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A State-of-the-Art Review of Sharing Economy Business Models and a Forecast of Future Research Directions for Sustainable Development: A Bibliometric Analysis Approach

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Abstract: The area of sharing economy business models (SEBMs) is expanding worldwide. To date, a few qualitative literature reviews concentrating on specific business models have been undertaken, while several have focused on the general concept of the sharing economy. Meanwhile, there is a lack of quantitative reviews in this area. Therefore, a retrospective review of the evolution of the SEBM area and prospective forecasts based on quantified data are urgently needed. In order to fill the gaps and critically evaluate the extant literature on the SEBM area and its scientometrics-related topics, this paper combines the Scopus and Web of Science databases to establish a dataset for a thorough bibliometric analysis. With 951 studies from 552 sources identified, this research provides comprehensive and nuanced information covering the most influential authors and their contributions to the subject, impactful articles with their citation details, ranked sources with their h_, g_ and m-index as well as collaboration maps for authors, affiliations and countries. Graphical representation of knowledge mapping depicts the evolution of publications over time and the emerging trends of current interests and potential directions for future research for sustainable development. This study revealed that *Sustainability* is the most relevant and second most impactful journal in SEBM research. More importantly, this research deployed keyword dynamic and thematic evolution to detect the current and future trending topics, providing seven future research directions: (1) drivers-, location- and competition-related topics; (2) SEBMs in emerging economies; (3) country-, region- and culture-oriented SEBMs; (4) the link between e-commerce and social media frameworks and SEBMs; (5) sustainability and SEBMs; (6) new technologies and SEBMs and (7) COVID-19 effects on SEBMs. Overall, the results of this study theoretically enrich the sharing economy business model literature and have substantial implications for policymakers and practitioners.

Keywords: sharing economy business models; bibliometric analysis; research directions; COVID-19; sustainable development

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1. Introduction

Thousands of years of the human behavior of sharing resources (e.g., food, living spaces) has evolved into what is called "the sharing economy", a phenomenon that appeared as early as the 1990s with the development of new technologies, particularly the internet, because these opened the way for information sharing and online transactions. Therefore, the sharing economy was born in the Internet Age [1,2], which is associated with the gig, collaborative and platform economies [3,4]. Over the past three decades, the rapid developments of the internet, cloud, block-chain, social media and e-commerce platforms in the business world have significantly changed people's daily lives and have facilitated the feasibility of economic sharing, from goods and assets to services based on the concept of "what's mine is yours" [5]. Public and governmental perceptions of the sharing economy have changed substantially worldwide [6]; it has come to be seen an one important pathway for socioeconomic progress, employment advancement and income growth.

From an academic research perspective, the sharing economy has steadily attracted interest in the last decade [6–8]. The sharing economy field of study has been exponentially expanding geometrically and disciplinarily [8]; research articles published in accredited journals have increased since 2014 at an average rate of 30% [3,9], and the citation number grew from 2 to 55 between 2014 and 2019 [8]. With this fast-growing number of publications, calls have been made to map the emerging sharing economy research field and to identify avenues for additional research attention [8,10]. Evidence shows that literature reviews are widely used to discover themes, patterns, processes and outcomes with regard to a research field [8]. Qualitative literature review approaches have been employed to identify thematic research clusters related to the sharing economy phenomenon [7,10].

Business models have featured prominently in sharing economy research [5,11]. Scholars have agreed that the core of the sharing economy is to share under-utilized assets for monetary and non-monetary benefits based on a business model supported by information and communication technologies and Web 2.0 [5,12]. It is emphasized that the future advancement of the sharing economy relies on new business models [12]. Thus, sharing economy business models (SEBMs) play a critical role in the sharing economy; however, this role has not yet been sufficiently explored [12,13]. To date, there has been a lack of thematic study and future research direction exploration in the area of SEBMs, particularly considering the dramatic changes in the business environment and human behavior caused by COVID-19, both during the pandemic and in the post-COVID-19 era [14,15].

Some retrospective works on the evolution of the subject have focused on specific areas such as asset-sharing, peer-to-peer business models, crowdsourcing, access-based consumption and community or specific platforms (e.g., Airbnb, Uber), while others have had a broader focus [16,17]. For instance, Silva and Moreira [3] conducted a bibliometric analysis that focused on entrepreneurship and the sharing economy, collecting 506 articles between 1991 and 2021 from Scopus and Web of Science (WoS). They found that sharing economy (platform) developers are crucial to developing strategies and policies and taking action to achieve social welfare through entrepreneurship in a platform ecosystem [3,18]. As another example, Kraus and co-authors [8,19] analyzed the state of the art of the sharing economy to explore research patterns by collecting publications from the WoS core collection between January 2013 and February 2020. They detected six thematic research trends in the sharing economy literature: (1) product liability, (2) organizing framework, (3) profile characteristics, (4) diverse economies, (5) consumption systems and (6) everyday life. Using a mixed method, one research paper set out to identify concurrent themes [20]. Five research themes emerged: consumer motivations; impact on society; market and policy; business models and revenue models and definition and frameworks. There have also been conceptual studies for a business model framework based on a qualitative literature review [12,21–23].

These literature reviews have been conducted in the sharing economy field, focusing on various areas. So far, there has been a lack of quantitative investigation focusing on knowledge mapping of SEBMs, which is unfortunate given that they have occupied an unparalleled central position in the sharing economy revolution [24]. The lack of SEBM reviews leaves a number of research gaps that need to be filled up. The gaps include, but are not limited to, the subject history and current development; influential authors, publishers, affiliations and countries; current influential articles; current focuses and future directions in research.

This study aims to fill the abovementioned gaps by systematizing the scientific achievements related to SEBMs, providing a holistic overview of the currently fragmented literature and proposing future research streams. The objectives of this bibliometric study are to (1) visualize the network of publications shaping the overall intellectual structure of the SEBM field by considering the period between 2014 and 2022, (2) map the clusters of thematically related publications, (3) reveal the emerging development paths that each thematic cluster represents and the strategic principles they embody and (4) explore future

research directions. With these in mind, a bibliometric analysis was conducted to answer the following research questions:

(1) What is the current publication trend in SEBMs?
(2) Which are the most influential sources, authors, affiliations, articles and countries on SEBMs?
(3) What collaboration networks are there among authors, affiliations and countries?
(4) What is the structure of the thematic evolution in SEBM research?
(5) What is the keyword intellectual structure of the current research on SEBMs?
(6) What are the emerging trends in SEBM research?
(7) What are the future research directions for SEBMs from a sustainable development perspective?

This paper begins with a brief explanation of the bibliometric analysis and its use in SEBM research before proceeding to outline the methodology with reference to the bibliometric approach, data collection process and dataset description. Comprehensive analytical results for authors, sources, affiliations, countries, keywords and emerging trends are then presented and include conceptual, intellectual and social structural mapping. After that, the current trends are underscored, and future research directions are forecasted. This is followed by a discussion of the theoretical and practical implications and a concluding summary of the paper.

2. Bibliometric Analysis and Its Application in SEBM Studies

Originating in the field of information science, a bibliometric analysis aims to quantify what has already been published and evaluate the evolution of related subjects and fields. Bibliometrics can reveal the macro- and meso-structures of scientific production development and its application, the development history of a specific field, the current research trends and future development directions [25]. Scholars have highlighted that the basic items of bibliometric analysis are articles, authors, citations, co-citations, partnerships, co-authorships, affiliations, countries and journals, as well as the interrelationship among these attributes [8,26].

Furthermore, a bibliometric analysis provides the field evolution of author keywords, authors and collaboration through historiography and thematic dynamics. Based on this information, bibliometrics statistically analyses the characteristics of publications and seeks to quantify, describe and predict the scientific conversation process. Over time, conversation studies reveal the behavior models and academic patterns that have been established in a field. Thus, bibliometric studies serve research by providing guidance on emerging themes when they are not yet consolidated in the academic–scientific environment.

A bibliometric analysis can be employed to focus on performance analyses, which concentrate on the productivity and impact of field publications. Scholars have conducted a hybrid review that combined bibliometric analysis and the antecedents, decisions and outcomes (ADO) framework to identify research themes, theoretical frameworks and related contexts and methods to service quality in the sharing economy [27]. They classified quality in SEBMs into four quadrants: quality is not a priority and not specified; quality is not a priority but is specified; quality is one of the priorities; quality has online and offline dimensions, and quality is a priority and is specified in terms of the qualities of the website, platform and service provided by peers [27]. This category of application is most commonly used to answer the question of "what we are researching" [28,29].

Bibliometrics can also be employed to focus on scientometric mapping, which investigates themes within a specific research area by engaging in citation analysis, co-citation analysis, bibliometric coupling, co-keyword and co-authorship analyses. By applying a bibliometric analysis, scholars have identified four clusters of existing research through co-citation analysis: freelance work and its implications; transportation and solutions for the sustainable development of the sharing economy; user experience and collaborative consumption; and the sharing economy in the context of hospitality and tourism [8,30].

This category of application can be employed to forecast future research directions through thematic mapping, thematic evolution factor analysis, and other enrichment technologies.

In summary, based on the findings of the bibliometric analysis and scientometric mapping, several indicators can be identified, including the most influential documents, authors, journals and participants. Thus, the portrait and framework of a research field can be generated, thematic mappings and evolutions created, current trends identified and future research directions predicted.

3. Methodology

When the scope of a review is broad and the dataset too large for manual review, a bibliometric analysis is the best instrument for encapsulating abundant data to present a research theme of a field's state of intellectual structure and emerging trends [31]. This research applied a bibliometric analysis to quantitatively review the state of the research on the theme of business models in the sharing economy field [9]. This approach has grown exponentially in business and management disciplines over the last 20 years and has created new knowledge in the literature [31]. Another strength of bibliometric analyses is that they are suitable for a multi-disciplinary, multi-theoretical and multi-methodological study.

3.1. Research Design

This study took five steps to achieve the five research objectives (Figure 1). After establishing the research aim, target and strategy, a series of keywords were defined for the database searches. The two most commonly used databases (Scopus and WoS) were selected to enhance the dataset and avoid missing any articles. By merging two outputs into one, thus removing duplicates, the final dataset was established. In the next step, Bibliometrix R, the highly recommended [23,32] visualization tool, was utilized for the data analysis (performance and science mapping). Finally, the final report—this paper—was created.

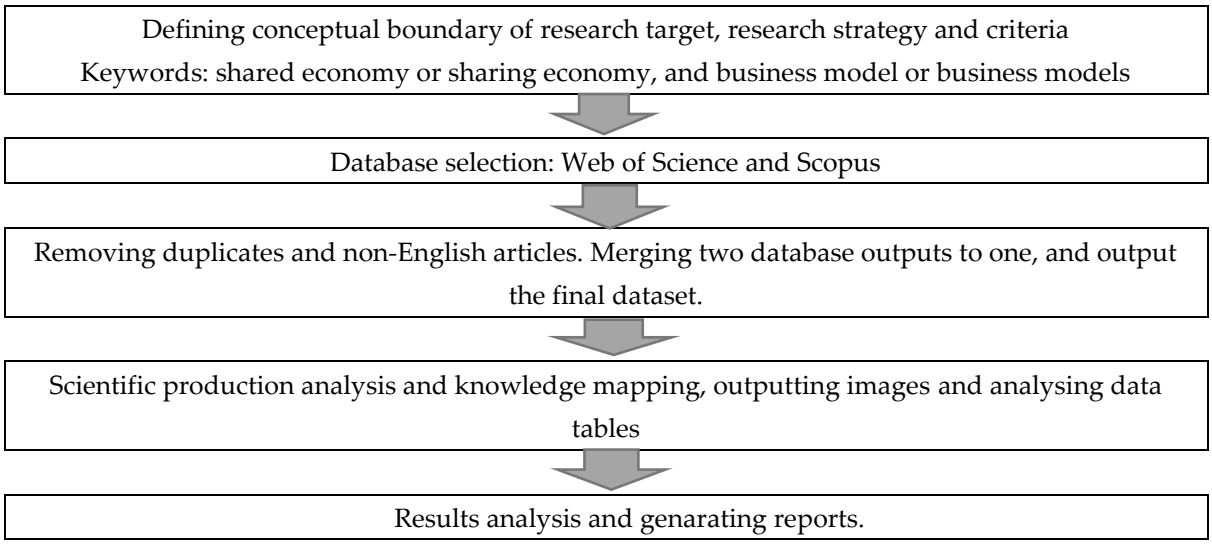

Figure 1. Five-step process of the research framework.

3.2. Dataset Descriptions

WoS Core Collection is the world's leading citation database. It contains records of articles from the highest-impact journals worldwide, including open-access journals, conference proceedings and books. Coverage of some titles dates back to 1900. Elsevier's Scopus is the largest database of abstracts and citations in the peer-reviewed literature, whether from scientific journals, books or conference papers. The database queries were conducted on 15 September 2022. The entire dataset included 11 articles in other languages; only duplicated articles were removed in Endnote.

The search string (inclusive criteria) used was ("shared economy" or "sharing economy") and ("business model" or "business models"). The searches resulted in 705 and 642 records, respectively, from WoS and Scopus. After removing duplicates, 951 entries were left for the final dataset from 552 sources. The total number of authors within the dataset was 2059 (Table 1). The dataset timespan was from 2014 to 2022. The first thing the author noticed from Table 1 was that a large number of sources (552) had published articles relating to SEBMs. A detailed analysis revealed that these five hundred and fifty-two sources included one hundred and forty-four conference proceedings, twelve books, fifty-seven book chapters and eight editorials, and each of these records with a different name was treated as an individual source. To present a comprehensive landscape of SEBMs studies, this research kept all knowledge from the entire dataset (no exclusive criteria).

Table 1. Description of the collected dataset (established on 15 September 2022).

