrence Network

Table 7 presents an overview of thematic clusters based on co-word analysis, highlighting their key areas of focus, significant findings, and potential future research directions, thereby providing a structured framework for understanding the interplay between UGC and sustainability.

Table 7: Thematic Clusters

Theme	Focus Area	Key Findings	Future Directions
Technology-Driven Decision Making ***(Red Cluster)***	Big Data Analytics, Artificial Intelligence (AI), Sentiment Analysis, and Deep Learning are used to analyze online consumer reviews providing businesses with actionable insights	- D'Acunto *et al.* (2024) analyzed hotel, airline, and tourist attraction reviews, revealing that younger, male Asian business travelers staying at hotel chains are more likely to discuss sustainability in their online reviews. This research highlights the importance of understanding the demographics and motivations of environmentally conscious consumers. - Lin *et al.* (2023) utilized deep learning techniques to analyze short-text online reviews demonstrating improved sentiment analysis accuracy compared to traditional methods. - Social media and AI can provide cost-effective insights into community challenges and resilience, offering new avenues for sustainability across various sectors such as urban planning (Abdul-	- Integrate real-time data from various sources (e.g., social media, sensor networks, IoT devices) to provide tourists with dynamic and personalized travel experiences. - Leveraging advanced AI models like transformers to analyze unstructured big data. - Comparative Analysis of Deep Learning Models. -Studies should explore techniques to detect, quantify, and reduce biases in AI algorithms.

		Rahman *et al.,* 2023), Travel and Tourism, Hospitality (Mariani and Borghi (2021), Financial Sector (Park and Javed (2020), and Transportation (Serna *et al.* (2021).	
Customer Experience provided by UGC Insights *(Green Cluster)*	Leveraging UGC to enhance customer satisfaction, improve service quality, and foster competitiveness	- Shahhosseini and Nasr (2024) identified food quality, value, and service as key determinants of customer satisfaction in green restaurants after analyzing 85,337 TripAdvisor reviews. - Song *et al.* (2024) found that convenient transit options and cleanliness significantly influenced passenger satisfaction at transportation hubs. - León *et al.* (2025) by analyzing UGC on social media revealed a growing emphasis on sustainability concerns among whale-watching tourists, highlighting the need for the industry to prioritize environmental sustainability to meet evolving consumer expectations. - Xie *et al.* (2024) demonstrated the effectiveness of text mining and sentiment analysis in evaluating airline service quality and identifying areas for improvement. - Chalupa *et al.* (2021) using text and sentiment analysis of 3671 reviews collected from various booking and review sites emphasized the importance of employee training and development and the creation of a sustainable workplace in enhancing service quality and customer satisfaction in hotel operations.	- Leverage UGC to monitor and track changes in customer expectations and preferences over time. - Conduct empirical validation of factors or models identified employing sentiment analysis on online reviews. - Use of predictive models that can anticipate future customer needs and preferences based on the analysis of UGC trends and patterns.
Behavioral Psychology Influenced by content generated by users *(Blue Cluster)*	Examining how UGC and social media influence consumer behavior, including intentions, actions, and further eWOM	- Puspita *et al.* (2022) indicated the influencing role of eWOM on purchase intention in the context of sustainable development, with a greater impact of influencer reviews compared to customer reviews combined with trust and perceived value. - Panopoulos *et al.* (2022) emphasized the importance of influencer marketing and concern for environment in impacting UGC and eco-labelling which further leads to shaping purchase intention towards sustainable products among Generation Z consumers. - Choi and Ahn (2023) examined the role of brand benefits, relationship commitment in shaping consumer	- Explore the potential of UGC to develop more sustainable business models and policies by identifying consumer preferences, identifying emerging trends, and anticipating future challenges. - Validate the findings from UGC analysis in emerging markets, considering urban-rural differences. - Investigate generational differences in UGC influence on sustainability. - Conduct cross-cultural studies to understand cultural nuances.