Description	Results	Description	Results
Timespan	2014:2022	Article	555
Sources (Journals, Books, etc.)	552	Article; book chapter	1
Documents	951	Article; early access	30
Annual growth rate %	50.98	Article; proceedings paper	4
Document average age	2.64	Book	12
Average citations per doc.	13.84	Book chapter	57
References	38,167	Conference paper	86
Keywords plus (ID)	1639	Conference review	2
Author's keywords (DE)	2371	Editorial material	8
Authors	2059	Meeting abstract	1
Authors of single-authored docs.	153	Proceedings paper	144
Single-authored docs.	166	Review	49
Co-authors per doc.	2.76	Review; early access	2
International co-authorships %	21.77		

3.3. Data Analysis and Visualization

To holistically analyze the dataset, the Bibliometrix software in the R-package was utilized for a major part of the data analysis and visualization. Data (mainly keywords) and their interconnections were classified into themes in four categories: motor themes, peripheral themes, emerging or declining themes and basic and transversal themes. Similar studies have been employed for some sharing economy themes other than business models, such as the entire sharing economy as a field [3], co-working space in the sharing economy [33] and the sharing economy from a sustainable development perspective [34]. The bibliometrics accessed through this research included scientific productions by authors, affiliations, publishers and countries, citations and co-citations and networks among authors and countries, productivity and citation growth, keywords and their structure, the co-occurrence of author keywords and article references to thematic maps and thematic evolution. The visualization features were used to illustrate both the knowledge networks and conceptual development. The keyword co-occurrence network maps the proximity of words appearing together in individual documents, followed by a factorial analysis that reduces the data's dimensionality through a multiple correspondence analysis (MCA). Some indicators used in the study are as follows: total citations—the number of citations received; h-index—the productivity and influence; m-index—the distribution of citations score in addition to influence and productivity; and g-index—the volume per year in the mentioned indicators.

3.4. Metric Measures and Descriptions

A performance analysis explores the contributions of research elements to a given field. Myriad measures for field production analysis exist, the most important of which are the quantity of publications, measuring productivity and citations per annual or per research constituent to measure the impact and influence. Other measures, such as cita-

tions per publication and the h-index, combine both citations and publications to measure the performance of research constituents. This study adopted Donthu et al.'s (2020) description for performance metric terms (Table 2) to measure the performance of research constituents [35]. The performance metrics were grouped into three categories: publication-related, citation-related and combined publication-related and citation-related.

Table 2. Metrics for performance analysis.

Metric	Description	Metric	Description
Publication-Related Metrics		***Citation-and-Publication-Related Metrics***	
Keywords Plus	A metric provided by the bibliophilic package based on words or phrases that frequently appear in the titles of an article's references and author keywords.	Collaboration index (CI)	(NCA ÷ TP) ÷ TP (i.e., the extent of collaboration of research constituent)
Author keywords	Chosen by authors to best reflect the content of articles.	Collaboration coefficient (CC)	1 − (TP ÷ NCA) (i.e., standardizes the extent of author collaboration between 0 and 1)
Total publications (TP)	Total publications of research constituent.	Number of cited publications (NCP)	Number of publications of research constituent that are cited
Number of contributing authors (NCA)	Total number of authors contributing to publications of research constituent.	Proportion of cited publications (PCP)	NCP ÷ TP
Sole-authored publications (SA)	Total number of sole-authored publications by research constituent.	Citations per cited publication (CCP)	TC for NCP
Co-authored publications (CA)	Total number of co-authored publications by research constituent.	h-index (h)	*h:* the number of publications cited at least *h* times (i.e., measure of influence)
Number of active years of publication (NAY)	Number of years that research constituent recorded a publication.	m-index (m)	*m:* the umber displays the h-index per year since first publication
Productivity per active year of publication (PAY)	TP ÷ NAY	g-index (g)	*g:* the number of publications receiving at least *g*2 citations (i.e., measure of impact)
Global citation (GC)	The number of citations in a paper.	*i*-index (*i*-10, *i*-100, *i*-200)	*i:* the number of publications cited at least *i* times (e.g., *i* = 10, 100, 200, etc.)
The local citation (LC)	The number of citations in a paper in a reference list to other papers within the collected dataset.		
Citation-related metrics			
Total citations (TC)	Total citations of research constituent		
Average citations (AC)	Average citations (e.g., per publication, per year, per period) of research constituent		

Note (s): Compilation based on author experience and expertise in bibliometric analysis. Metrics can be computed for each research constituent (e.g., authors, institutions, countries, journals) as an aggregate (e.g., research constituent) or specifically (e.g., research constituent per publication, per year, or per period) depending on information needs (e.g., aggregates for overviews, specifics for trends observation).

Knowledge mapping explores the relationships between research elements. The analysis pertains to the intellectual interactions and structural connections among research elements. The techniques for knowledge mapping include analyses of citations and co-citations, bibliographic coupling (authors and articles), co-word analysis and co-authorship analysis. Such techniques, when combined with network analysis, are instrumental in presenting the bibliometric structure and the intellectual structure of a research field [31].

Table 3 presents a summary of the different techniques used for science mapping with a focus on their usage and data considerations.

Table 3. Techniques for science mapping and their usage, unit of analysis and data.

Technique	Usage	Unit of Analysis	Data Requirements
Citation analysis	To analyze the relationships among publications by identifying the most influential publications in a research field.	Documents	Author name, citations, title, journals, DOI, references
Co-citation analysis	To analyze the relationships among cited publications to understand the development of the foundational themes in a research field.	Documents	References
Bibliographic coupling	To analyze the relationships among citing publications to understand the periodical or present development of themes in a research field.	Documents	Author name, title, journals, DOI, references
Keywords co-occurrence analysis	To explore the existing or future relationships among themes in a research field by focusing on the written content of the publication itself.	Words	Title, abstract, author keywords, index keywords, full text
Co-authorship analysis	To examine the social interactions or relationships among authors and their affiliations and equivalent impacts on the development of the research field.	Authors affiliations	Author affiliation (institution and country)

Network metrics for thematic classification are used to improve the assessment of bibliometric analyses. In particular, network metrics explain the relative importance of research components such as keywords or a group of keywords. Importantly, network metrics are commonly deployed to enrich the conversation of research subjects in bibliometric studies, and thus, they represent a legitimate method for improving bibliometric assessments. Several network metrics were applied (e.g., degree of centrality, betweenness, degree of impact, centrality and PageRank) in this study, along with a table of the most-cited publications. This study adopted Donthu et al.'s (2020) and Sharma et al.'s 2018) description for thematic metric terms (Table 4) to measure the degree of centrality, closeness centrality, PageRank, and more variables of the field [31,36]. Important terms and their descriptions are detailed in Table 4.

Table 4. Terms and descriptions for thematic metrics.

Terms	Description	Reference
Degree of centrality	Refers to the number of relational ties a research constituent has in a network.	(Donthu et al., 2021) [31]
Closeness centrality	Refers to the capability of nodes to carry information effectively by being closer to other nodes in the network. The sum of distance of such nodes from other nodes in the network. How close a node is to all other nodes in the network.	(Donthu et al., 2021) [31]; (Sharma et al., 2018) [36]
PageRank	Is an alternative measure of a publication's impact.	(Donthu et al., 2021) [31]
Betweenness centrality	Refers to a node's ability to carry information between unconnected groups of nodes, wherein each node represents a research constituent, or how often a node (vertex) is located on the shortest path (geodesic) between other nodes.	(Donthu et al., 2021) [31] (Sharma et al., 2018) [36]
Eigenvector centrality	Is higher for nodes that are connected to other highly-connected nodes, wherein each node represents a research constituent.	(Donthu et al., 2021) [31]
Impact	Refers to the frequency of use by the articles in the dataset in coupling analysis.	(Sharma et al., 2018) [36]

4. Results

4.1. Analysis of Sources

4.1.1. Most Relevant Sources by the Number of Publications

Figure 2 highlights the top 20 sources for SEBM research papers. The top five sources were Sustainability (61), Journal of Cleaner Production (36), Journal of Business Research (15), Technological Forecasting and Social Change (11) and International Journal of Hospitality Management (9). A total of one hundred and thirty-two articles appeared across these top five sources, representing 13.88% of the nine hundred and fifty-one papers in the dataset. There were 235 articles published by the top 20 sources, representing 24.71% of the total publications.

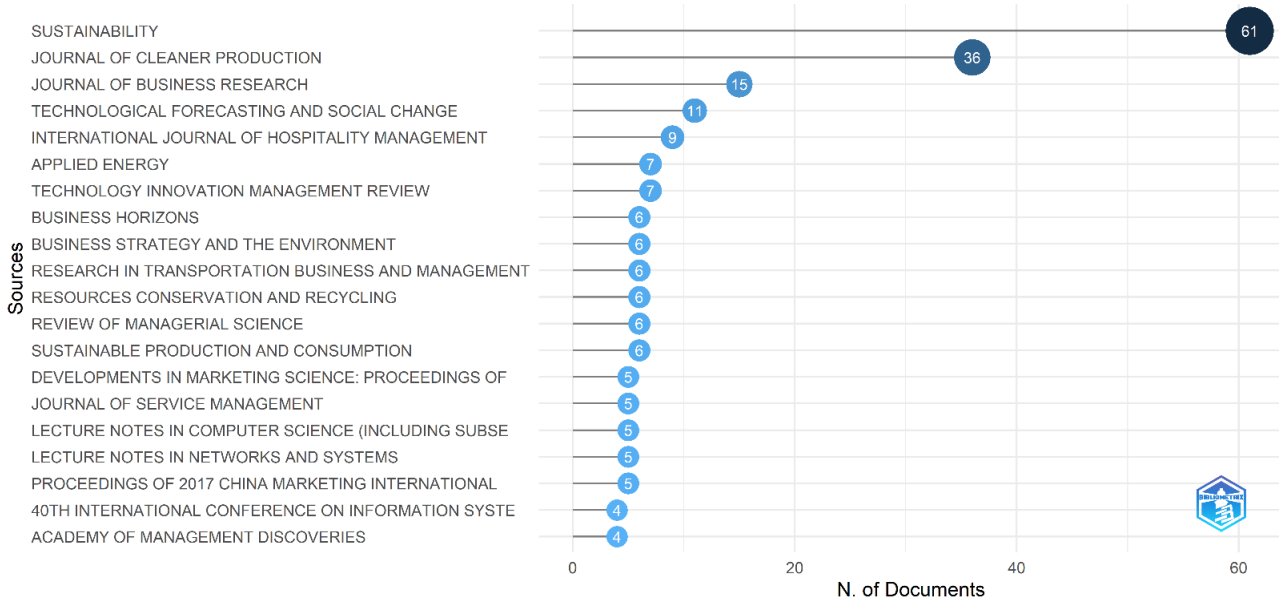

Figure 2. Top 20 most relevant sources.

Figure 3 shows that the productivity of each source has been dynamic over time. Of the top twenty productive sources, none published relevant articles in 2014; one article was published in *Computers in Human Behavior*; and, in 2016, one each was published in the *International Journal of Hospitality Management* and *Business Horizons*. It was noticed that the journal rankings of the most relevant, impactful and cited sources were not identical. For example, *Computers in Human Behavior* was ranked in the list of most impactful and cited sources but not in the most relevant sources.

4.1.2. Top 20 Highest Impactful Sources

While the most relevant sources measure the total number of articles published in a journal list, Table 5 lists the top 20 highest impactful sources, measured by h-index, g-index and m-index. Ranked differently to the most relevant sources, the five highest impactful journals were *Journal of Cleaner Production* (h-index = 19, total citations = 1252), *Sustainability* (14, 783), *Technological Forecasting and Social Change* (10, 458), *International Journal of Hospitality Management* (6, 793) and *Journal of Business Research* (6, 243). All five journals started publishing relevant articles between 2016 and 2018. The average h-index, g-index, m-index, TC, NP and PY_start for the top 20 sources were 5.12, 6.88, 1.08, 255.6, 8.08 and 2018, respectively.

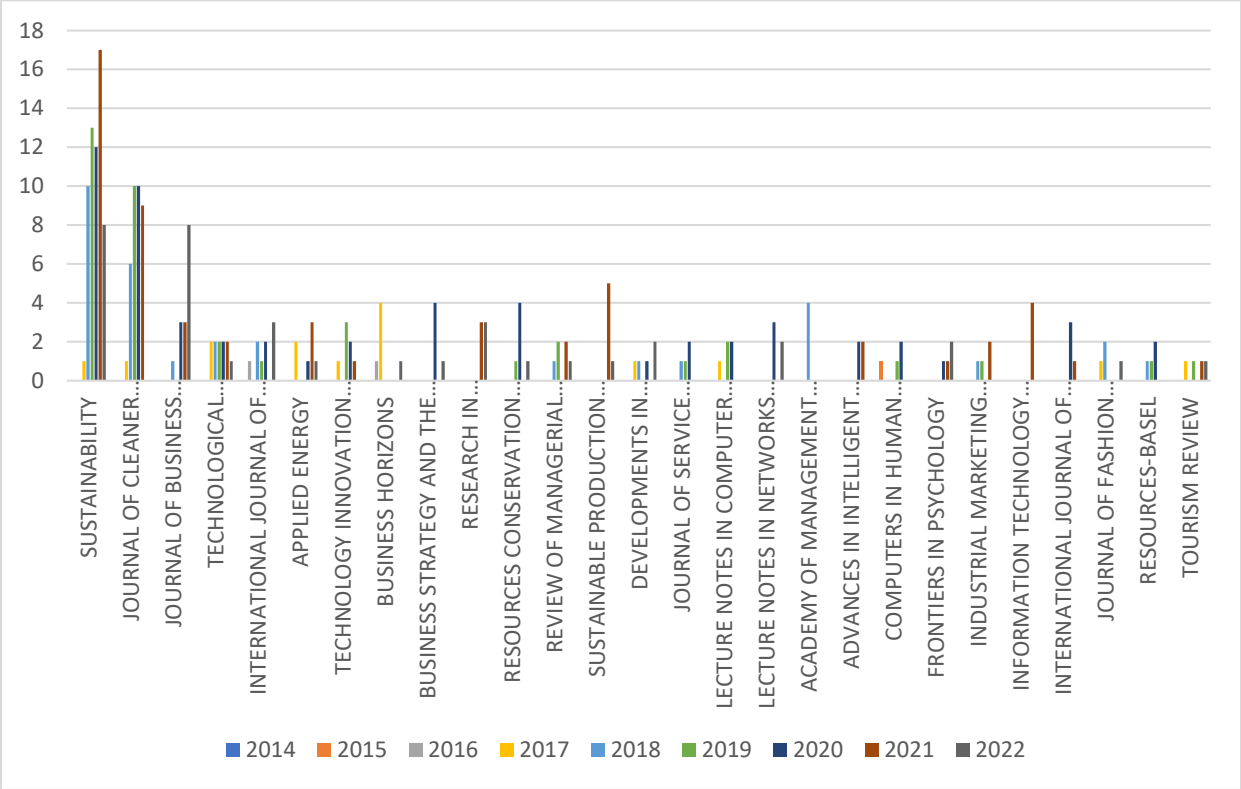

Figure 3. Source dynamics by the yearly number of publications (top 20 journals).

Table 5. Top 20 SEBM sources.

Source	h-Index	g-Index	m-Index	TC	NP	PY_Start
Journal of Cleaner Production	19	35	3.167	1252	36	2017
Sustainability	14	25	2.333	783	54	2017
Technological Forecasting and Social Change	10	10	1.667	458	10	2017
International Journal of Hospitality Management	6	7	0.857	793	7	2016
Journal of Business Research	6	14	1.2	243	14	2018
Business Horizons	5	6	0.714	496	6	2016
Resources Conservation and Recycling	5	5	1.25	172	5	2019
Review of Managerial Science	5	6	1	339	6	2018
Sustainable Production and Consumption	5	6	2.5	46	6	2021
Academy of Management Discoveries	4	4	0.8	101	4	2018
Business Strategy and the Environment	4	5	1.333	57	5	2020
Computers in Human Behavior	4	4	0.5	410	4	2015
International Journal of Production Economics	4	4	1.333	144	4	2020
Journal of Service Management	4	4	0.8	218	4	2018
Applied Energy	3	7	0.5	199	7	2017
Australasian Marketing Journal	3	3	1	54	3	2020

Table 5. *Cont.*

Source	h-Index	g-Index	m-Index	TC	NP	PY_Start
Ciriec-Espana Revista De Economia Publica, Social Y Cooperativa	3	3	0.429	33	3	2016
Climatic Change	3	3	1	33	3	2020
Creativity and Innovation Management	3	3	0.5	120	3	2017
Energies	3	3	0.75	24	3	2019
Information Technology & People	3	3	1	35	3	2020
Information Technology & Tourism	3	3	0.429	39	3	2016
International Journal of Information Management	3	3	0.6	243	3	2018
International Journal of Innovation And Technology Management	3	3	0.75	30	3	2019
Internet Research	3	3	0.6	68	3	2018
Average	5.12	6.88	1.08	255.6	8.08	2018

4.1.3. Most Local Cited Sources

Figure 4 shows the top 20 most locally cited sources (from reference lists). Local citations measure how many times an article included in a dataset has been cited by the articles also included in the dataset. A cited source is a journal/book/conference proceeding series, etc., included in at least one of the reference lists (bibliography) of the dataset. This research detected 18,795 locally cited sources. The *Journal of Cleaner Production* stood out in first position with one thousand six hundred and sixty-five articles, in second position was the *Journal of Business Research* with eight hundred and eighty-nine articles and Technology *Forecasting and Social Change* was in third position with seven hundred and eighteen articles. In other words, the *Journal of Cleaner Production* had the greatest contribution within the research dataset.

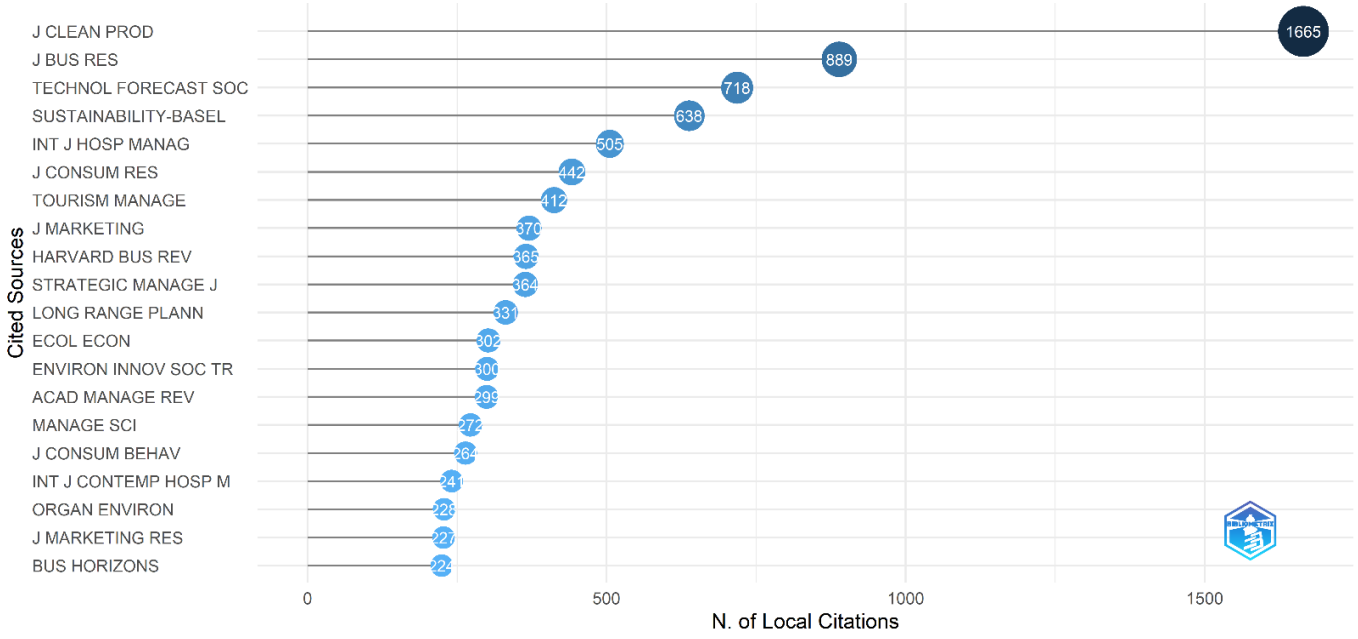

Figure 4. Top 20 most locally cited sources.

4.1.4. Bradford's Law

Journals in a particular field are divided into three categories according to Bradford's Law [37]. According to the law, if journals in a field are categorized by article number into three zones, each with one-third of all articles, then the number of journals in each group will be proportional to 1:n:$n \times n$. In this study, although the entire dataset contained five hundred and fifty-two sources, the output of the Bradford's law analysis (Figure 5) illustrated that the top five journals were the *Journal of Cleaner Production*, *Sustainability*, *Technological Forecasting and Social Change*, *International Journal of Hospitality Management* and *Journal of Business Research*. While these five journals only published one hundred and thirty-one articles, which was 12.7% of the dataset, they can be understood as representing the essential knowledge in SEBM research, based on Bradfords' law.

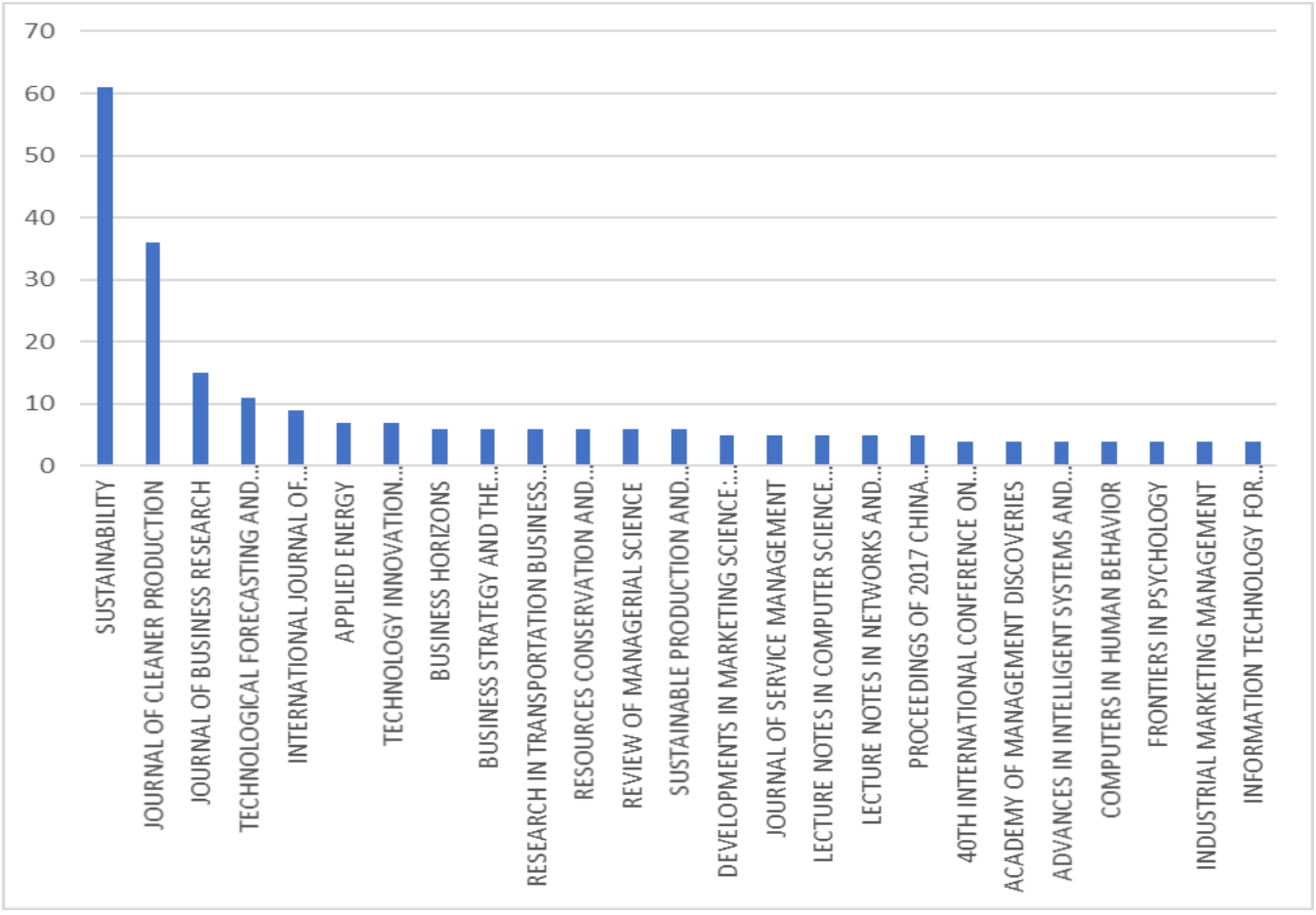

Figure 5. Output of Bradford's law analysis (top 25 sources).

4.1.5. Source Dynamics

The source dynamics presented in Table 6 apply to the number of articles published by the top 12 journals in the SEBM area from 2014 to 2022. The majority of these journals have consistently increased their publication of relevant articles. *Sustainability and the Journal of Cleaner Production* were the top two journals, with SEBM articles being published every year from 2017. The majority of the sources published small numbers of relevant articles at various points in the time period. The total number of publications from these top 12 has kept growing, as the table shows, which indicates that SEBM research is in a fast-growing period at the moment.

Table 6. Sources dynamic (top 12 by number of publications).

Year	2014	2015	2016	2017	2018	2019	2020	2021	2022
Sustainability	0	0	0	1	10	13	12	17	8
Journal of Cleaner Production	0	0	0	1	6	10	10	9	0
Journal of Business Research	0	0	0	0	1	0	3	3	8
Technological Forecasting and Social Change	0	0	0	2	2	2	2	2	1
International Journal of Hospitality Management	0	0	1	0	2	1	2	0	3
Applied Energy	0	0	0	2	0	0	1	3	1
Technology Innovation Management Review	0	0	0	1	0	3	2	1	0
Business Horizons	0	0	1	4	0	0	0	0	1
Research in Transportation Business and Management	0	0	0	0	0	0	0	3	3
Resources Conservation and Recycling	0	0	0	0	0	1	4	0	1
Review of Managerial Science	0	0	0	0	1	2	0	2	1
Sustainable Production and Consumption	0	0	0	0	0	0	0	5	1
Total	0	0	2	11	22	32	36	45	

4.2. Analysis of Authors, Affiliations and Countries

4.2.1. Most Relevant Authors

Table 7 provides a list of the top 50 most relevant authors by order of the number of articles published. The total citation number, h-index, g-index, m-index and starting year of publishing SEBM articles are also on the list. Koen Frenken from Utrecht University, Netherlands, was ranked at the top. Starting in 2017, he and his co-authors published research on "Energy Research & Social Science (2019)", "Environmental Innovation and Societal Transitions (2021)", "Information Systems and E-Business Management (2018)", "International Journal of Sustainable Transportation (2020)", "Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences (2017)", "Policy and Internet (2020)", and "Transportation Research Part D-Transport and Environment (2019)". These seven articles, focusing on energy, transportation, environment and sustainability, have been cited two hundred and seventy-seven times. The h-index, g-index and m-index were calculated from the dataset of this research.