		behavior and eWOM towards sustainable fashion brands on Instagram. Their findings highlighted the importance of understanding the diverse benefits such as warm glow, and economic and green benefits that consumers associate with sustainable fashion brands in influencing consumer behavior. - Pathania *et al.* (2024) demonstrated that online reviews written by homophilous users (users with similar characteristics) and perceived uncertainties related to personal propensity and firm reputation influence individuals' decisions to adopt wearable technologies for personal healthcare.	
Sustainable Tourism and Corporate Social Responsibility (CSR) ***(Yellow Cluster)***	Examining the role of UGC and online reviews in understanding and promoting sustainable tourism practices and evaluating the impact of CSR initiatives.	- Wang *et al.* (2024) demonstrated the effectiveness of analyzing tourist online reviews to identify key destination attributes and their association with tourists' ratings to improve decision-making for sustainable urban waterfront development. - Hassan *et al.* (2024) identified recurring issues affecting the sustainability of Egypt's archaeological sites, such as uncontrolled commercialization and environmental degradation, through a multisite content analysis of TripAdvisor reviews, thereby reflecting the need to balance heritage preservation with tourism development. - Rahman *et al.* (2023) found that eWOM significantly mediates the relationship between destination image, service quality, and tourist loyalty, thus emphasizing the importance of leveraging social media to attract and retain tourists. - D'Acunto *et al.* (2020) found that hotel customers have gradually begun paying more attention to CSR factors in their online reviews, particularly to social and environmental ones. - Cheng *et al.* (2021) found that customer-related CSR activities on social media positively influence customer behavioral outcomes, such as purchase intention and eWOM, with mediated by brand attitude.	- Longitudinal studies to track evolving tourist sustainability preferences reflected in UGC. - Investigate influencer impact on tourist sustainability perceptions, focusing on authenticity and transparency of influencer endorsements. - Conduct experimental studies to assess the causal impact of CSR initiatives and their communication strategies on consumer behavior. - Develop a framework for assessing CSR communication effectiveness beyond traditional marketing metrics by considering social and environmental dimensions - Focus on ethical considerations in using UGC to influence tourist behavior.

3.10 Co-authorship of Countries

Figure 11 demonstrates a representation of the analysis of the author's co-authorship network across connected nations, where the size of the items reflects the relevance of the country, while the connections between points on the map represent co-authorship between countries, and the proximity of the clusters indicates the intensity of their collaborative relationships (Seguí-Amortegui *et al.*, 2019). When the minimum number of documents and citations per country was set to 5 and 20, respectively, out of 79 countries, 33 met the criteria.

Notably, China, the United States, Spain, and South Korea emerge as the most significant contributors, exhibiting the strongest collaborative ties when measured by link strength. The top contributor in the domain (China) has robust international partnerships with the United States, Australia, Taiwan, South Korea, Spain and others, while weak link strength with Indonesia, India, the United Kingdom and such. This highlights an opportunity for future research collaborations and knowledge exchange with these emerging economies, fostering a more diverse and globally integrated research network on sustainability.