Nancy Bocken, from Lund University, Sweden, and her co-authors contributed the same number of research papers. Their papers have been cited 188 times. Other important contributors to the SEBM area include Sascha Kraus from Durham University, Durham, UK and Ricarda Bouncken from the University of Bayreuth, Bayreuth, Germany. On average, the top 50 authors published 4.8 articles and had 137 citations. The average level of h-index, g-index, m-index, TC, NP and PY_start for these 50 top contributors were 3.66, 4.08, 0.760, 136.96, 4.08 and 2017, respectively, as the table shows.

4.2.2. Author Contributions to the Area Development

Figure 6 shows a three-field plot of the author contributions to the areas and their original citations. The interpretation of the figure is strongly related to Table 8 for the top 50 authors, and the top 50 most influential articles (discussed later). The figure depicts the relationship between the current conversations in SEBM studies and their valuable contributors. It illustrates that business model(s), innovation and sustainable development are the keywords that frequently appeared together as a theme, and the contributors included, among others, R. Bouncken, Y. Wang, S. Kraus, Y. Chen and D. Mangalagiu. The far-left column indicates which author(s) and article(s) these theme contributors referenced.

Table 7. Ranked top 50 contributors in SEBM research.

Rank	Author	h-Index	g-Index	m-Index	TC	NP	PY_Start
1	Frenken K.	7	7	1.167	277	7	2017
2	Bocken N.	6	7	1	188	7	2017
3	Kraus S.	6	6	1	330	6	2017
4	Bouncken R.	5	7	0.833	326	7	2017
5	Ma Y.	5	6	0.833	334	6	2017
6	Mangalagiu D.	5	6	0.833	334	6	2017
7	Thornton T.	5	6	0.833	334	6	2017
8	Wang Y.	5	6	0.833	152	6	2017
9	Zhu D.	5	6	0.833	289	6	2017
10	Akhmedova A.	4	5	1.333	64	5	2020
11	Alonso-Almeida M.	4	4	0.571	68	4	2016
12	Boon W.	4	4	0.8	127	4	2018
13	Curtis S.	4	4	1	169	4	2019
14	Li J.	4	4	1	179	4	2019
15	Marimon F.	4	6	1.333	88	6	2020
16	Mas-Machuca M.	4	6	1.333	63	6	2020
17	Mont O.	4	4	1	101	4	2019
18	Munzel K.	4	4	0.8	130	4	2018
19	Piscicelli L.	4	4	0.8	163	4	2018
20	So K.	4	4	1	141	4	2019
21	Amasawa E.	3	3	0.6	36	3	2018
22	Boons F.	3	3	0.5	128	3	2017
23	Carbone V.	3	3	0.6	113	3	2018
24	Fogarassy C.	3	3	0.75	34	3	2019
25	Hazee S.	3	3	1	31	3	2020
26	Hu M.	3	3	1	91	3	2020
27	Iran S.	3	3	0.5	98	3	2017
28	Kietzmann J.	3	3	0.333	542	3	2014
29	Kljucnikov A.	3	4	0.6	52	4	2018
30	Lan J.	3	3	0.5	202	3	2017
31	Laurell C.	3	5	0.6	89	5	2018
32	Li H.	3	3	0.6	59	3	2018
33	Li L.	3	4	0.5	20	4	2017
34	Li S.	3	3	0.75	19	3	2019
35	Liu J.	3	4	0.5	177	4	2017
36	Liu S.	3	3	0.75	182	3	2019
37	Meged J.	3	3	0.6	41	3	2018
38	Rong K.	3	3	0.6	145	3	2018
39	Sandstrom C.	3	3	0.6	85	3	2018
40	Tiberius V.	3	3	1	51	3	2020
41	Van V. Y.	3	3	0.6	97	3	2018
42	Vaskelainen T.	3	3	0.6	81	3	2018
43	Wagner N.	3	3	0.75	33	3	2019
44	Wang J.	3	3	0.6	74	3	2018
45	Wirtz J.	3	3	0.75	179	3	2019
46	Wu C.	3	3	0.429	88	3	2016
47	Xu Y.	3	4	0.6	31	4	2018
48	Zhang N.	3	4	0.5	130	4	2017
49	Zhang X.	3	4	0.429	61	4	2016
50	Zhang Y.	3	3	0.75	22	3	2019
	Average	**3.66**	**4.08**	**0.760**	**136.96**	**4.08**	**2017**

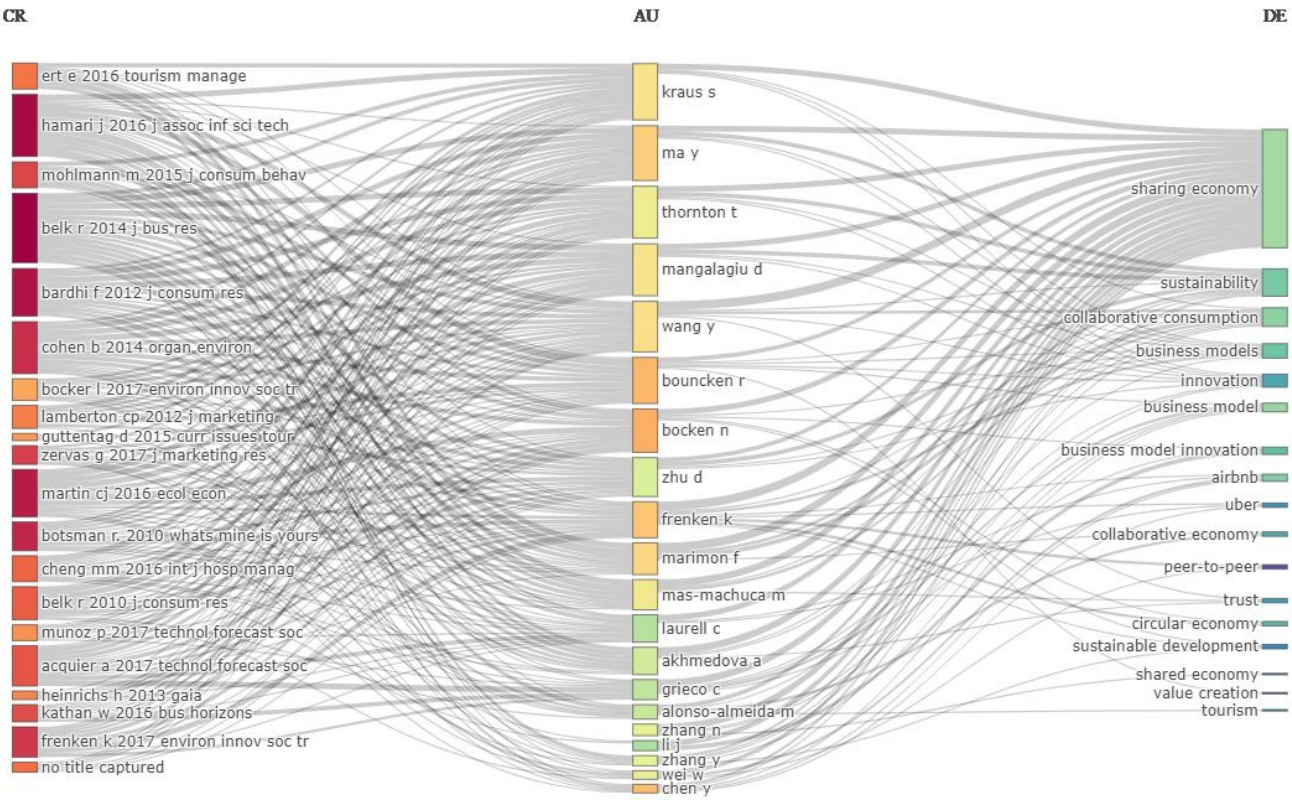

Figure 6. Three-field plot of author contributions to the areas and original citations.

Table 8. Ranked top 20 most relevant affiliations.

Rank	Affiliation	Articles
1	LUND UNIV	17
2	UNIV UTRECHT	14
3	BUCHAREST UNIV ECON STUDIES	11
4	TSINGHUA UNIV	10
5	UNIV INT CATALUNYA	10
6	TONGJI UNIV	9
7	UNIV BAYREUTH	9
8	KAUNAS UNIV TECHNOL	8
9	NEOMA BUSINESS SCH	8
10	UNIV CALIF BERKELEY	8
11	UNIV MANCHESTER	8
12	HONG KONG POLYTECH UNIV	7
13	SOUTHEAST UNIV	7
14	UNIV SOUTH CAROLINA	7
15	UNIV SYDNEY	7
16	KTH ROYAL INST TECHNOL	6
17	NATL UNIV SINGAPORE	6
18	NORTH CAROLINA STATE UNIV	6
19	OREBRO UNIV	6
20	UNIV OXFORD	6
21	GRIFFITH UNIV	5
22	KAUNAS UNIVERSITY OF TECHNOLOGY	5
23	OKLAHOMA STATE UNIV	5
24	RATIO INST	5
25	TECH UNIV CHEMNITZ	5

4.2.3. Author Production over the Review Period

When analyzing author production chronologically over time, A. Akhmedova, M. Alonso-Almeida, N. Bocken, R. Bouncken, Y. Chen, K. Frenken, S. Kraus, C. Laurell, J. Li, L. Li, Y. Ma, D. Mangalagiu, F. Marimon, M. Mas-Machuca, T. Thornton, Y. Wang, W. Wei, N. Zhang, Y. Zhang and D. Zhu were the top 20 contributors who represented the chronological line of production, as shown in Figure 7. It is worth noting that all these authors contributed in the year 2020. However, fourteen of them published extensively in the period of time from 2017 until 2019, and four of them had no publications after 2020. New players, starting from 2020, were F. Marimon, M. Mas-Machuca and A. Akhmedova, while Y. Chen, Y. Ma, Y. Wang, C. Laurell and W. Wei were key players in the area, having contributed continuously throughout the period.

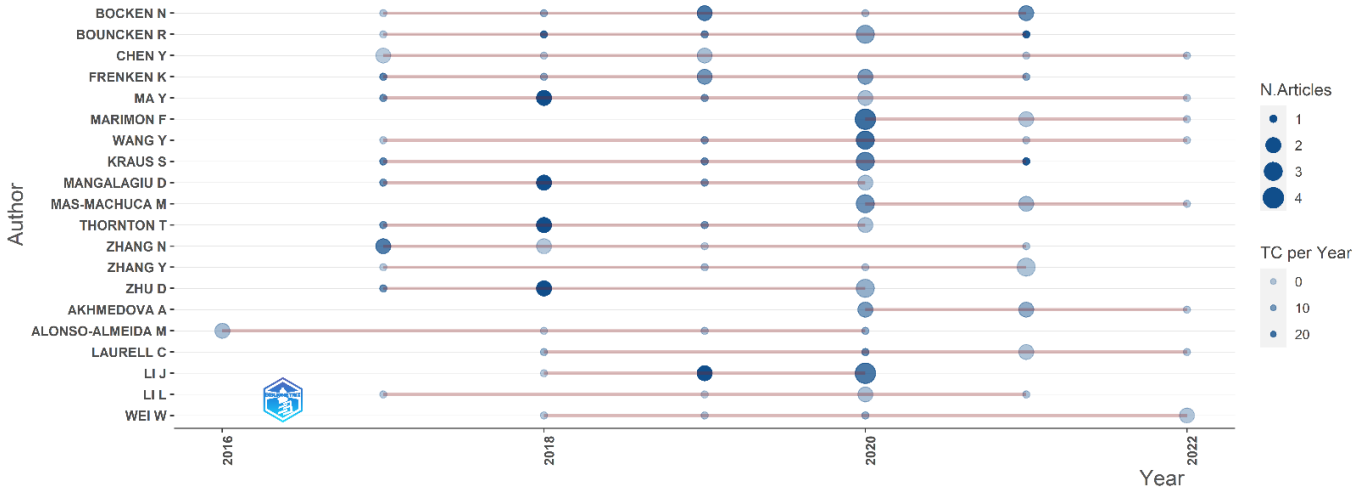

Figure 7. Author production over the review period.

4.2.4. Collaboration Networks by Authors

Co-authoring or collaboration network analysis facilitates the identification of how researchers, affiliations or countries are connected based on the number of publications they have co-authored [38]. With a 21.77% international co-authorship and an average of 2.76 authors per article (Figure 8), the SEBM area appears to be an international conversation and appears to be well collaborated in comparison to other research topics in the sharing economy field [3,38]. Nevertheless, the author networks shown in Figure 8 were small and had weak connections. With eleven networks detected, no network had more than eight nodes; thus, there was a low density of cooperative networks compared to scholars' [3,39] reports of different studies.

4.2.5. Affiliations

The results (Table 8) for the top twenty most relevant affiliations indicated that Lund University of Sweden (seventeen articles), Utrecht University of Netherlands (fourteen articles), Bucharest University of Economic Studies in Romania (eleven articles), Tsinghua University in China (ten articles) and UIC Barcelona International University of Catalonia (ten articles) were the top five institutions affiliated with the production of articles related to the SEBM area. Figure 9 shows that these five institutions have increased their publication numbers exponentially over the last five years.

Figure 9 demonstrates that the number of publications from the top five affiliations is still growing. This implies that the SEBM research area is in a growth period and will continue to grow in the next few years.

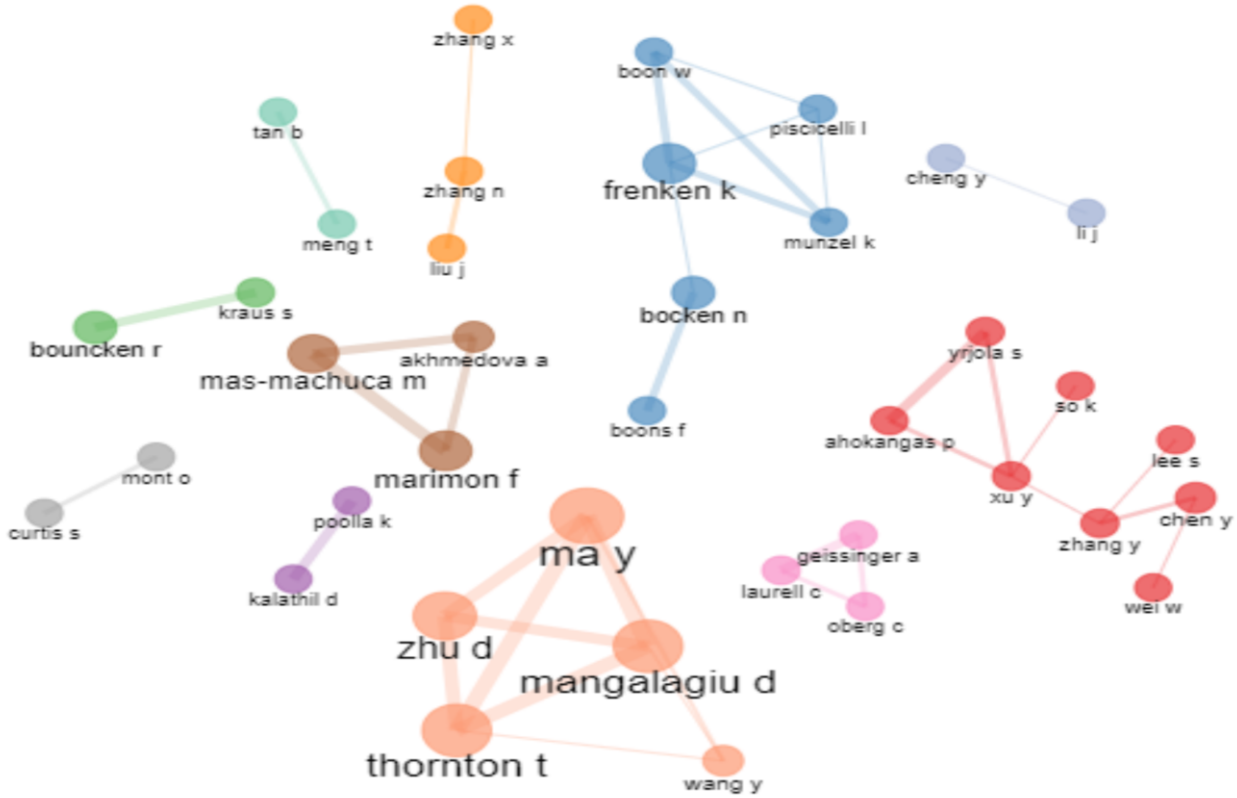

Figure 8. Author collaboration networks.

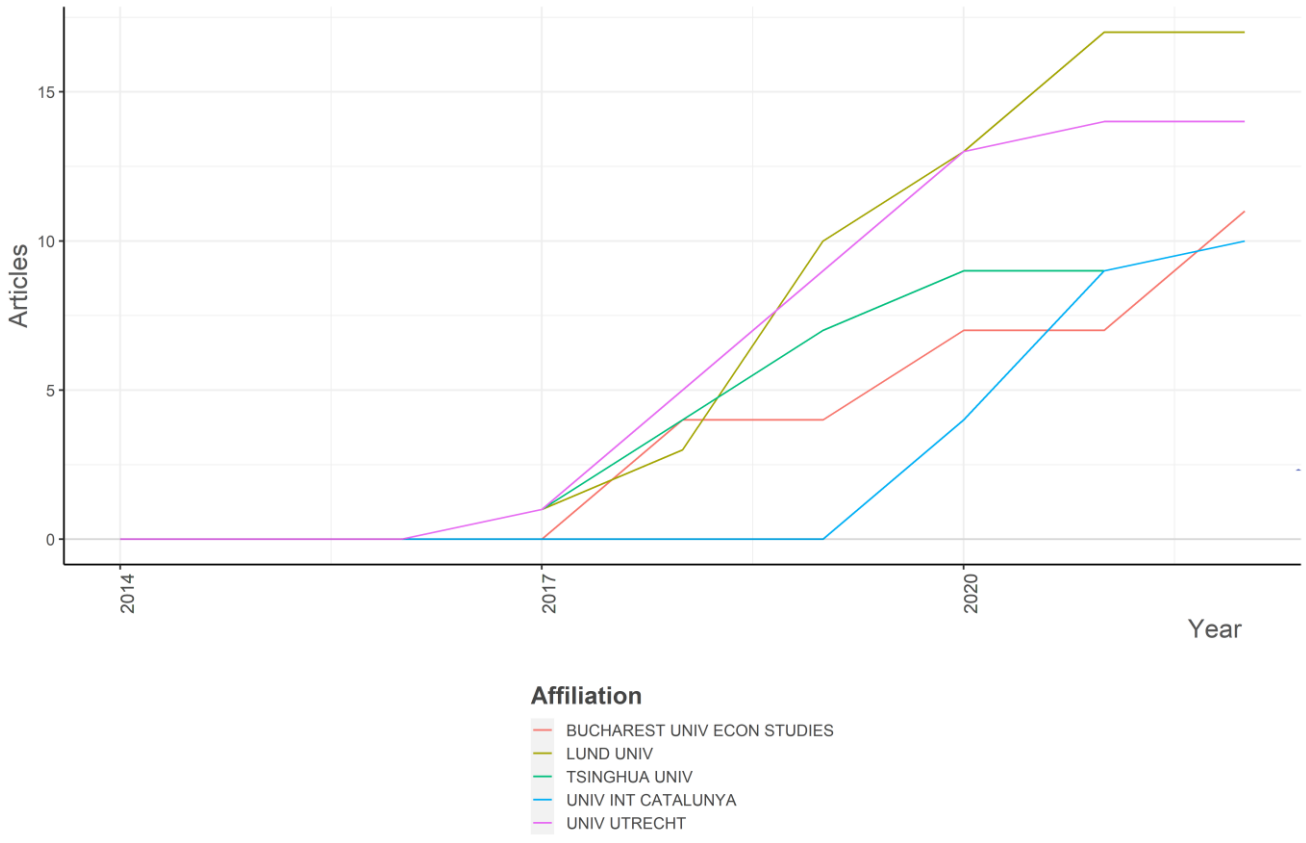

Figure 9. Accumulated publication growth for top five affiliations.

4.2.6. Institutional Collaboration Network

On the other hand, the collaboration networks among the institutions were comprehensive, with stronger connections among them in comparison to author collaboration. Seven affiliation networks were detected (Figure 10), and four of them were connected. The largest collaboration network was between institutions in Europe and China; NEOMA Business School in France, Oxford University in England and Tongi University and Tsinghua University in China.

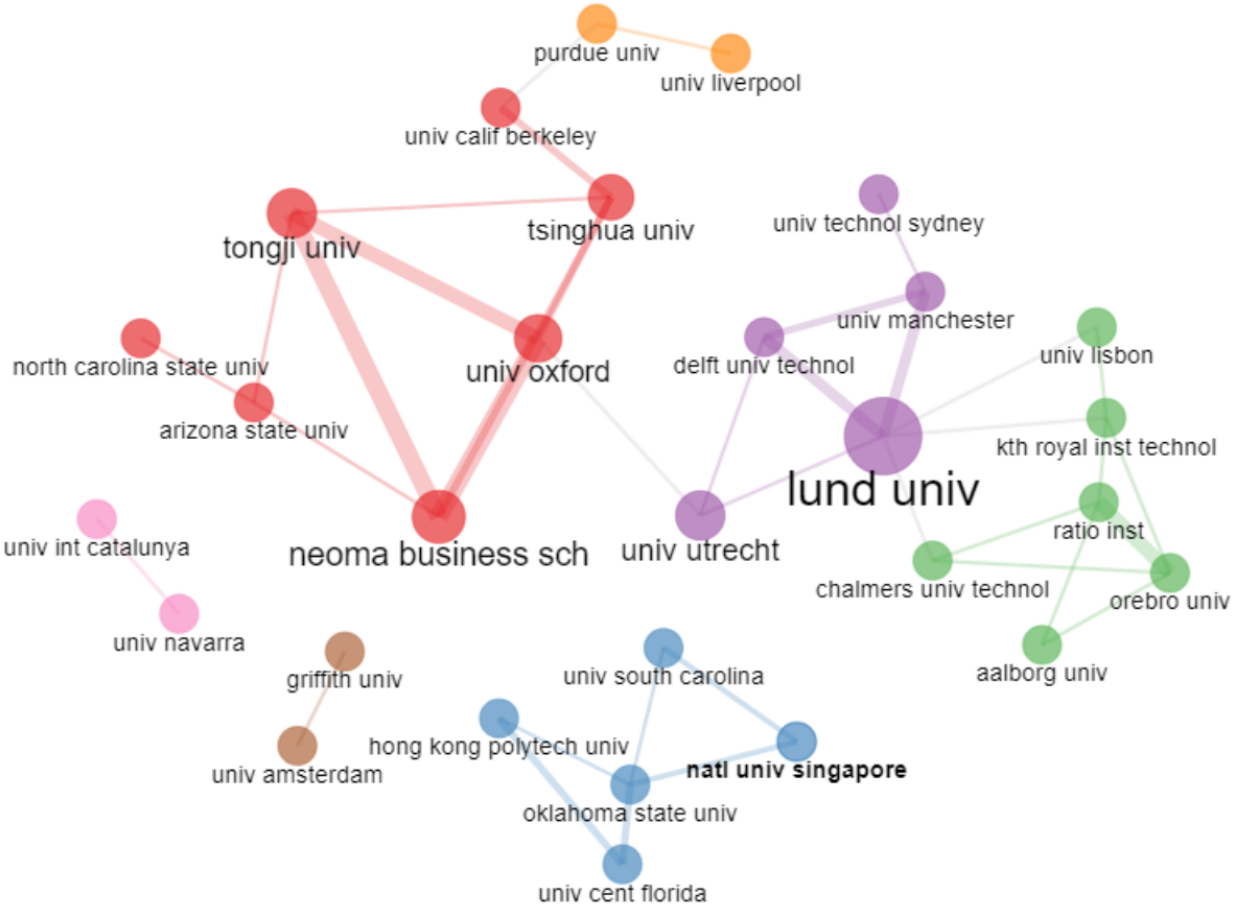

Figure 10. Institutions' collaboration networks.

4.2.7. Country Activity Analysis

Figure 11 illustrates the contributions to the SEBM area by country. It was established that China, USA, Germany, Spain and the United Kingdom were the top five countries in terms of output. Furthermore, apart from Poland and Russia, all countries showed an intra-country collaboration, or single-country publication (SCP), with an average rate of 62%, and an inter-country collaboration, or multiple country publications (MCP), with an average rate of 21%. The numbers and the ratios of SCP and MCP for these countries are listed in Table 9.

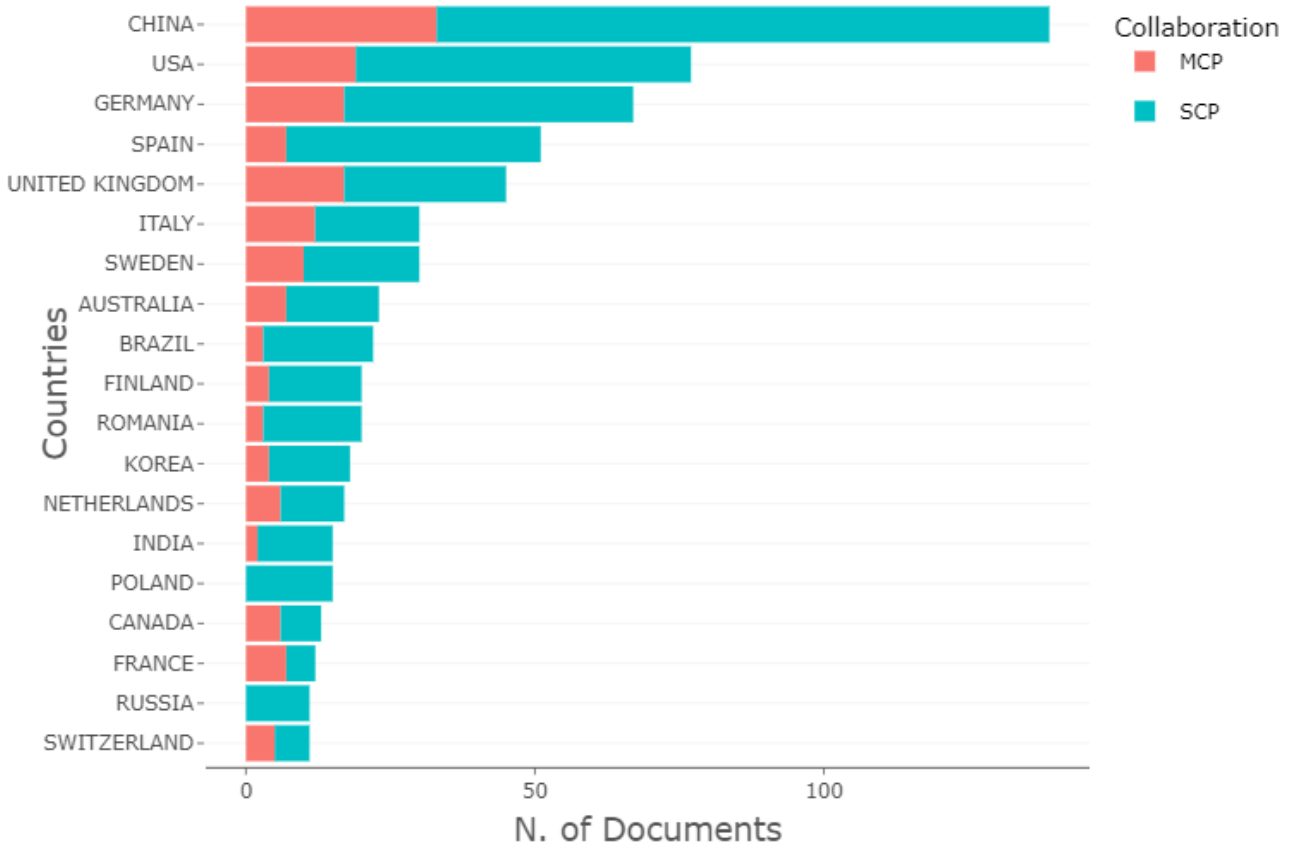

Figure 11. Ranked contribution by countries (Top 20).