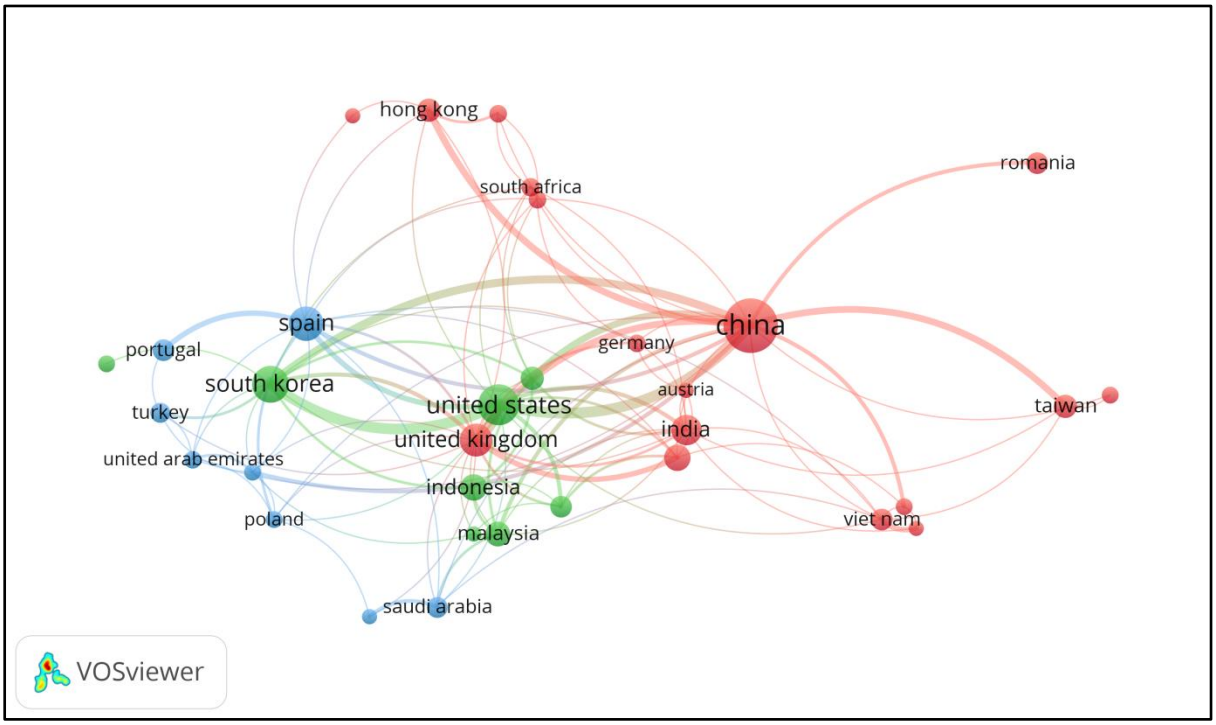

Figure 11: Co-Authorship of Countries

4. Implications of the Study

The findings of the study have profound implications for various stakeholders, including academia, businesses, policymakers, and others. By pinpointing influential authors, popular journals, and emerging trends, the study provides academicians with a better understanding of the dynamic landscape and future directions on the convergence of UGC and sustainability research. The study suggests that by leveraging smart technologies like AI, big data, companies can dive into customer behavior, tastes and sustainability trends inherent in UGC that can help businesses in the creation of products and services aligned with social and environmental values. For instance, the findings of this study highlight a significantly growing interest in the domain, particularly in the context of sustainable or eco-tourism, especially in Asian countries. The findings from Kong *et al.,* (2022) research have indicated that in highly environmentally conscious cultures, sustainability communications favor the positioning of non-luxury brands compared to luxury ones. This cultural renaissance presents a highly convenient platform enabling stakeholders to align their strategies with what environmentally conscious consumers want. This provides important marketing implications in terms of efforts to mainstream sustainable consumption among different groups of consumers. The results of this study can be leveraged by policymakers to frame policies and programs within the values of UGC in society and sustainability. Also, technology

innovators can explore areas where UGC platforms may join sustainable practices, hence the need to develop such technologies that fit today's environmental and social concerns.

Table 8 depicts key findings from the literature on UGC and sustainability, offering actionable implications for various stakeholders. Thus, this bibliometric study of the role of content generated by users in promoting sustainability acts as a sound tool for strategic directions, enhancing collaboration, and future development orientations.