Table 9. Corresponding author's country, intra- and inter-country collaborations.

Country	Articles	SCP	MCP	SCP_Ratio	MCP_Ratio
China	139	106	33	0.76	0.237
USA	77	58	19	0.75	0.247
Germany	67	50	17	0.75	0.254
Spain	51	44	7	0.86	0.137
United Kingdom	45	28	17	0.62	0.378
Italy	30	18	12	0.60	0.4
Sweden	30	20	10	0.67	0.333
Australia	23	16	7	0.70	0.304
Brazil	22	19	3	0.86	0.136
Finland	20	16	4	0.80	0.2
Romania	20	17	3	0.85	0.15
Korea	18	14	4	0.78	0.222
Netherlands	17	11	6	0.65	0.353
India	15	13	2	0.87	0.133
Poland	15	15	0	1.00	0
Canada	13	7	6	0.54	0.462
France	12	5	7	0.42	0.583
Russia	11	11	0	1.00	0
Switzerland	11	6	5	0.55	0.455
Czech Republic	10	9	1	0.90	0.1
Hungary	10	7	3	0.70	0.3
Total	684	513	171		
Average				0.62	0.21

The MCP ratio represents the current level and willingness of a country to participate in international SEBM research cooperation. Table 9 depicts that intra-country collaborations was common; in the top 20 countries, the rate of co-authorship ranged from 42% (France) to 100% (Poland). This indicated that the movement of SEBM research paper writing was more toward intra-country co-authoring. Meanwhile, the rate of inter-country co-authorship was between 0% (Russia) and 58.3% (France). Silva and Moreira's (2022) bibliometric study of the "entrepreneurship and sharing economy" area found an MCP rate of 92.74% and an SCP rate of 7.26%. In contrast, the MCP and SCP rates for SEBM research were, respectively, moderately higher and dramatically lower. Overall, the top 20 countries' 684 publications represented 85% (articles without country information were removed) of the total publications from 71 countries, whereas the top 10 countries were responsible for 62.5% of these publications. The total articles, SCP and MCP for the top 20 countries were 684, 513 and 171, respectively. The average level of SCP_Ratio and MCP_Ratio was 0.62 and 0.21, respectively.

While SCP and MCP measure articles with more than one author, the sum of the articles produced by each country and the sum total of the citations each country's articles received measure a countries' contribution to the area. Table 10 lists the top 25 countries by the sum total of citations received. In this measure, the USA and Germany were positioned at the top. China came third despite its total number of publications being much higher than that of the USA and more than twice that of Germany. This phenomenon might be related to regional differences in preferences for engaging in the sharing economy in order to do business [40]. The average citations per article for these top 25 countries was 32.39 with the total number of articles and total citations being 1274 and 11,612, respectively. The average number of articles and citation for these countries was 467 and 51.16, respectively.

Table 10. Total articles, citations and average citations per article by country.

Country	Average Citations per Article	Sum of Articles	Sum of TC
USA	25.59	191	1868
Germany	19.77	116	1285
China	8.61	256	1171
United Kingdom	25.39	95	1117
Australia	38.9	55	817
Sweden	19.66	65	570
Netherlands	32.19	38	515
Chile	256.5	4	513
Spain	9.48	90	455
Norway	48.89	16	440
Korea	23.75	18	380
Finland	18.58	37	353
Canada	23.38	21	304
Italy	9.43	61	264
Hungary	23.6	14	236
France	19.5	37	234
Brazil	9.82	50	216
Denmark	24.88	22	199
Austria	35.8	16	179
Singapore	26.4	14	132
Poland	6.53	29	98
South Africa	19.4	12	97
Qatar	46.5	4	93
Lithuania	12.67	13	76
Thailand	24	5	72
Total/Average	32.39	1274/51.16	11,612/467

The number of publications in a country is a measure used to assess a country's contribution; the citation number is another commonly used measure used to assess a country's influence. The most influential countries by citation (Table 10) showed several

realities in terms of the total citations. It showed, by citation, that the top three countries were the USA (1868), Germany (1285) and China (1171). Despite the fact that China had the most publications, it only ranked as the third most-referenced country. In the calculation process, it was noted that several countries that made the top contributors' list on the basis of citation number were not among the top publication countries: Chile (8), Denmark (18), Austria (19), Singapore (20), South Africa (22), Qatar (23), Lithuania (24) and Thailand (25). A few countries with higher publication numbers did not make the list such as Hungary, Czech Republic and Switzerland. This phenomenon may indicate that some articles from specific countries are valued more. A great example is Chile; although only having four publications, it was the seventh most-cited country with an average number of citations of 256.6 per article.

4.2.8. Collaboration World Map

Since over 25% of the articles were collaborations among countries, international co-authorship is a critical consideration for scholars in the SEBM field. However, some of the most prolific countries (top 25), such as Poland, India and Indonesia, do not engage in international cooperation. Figure 12 shows the relationships of collaboration among countries. The most active regions for international cooperation were the USA, Europe, China and Australia. As a new research field, SEBMs are strongly related to a country's economic development, and collaborative research has mainly been carried out in and among developed countries.

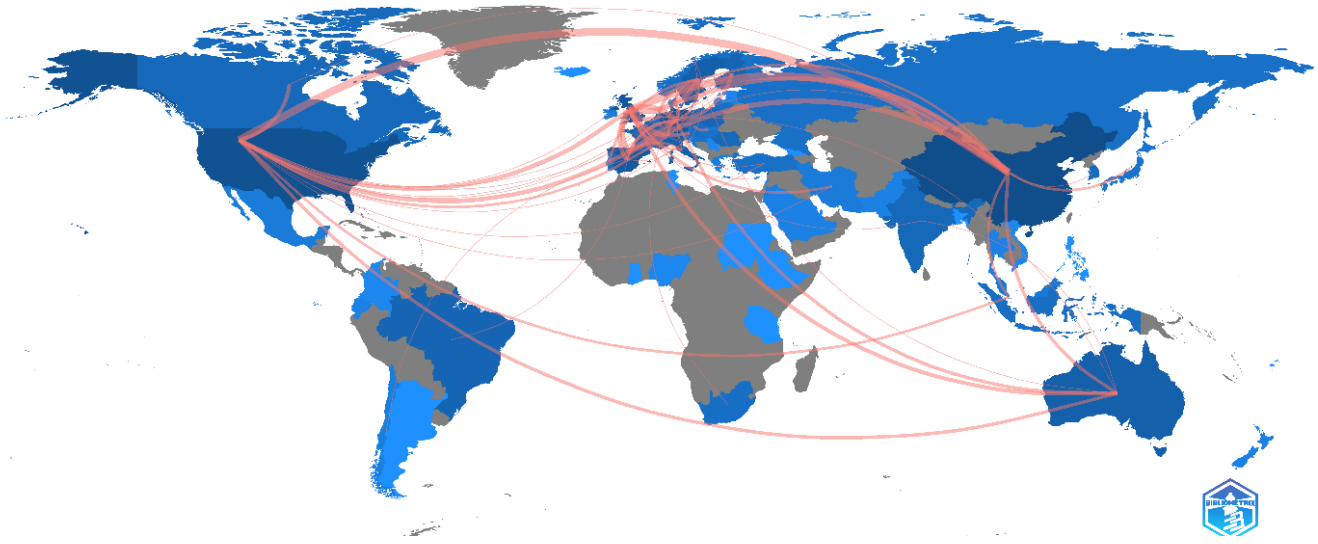

Figure 12. Collaboration world map.

4.3. Analysis of Articles

4.3.1. Top Influential Articles

Table 11 shows the 50 most-cited research papers with their total citation number, yearly citation number and normalized yearly citation number. The top 10 most-cited articles corresponded to 25.08% of the total citations in the dataset. Following this vein, the top 20 most influential articles received 29.1% of the total citations. The majority of these highly cited articles were published between 2014 and 2018. As shown in Table 11, the most-cited papers globally were as follows: "Ride On! Mobility Business Models for the Sharing Economy," published in *Organization & Environment* by Cohen and Kietzmann in 2014; "Sharing Economy a Review and Agenda for Future Research," published in the *International Journal of Hospitality Management* by Cheng in 2016; and "Conceptual Foundations for Understanding Smart Tourism Ecosystems" published in *Computers in Human Behavior* by Gretzel, Werthner, Koo and Lamsfus in 2015.

Table 11. Top 50 most influential articles.

Author(s)	Year	Article Type	Title	Journals	TC	TC/Year	TC/Norm
Cohen B; Kietzmann J. [6]	2014	Article	Ride on mobility business models for the sharing economy	Organization & environment	484	53.78	3.62
Cheng M. [7]	2016	Review	Sharing economy a review and agenda for future research	International journal of hospitality management	442	63.14	14.14
Gretzel U.; Werthner H.; Koo C.; Lamsfus C. [41]	2015	Article	Conceptual foundations for understanding smart tourism ecosystems	Computers in human behavior	264	33	5.13
Lacy P.; Rutqvist J. [42]	2016	Book	Waste to wealth the circular economy advantage	Waste to wealth: the circular economy advantage	228	32.57	7.3
Sutherland W.; Jarrahi M. [43]	2018	Review	The sharing economy and digital platforms a review and research agenda	International journal of information management	205	41	9.39
Horn K.; Merante M. [44]	2017	Article	Is home sharing driving up rents evidence from airbnb in boston	Journal of housing economics	182	30.33	8.36
Munoz P.; Cohen B. [45]	2017	Article	Mapping out the sharing economy a configurational approach to sharing business modeling	Technological forecasting and social change	179	29.83	8.22
Tauscher K.; Laudien S. [46]	2018	Article	Understanding platform business models a mixed methods study of marketplaces	European management journal	175	35	8.02
Kathan W.; Matzler K.; Veider V. [47]	2016	Article	The sharing economy your business models friend or foe	Business horizons	170	24.29	5.44
Kumar V.; Lahiri A.; Dogan O. [24]	2018	Article	A strategic framework for a profitable business model in the sharing economy	Industrial marketing management	164	32.8	7.51
Todeschini B.; Cortimiglia M.; Callegaro-de-Menezes D.; Ghezzi A. [48]	2017	Article	Innovative and sustainable business models in the fashion industry entrepreneurial drivers opportunities and challenges	Business horizons	143	23.83	6.57
Lutz C.; Newlands G. [49]	2018	Article	Consumer segmentation within the sharing economy the case of airbnb	Journal of business research	139	27.8	6.37
Li J.; Greenwood D.; Kassem M. [50]	2019	Review	Block-chain in the built environment and construction industry a systematic review conceptual models and practical use cases	Automation in construction	138	34.5	8.73
Bouncken R.; Reuschl A. [51]	2018	Review	Coworkingspaces how a phenomenon of the sharing economy builds a novel trend for the workplace and for entrepreneurship	Review of managerial science	136	27.2	6.23

Table 11. *Cont.*

Author(s)	Year	Article Type	Title	Journals	TC	TC/Year	TC/Norm
Esmaeilian B.; Sarkis J.; Lewis K.; Behdad S. [52]	2020	Article	Block-chain for the future of sustainable supply chain management in industry 40	Resources conservation and recycling	128	42.67	11.13
Habibi M.; Davidson A.; Laroche M. [53]	2017	Article	What managers should know about the sharing economy	Business horizons	124	20.67	5.69
Wirtz J.; So K.; Mody M.; Liu S.; Chun H. [54]	2019	Article	Platforms in the peertopeer sharing economy	Journal of service management	119	29.75	7.53
Lombardi P.; Schwabe F. [55]	2017	Article	Sharing economy as a new business model for energy storage systems	Applied energy	117	19.5	5.37
Bellos I.; Ferguson M.; Toktay L. [56]	2017	Article	The car sharing economy interaction of business model choice and product line design	M&som-manufacturing & service operations management	116	19.33	5.33
Richter C.; Kraus S.; Brem A.; Durst S.; Giselbrecht C. [5]	2017	Article	Digital entrepreneurship innovative business models for the sharing economy	Creativity and innovation management	111	18.5	5.1
Henten A.; Windekilde I. [57]	2016	Article	Transaction costs and the sharing economy	Info	110	15.71	3.52
Frenken K. [58]	2017	Article	Political economies and environmental futures for the sharing economy	Philosophical transactions of the royal society a-mathematical physical and engineering sciences	109	18.17	5
Zhang T.; Jahromi M.; Kizildag M. [59]	2018	Article	Value cocreation in a sharing economy the end of price wars	International journal of hospitality management	108	21.6	4.95
Ma Y.; Lan J.; Thornton T.; Mangalagiu D.; Zhu D. [60]	2018	Article	Challenges of collaborative governance in the sharing economy the case of freefloating bike sharing in shanghai	Journal of cleaner production	104	20.8	4.76
Bridges J.; Vasquez C. [61]	2018	Review	If nearly all airbnb reviews are positive does that make them meaningless	Current issues in tourism	102	20.4	4.67
Camacho-Otero J.; Boks C.; Pettersen I. [62]	2018	Review	Consumption in the circular economy a literature review	Sustainability	102	20.4	4.67
Nowinski W.; Kozma M. [63]	2017	Article	How can block-chain technology disrupt the existing business models	entrepreneurial business and economics review	98	16.33	4.5
Akbar Y.; Tracogna A. [64]	2018	Article	The sharing economy and the future of the hotel industry transaction cost theory and platform economics	International journal of hospitality management	96	19.2	4.4
Lan J.; Ma Y.; Zhu D.; Mangalagiu D.; Thornton T. [65]	2017	Article	Enabling value cocreation in the sharing economy the case of mobike	Sustainability	95	15.83	4.36
Hossain M. [66]	2020	Review	Sharing economy a comprehensive literature review	International journal of hospitality management	93	31	8.09

Table 11. *Cont.*

Author(s)	Year	Article Type	Title	Journals	TC	TC/Year	TC/Norm
Fraga-Lamas P.; Fernandez-Carames T. [67]	2019	Review	A review on block-chain technologies for an advanced and cyberresilient automotive industry	Ieee access	93	23.25	5.88
Curtis S.; Lehner M. [59]	2019	Review	Defining the sharing economy for sustainability	Sustainability	90	22.5	5.69
Bocken N.; Boons F.; Baldassarre B. [68]	2019	Article	Sustainable business model experimentation by understanding ecologies of business models	Journal of cleaner production	87	21.75	5.5
Ertz M.; Leblanc-Proulx S. [69]	2018	Article	Sustainability in the collaborative economy a bibliometric analysis reveals emerging interest	Journal of cleaner production	86	17.2	3.94
Castillo V.; Bell J.; Rose W.; Rodrigues A. [70]	2018	Article	Crowdsourcing last mile delivery strategic implications and future research directions	Journal of business logistics	85	17	3.89
Dreyer B.; Ludeke-Freund F.; Hamann R.; Faccer K. [71]	2017	Article	Upsides and downsides of the sharing economy collaborative consumption business models stakeholder value impacts and their relationship to context	Technological forecasting and social change	81	13.5	3.72
Gossling S.; Hall C. [72]	2019	Article	Sharing versus collaborative economy how to align ICT developments and the sdgs in tourism	Journal of sustainable tourism	81	20.25	5.12
Zhang T.; Gu H.; Jahromi M. [73]	2019	Article	What makes the sharing economy successful an empirical examination of competitive customer value propositions	Computers in human behavior	79	19.75	5
Gerwe O.; Silva R. [74]	2020	Article	Clarifying the sharing economy conceptualization typology antecedents and effects	Academy of management perspectives	79	26.33	6.87
Bouncken R.; Kraus S.; Roig-Tierno N. [75]	2021	Article	Knowledge and innovationbased business models for future growth digitalized business models and portfolio considerations	Review of managerial science	78	39	17.01
Plewnia F.; Guenther E. [76]	2018	Article	Mapping the sharing economy for sustainability research	Management decision	78	15.6	3.57
Ritter M.; Schanz H. [21]	2019	Review	The sharing economy a comprehensive business model framework	Journal of cleaner production	75	18.75	4.75
Kraus S.; Roig-Tierno N.; Bouncken R. [19]	2019	Editorial material	Digital innovation and venturing an introduction into the digitalization of entrepreneurship	Review of managerial science	75	18.75	4.75

Table 11. *Cont.*

Author(s)	Year	Article Type	Title	Journals	TC	TC/Year	TC/Norm
Choi T.; He Y. [77]	2019	Article	Peertopeer collaborative consumption for fashion products in the sharing economy platform operations	Transportation research part e-logistics and transportation review	74	18.5	4.68
Piscicelli L.; Ludden G.; Cooper T. [78]	2018	Article	What makes a sustainable business model successful an empirical comparison of two peertopeer goodssharing platforms	Journal of cleaner production	73	14.6	3.34
Andreassen T.; Lervik-Olsen L.; Snyder H.; Van R. A.; Sweeney J;. Van V. Y. [79]	2018	Article	Business model innovation and valuecreation the triadic way	Journal of service management	72	14.4	3.3
Kalathil D.; Wu C.; Poolla K.; Varaiya P. [80]	2019	Article	The sharing economy for the electricity storage	Ieee transactions on smart grid	72	18	4.56
Remane G.; Nickerson R.; Hanelt A.; Tesch J.; Kolbe L. [81]	2016	Conference paper	A taxonomy of carsharing business models	2016 international conference on information systems, icis 2016	72	10.29	2.3
Govindan K.; Shankar K.; Kannan D. [82]	2020	Article	Achieving sustainable development goals through identifying and analyzing barriers to industrial sharing economy a framework development	International journal of production economics	71	23.67	6.17
Cherry C.; Pidgeon N. [83]	2018	Article	Is sharing the solution exploring public acceptability of the sharing economy	Journal of cleaner production	71	14.2	3.25
Ranjbari M.; Morales-Alonso G.; Carrasco-Gallego R. [84]	2018	Article	Conceptualizing the sharing economy through presenting a comprehensive framework	Sustainability	71	14.2	3.25
Liu J.; Zhang N.; Kang C.; Kirschen D.; Xia Q. [85]	2017	Article	Cloud energy storage for residential and small commercial consumers a business case study	Applied energy	70	11.67	3.21

The dataset of this study has been cited 13,127 times, with an average of 13.87 citations per article and of 1.75 yearly citations per article, as shown by the following table.

4.3.2. Reference Spectroscopy Analysis

Recently, Reference Publication Year Spectroscopy (RPYS) analysis was introduced by Marx, Bornmann, Barth and Leydesdorff in 2014 [86]. RPYS analyzes the frequency with which references are cited in publications in a particular field in relation to their publication years. Deploying RPYS in scientometric studies can detect the historical roots of a specific research field and weigh their influence on the current state of research. Figure 13 shows that most of the cited references were in publications between the years 2000 and 2014, peaking in 2010. The oldest reference was as far back as 1776, and it can be interpreted that sharing economy researchers have tried to connect the sharing economy to historical economic theories.

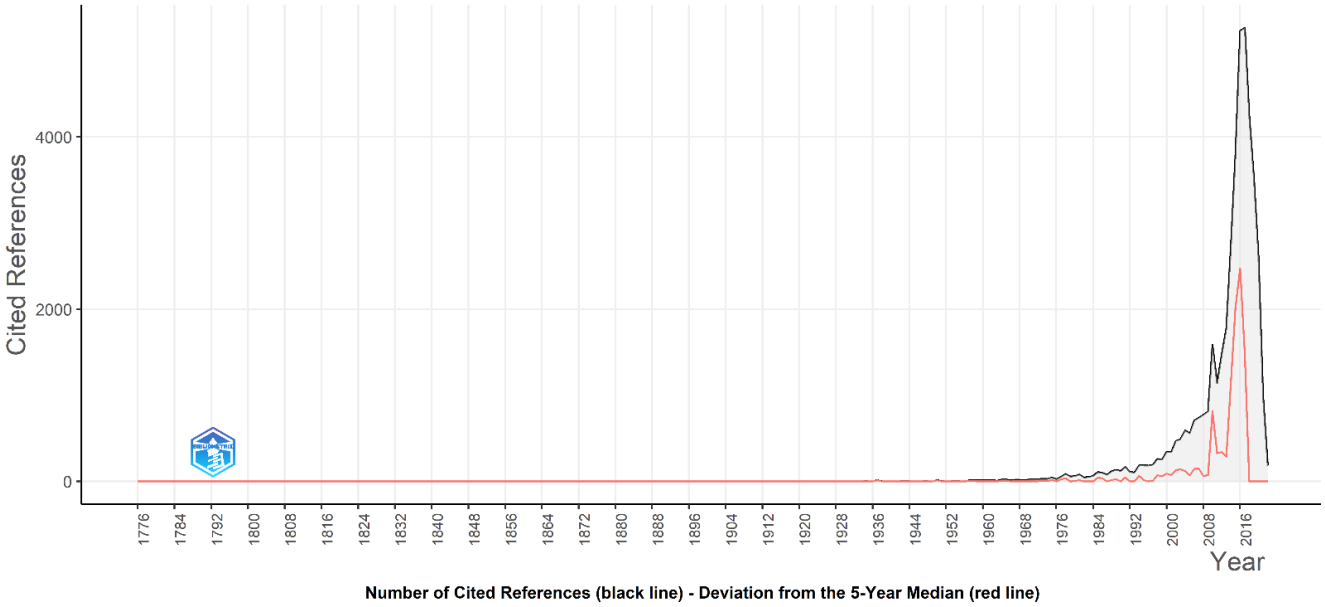

Figure 13. Reference publication year spectroscopy.

4.4. Keywords Analysis

Keyword analysis can identify research themes and knowledge structures [31] within the SEBM area. The approach centers on understanding the components and structure of SEBM studies by examining the keywords in the dataset. A total of 1639 keywords were identified within the dataset, and 2371 author keywords were determined.

To understand the most relevant terminology in the SEBM area, this research analyzed 50, 100, 200 and up to 700 keywords, plus author keywords. In order to build the maps correctly and analyze the research trends, this paper grouped the keywords presenting similar concepts as a group. The results showed that the top 50 keywords were in two groups, sharing economy and business models, both of which were under scrutiny in this paper. A highlighted word tree for the top 50 keywords plus found in the dataset is provided in Figure 14.

As shown in Figure 14, it can be seen that authors preferred keywords such as "innovation" (108) and "consumption" (101) with "sharing economy," while "consumption" (101) and "collective consumption" (87) were used with "business models" (131). As shown in the third column, the keywords "framework" (75) and "sustainability" (64) were strongly related to "innovation," while "sustainability" and "future" (45) were closely used with "consumption." The keywords "future" and "business model" are closely related to "collective consumption." This word tree represents the scientific conversations that were most likely to be had about SEBMs, and it shows how each keyword hierarchy linked back to the SEBM area.

Figure 14 also shows that the main author keywords related to SEBM studies also included "trust" (44), "economy" (36), "impact" (36), "pathway" (36) and "management" (35). It is noteworthy that terms such as "satisfaction" (35), "platforms" (30), "performance" (29), "information system" (26), "model" (26) and "competition" (25) were also well established. It can be seen that these keywords and those discussed in the previous paragraphs were well established and have a hierarchical relationship in the SEBM area.

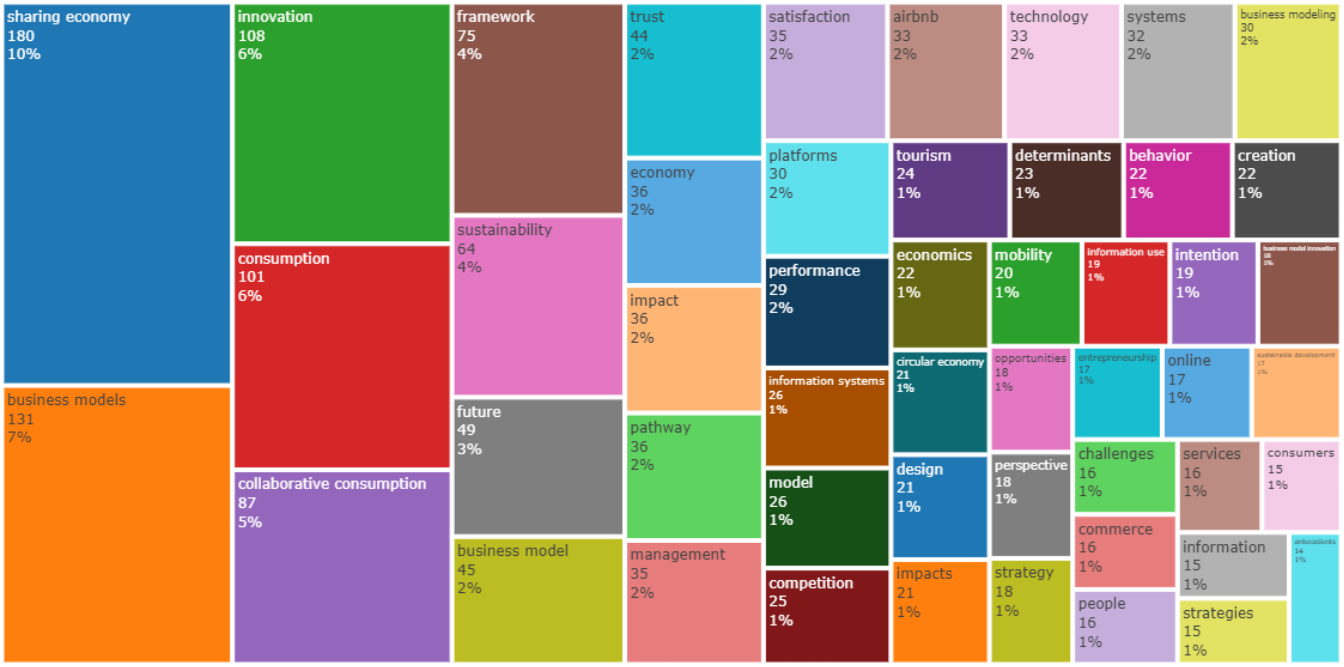

Figure 14. Word tree for top 50 keywords plus.

5. Forecast Future Research Directions

5.1. Forecast through Keyword Evolution

As Figure 15 shows, the three latest keywords, appearing in 2021 and 2022, were "drivers", "location" and "competition". Between 2020 and 2021, there were six popular keywords: "business models", "competition", "behavior", "sharing economy", "business models" and "innovation". These six keywords became the latest keyword trends. Figure 15 also shows the 11 most commonly used keywords between 2014 and 2020: "business model (s)", "sharing economy", "innovation", "business modelling", "perspective", "commerce", "information systems", "economics", "information use" and "organization". It is clear that the keywords used by authors have evolved.