Table 8: Interplay of UGC and Sustainability with Implications

Theme	Key Insights	Implications	Supported Evidence
UGC & Consumer Trust in Sustainable Products	- Specific mentions (e.g., material, durability, impact) build trust - A responsible image reduces the impact of negative reviews - Knowledgeable users value details	- Promote detailed, attribute-based reviews - Use eco-verified badges for credible UGC	Huang (2024), Mariani and Borghi (2021); Du *et al.* (2019); Zhao (2024)
Green eWOM and Purchase Decisions	- Boosts purchase intent for high-involvement green products (luxury goods, cellphones) - Shapes behavior in tourism sector	- Launch UGC-based influencer campaigns - Highlight eco-testimonials on booking sites	Lin *et al.* (2023); Reyes-Menendez *et al.* (2020)
UGC and Consumer Satisfaction	- Eco-reviews receive higher ratings from green-conscious users - Drives brand reputation and loyalty	- Offer rewards for sustainability mentions - Display eco-feedback visibly on platforms	D'Acunto *et al.* (2023), Saura *et al.* (2023)
Virtual Tourism & Green Awareness	- Virtual travel experiences using UGC promote eco-awareness - Enhances sustainable travel interest and increases tourist engagement	- Use virtual tours to reduce over-tourism - Display eco-feedback visibly on platforms	Nazare *et al.* (2024)
Social Media & Green Behavior	- UGC on social media internalizes eco-social norms into moral obligations - Most effective when actions are easy/affordable	- Use of normative messaging with emotional triggers - Run short-form video content or short social media campaigns	Han *et al.* (2023)
Influencers in Sustainability Perception	- Authentic influencers drive trust - Expert and educational voices increase engagement	- Partner with micro-influencers and industry experts - Focus on educational, real-life messaging	Haines *et al.* (2023)
Green Marketing Strategies in Fashion	- Sustainability concerns evolve: (waste & addiction → ethics→ habits) - Priorities differ by adoption stage	- Early adopters emphasize transparency, and mainstream consumers may want ease and cost savings - Adjust the message accordingly	Haines *et al.* (2023)
Fake Reviews & Perceived Authenticity	- Fake reviews lack sensory details & experiential language - Lower trust in green claims	- Adopt AI-detection models, linguistic and behavioral patterns - Crowdsourcing detection for filtering fake claims	Zhang *et al.* (2023); Nemeth *et al.* (2024)

Platform-Specific UGC Strategies	- LinkedIn outperforms Twitter & Facebook for green engagement with human-centric images	- Tailor content strategies for different platforms with engaging captions and personal imagery	Primozic *et al.* (2024)
Branding and Eco-Reviews	- Culture affects sustainability messaging, like non-luxury brands benefiting more in high-awareness settings. - Emotional appeals like pride and gratitude shape eWOM differently	- Tailor sustainability messaging based on cultural awareness - Leverage pride status-driven appeals, gratitude for values	Septianto *et al.* (2021); Kong *et al.* (2021)

5. Conclusion

In order to identify major contributors in the domain of UGC and sustainability, the study has employed VOSviewer and biblioshiny software. This assessment considered various indicators, such as trends in publications, prolific authorship, countries of origin, significant affiliations, relevant sources, and such. The findings revealed a positive trend of publications in the research area, especially after 2017, with the most productive year being 2024 with 92 publications and 2408 citations, indicating the growing interest of researchers in this field in the future. KIM H-S stands out as the leading author in this field in terms of publications (8) and SAURA JR in terms of citation count (369). More than seventy-five countries have at least one document in this domain, indicating the global prominence of the subject area. China, the United States and South Korea emerged as the most influential nations in terms of the number of publications. The analysis of co-authorship of countries indicated the collaborative link strength among different nations. China has the maximum number of link strength, i.e., 59, followed by the United States (38). Kyungsung University in South Korea and Graz University in Austria stand out as the most relevant affiliations that have made a significant contribution to the growth of research in this domain. “Sustainability (Switzerland)”, has diffused the maximum number of articles (110) in the research area with a count of 2168 citations. The co-occurrence analysis of keywords revealed four major clusters within the field.

6. Limitations and Future Research Agenda

It is important to acknowledge a few limitations in the present study, given all contributions. Subject to the constant growth and change in the studies in this area, using only the articles for analysis and excluding the conference papers and the book chapters might have reduced the scope of the study. The addition of the book records could alter the co-citation and co-keyword networks. Besides, the fact that the study relied on the Scopus database only makes it probable that other valuable articles available in other databases were not considered. Furthermore, there is potentially a language bias because the study included only articles indexed in the databases in English.

Future studies may employ different approaches and databases to include a broader range of documents that reflect diverse facets of the role of UGC in supporting sustainability.

Future research may analyze the relationships between various forms of UGC and consumer trust and engagement, and also introduce some basic computational text-and-data mining methods for assessing consumer sentiments.

Exploration of cultural dimensions may reveal how contextualized values of society, flowing through social capital, shape discourse on sustainability.

As reflected in the findings, new areas emerging in these forums can be integrated into UGC analysis, including urban planning and climate change.

In addition, longitudinal studies focusing on modeling the evolution of sustainability communication and how it impacts the UGC, thus enabling fact-based-intensive market initiatives that promote sustainability practices, can be conducted.

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