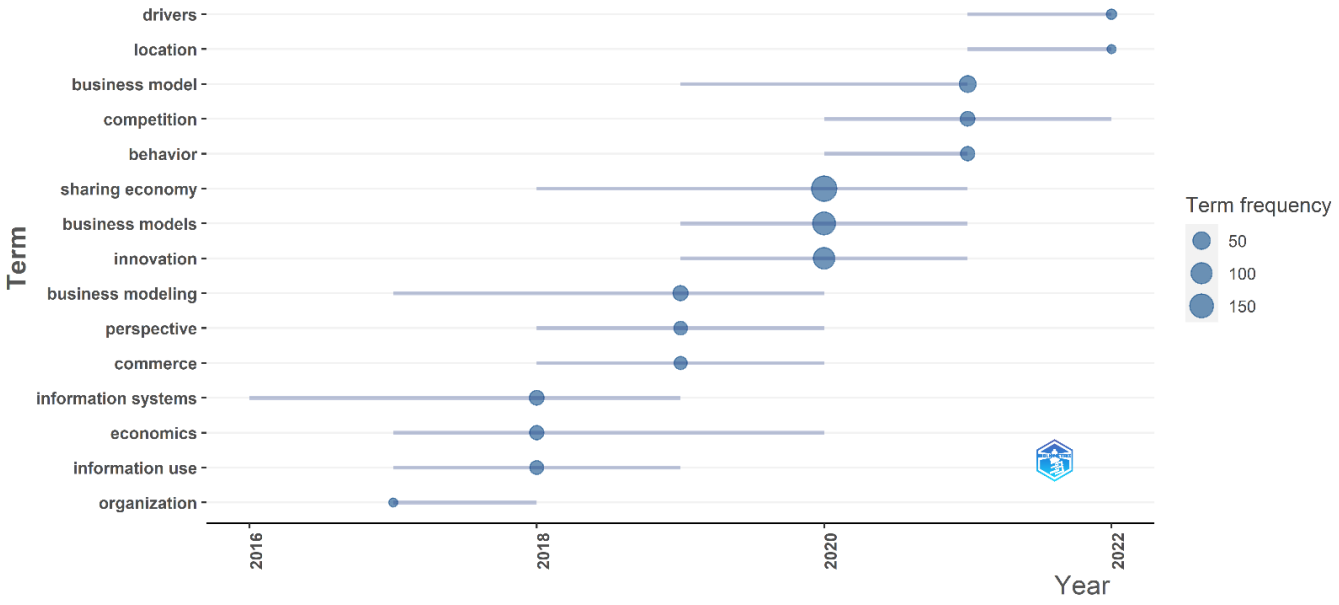

Figure 15. Keyword evolutions.

"Drivers" is an emerging theme within SEBM research with two aspects: ride-sharing drivers [87] and drivers of [88] SEBM development, which indicate that both Uber users and the determinants of SEBM development will be emphasized in the next few years. The theme "location" as a trend started from 2022, which indicates that SEBM research is moving into a location-specific (country, region, city, urban) period. The keyword "competition" emerged from 2021, illustrating that the sharing economy demands a new perspective on fair competition regulation in various areas such as business models, Uber, collaborative consumption [89] and Airbnb [3,90]. Some keywords such as "innovation", "perspective" and "commerce" were the most frequently mentioned themes between 2018 and 2021.

5.2. Forecast through Thematic Evolution

Figure 16 shows the thematic analysis results for the period 2014–2022, i.e., the entire SEBM research period. Notably, there were nine clusters in the SEBM research. They were:

- One motor theme: the theme in the upper-right quadrant that was both well developed and important [91] for structuring the SEBM area; "trust, satisfaction, and model".
- Two basic themes: the themes in the lower-right quadrant, which were basic and transversal themes and were important for the SEBM field but not well developed; "sharing economy, business model innovation, and cities" and "business modeling, sustainable development, and commerce".
- Two emerging or declining themes: the themes in the lower-left quadrant, which were weakly developed and marginal [91] to the SEBM area; "economics, new business models" and "information systems, information use, and ride-sharing".
- Two niche themes: the themes in the upper-left quadrant, which were well-developed, standalone themes that insignificantly influenced the other themes; "digital business, social networking (online)", and "energy-storage, choices, and risk".
- One theme between the niche and motor themes was "strategies, industry, and dynamic". There were characteristics of both niche and motor themes in this theme.
- One theme between motor and basic themes was "business models, innovation, and consumption". This theme combines the characteristics of both niche and motor themes.

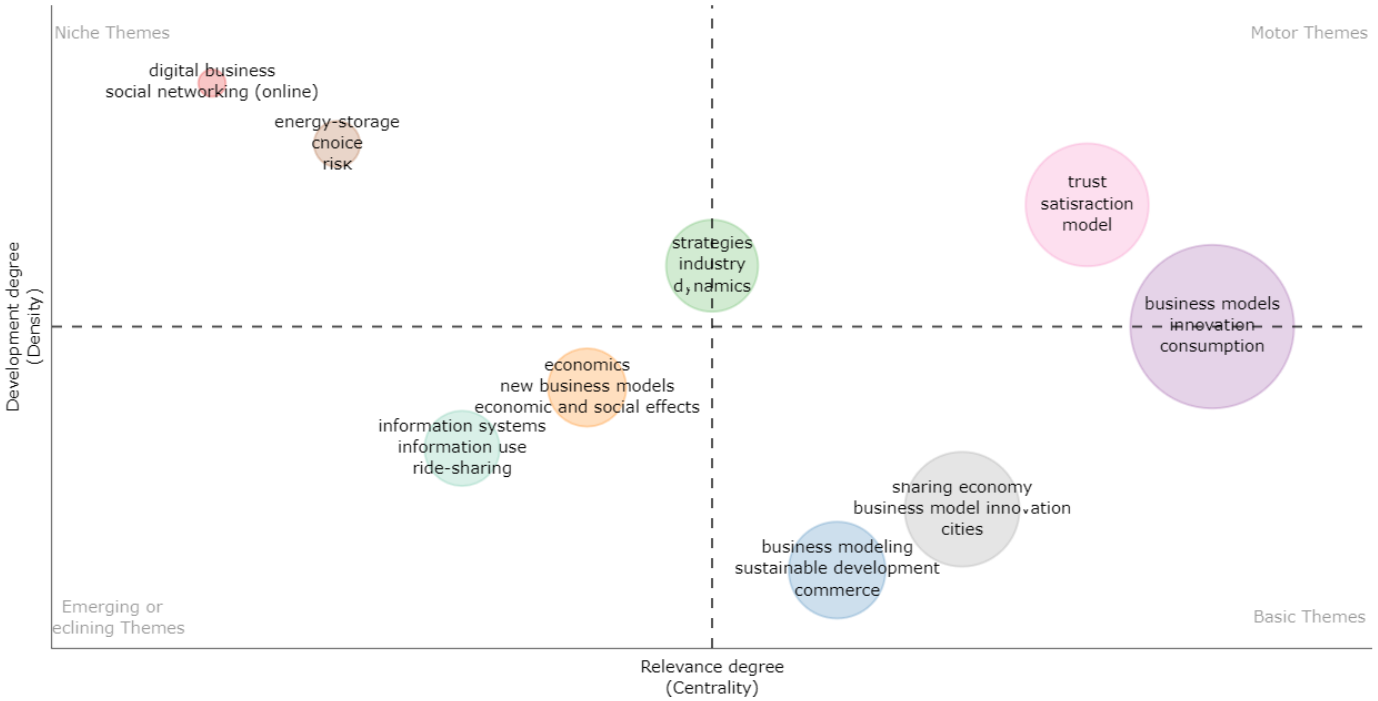

Figure 16. SEBM research themes between 2014-2022.

Based on the centrality and density classification methodology, the themes in different quadrants imply various future research directions. Therefore, research is required on how emerging themes relate to other topics in the field and how they can be developed to be more independent. It is necessary to develop niche topics in order to establish their connections to other themes in the field. Future research is required to make the basic themes stand alone.

Table 12, using the first words of the themes (Figure 16) as labels, illustrates the characteristics of these nine themes existing in the current SEBM research. The order, from strong to weak by centrality, was as follows: business models, trust, sharing economy, business modeling, strategies, economics, information systems, energy storage and digital business. The higher the centrality the theme ranked, the stronger the impact on the SEBM area the theme had. The order, from strong to weak, of density was as follows: digital business, energy storage, trust, strategies, business models, economics, information systems, sharing economy and business modeling. The stronger the density the theme is ranked, the more self-dependent the theme was.

Table 12. Research themes between 2014–2022 (ranked by cluster frequency).

Theme	Theme Label	Callon Centrality	Callon Density	Rank Centrality	Rank Density	Cluster Frequency
1	Business Models	7.78	23.84	9	5	1815
2	Trust	2.96	25.12	8	7	360
3	Sharing Economy	1.88	17.06	7	2	260
4	Business Modelling	1.71	16.50	6	1	127
5	Strategies	0.98	25.01	5	6	105
6	Economics	0.77	21.33	4	4	61
7	Information Systems	0.43	18.44	3	3	54
8	Energy Storage	0.05	28.13	2	8	17
9	Digital Business	0.00	31.25	1	9	8

5.3. Future Research Directions for Sustainable Development

To date, the majority of the academic research on SEBMs has focused on sharing accommodations and sharing rides; though the sharing economy encompasses a diversity of business models, this has not yet been adequately explored. In order to gain a deeper understanding of SEBMs, in particular the attributes that deliver on their purported sustainability potential, we need more conceptual and empirical research. An improved SEBM design and implementation with improved sustainability performance is needed. Due to the overwhelming evidence that SEBMs are not sustainable by default [39], it is important that clear research directions be established in SEBMs for sustainable development.

A number of current thematic trends were detected through the analyses of the articles, sources, authors, affiliations, countries, keywords and thematic evolution detailed in the previous subsections. Numerous future research directions are implied by these analyses and related results from a variety of disciplinary perspectives. This subsection provides a holistic view in regard to future research agendas from the perspective of sustainable development through a combined discussion of the results of these analyses.

5.3.1. Six Trendy Topics from Keywords on SEBMs and Sustainable Development

First, the keyword evolution analysis revealed that, between 2020 and 2022, the central themes included “business models”, “competition”, “behavior”, “sharing economy”, “business models” and “innovation”. These six keywords become the keyword trends. Further, the three latest keywords appearing in 2022 were “drivers”, “location” and “competition”. The results showed that the themes of innovative and sustainable business models in

relation to entrepreneurial opportunities and challenges [5,92,93] have been an important trend. Drivers of the Uber model and drivers of SEBMs were two recent themes. Drivers for transport services within the Uber model have been investigated from perception, regulation and determinant perspectives [94–97]. Location-specific sharing models such as fashion [98,99], ride-sharing and energy are still popular themes [100–103]. A legal and political theme has arisen, specifically in regard to how different regulations and policies as drivers of innovation and competition may foster or hinder sharing economy growth [40,104]. Since SEBMs are not sustainable by default, as shown by the fact that there is sufficient evidence to support this assertion [105], sustainability must be considered in the topics of "business models", "competition", "behavior", "sharing economy", "business models" and "innovation" in future SEBM studies.

5.3.2. SEBM Study in Emerging Economies and Sustainable Development

Second, this study found that even though the largest number of studies were from developed countries in some areas of sharing economy research [3,38,106], this was not the case for business model studies. Among the top twenty most-contributing countries, eight of them were emerging countries such as China, India, Indonesia, Czech Republic and Russia. China, as an emerging economy, was the top contributor. This result illustrates that the interest in SEBM research may be strongly related to the country's population rather than its level of economic development. As there are infrastructural, economic and cultural disparities among these countries, future studies should be conducted in comparative contexts (advanced and developing countries) to determine what drives sharing economy and business-model research. By examining the determinants that foster and hinder SEBM research, scholars may be able to enhance the current analytical frameworks with the insights obtained. In view of the fact that sustainable development has attracted the attention of numerous scholars [107–109], further emphasis should be placed on the sustainable development of the shifting economy and the development of SEBM.

5.3.3. Location- and Culture-Specific SEBM Study and Sustainable Development

Third, location-specific (country, region and culture) SEBMs are worth further investigation [110]. Not only are a large proportion of articles location-specific but articles identifying non-location-fit SEBMs also indicated the importance of location-fitting. For example, Uber was acquired by Didi in the ride-sharing industry, eBay left the Chinese market because of Alibaba and Groupon was defeated by Meituan in the group-buying sector [111]. The author argues that future location-specific studies should be conducted from a geographical entrepreneurial ecosystem perspective in addition to the current focus on the organizational business ecosystem. From a sustainability perspective, scholars [110] and international organization [112] believe that sustainable development is location-oriented; therefore, location- and culture-specific SEBM studies would be beneficial to sustainability.

5.3.4. Relationship among E-Commerce, Social Media Frameworks and SEBMs, and Sustainable Development

Fourth, "collaborative consumption" has been and will continue to be an important direction, since it has close links with consumption, tourism, opportunities, antecedents, model, impact, Airbnb, online, trust, behavior, consumers and information [28,113–124]. It has economic, social and sustainability characteristics: reducing customers' expenses, providing social benefits and being environmentally friendly (triple bottom line theory). More importantly, collaborative consumption blurs the boundary among e-commerce and social media frameworks and SEBMs.

5.3.5. Research on SEBMs and Sustainable Development

Fifth, with 625 out of 951 articles emphasizing (the term of sustainability being part of the titles) the importance of sustainability from either an economic, social, business development, business model or environmental perspective [34,125–129], it is clear that

SEBMs have been examined conceptually and empirically based on theories of sustainability and will continue to be a thematic conversation. The thematic evolution shows that future sustainability considerations should include location (incl. culture), industry, platforms, innovation and new technologies [54]. SEBMs have positive environmental influences through reducing the total resources required and help to reduce pollutants, emissions and carbon footprints. Such sharing activities can also stimulate great changes in people's behavior by shifting asset choices from ownership to demand-driven. The behavior changes in relation to sustainability require great attention.

5.3.6. New Technologies for SEBMs and Sustainable Development

Sixth, it is evident that the effect of new technologies on SEBMs is an important direction for future research [36,130,131]. Big data and blockchain technology have become standalone themes in thematic evolution analysis. Key research themes include: (1) blockchain and information management; (2) tourism, digital business and digital technology; (3) big data, new business models and business modeling; and (4) sales, ecosystems and open data. How to apply new technologies in SEBM development and how the technologies impact SEBMs are questions that need to be addressed.

5.3.7. COVID-19 Effects on SEBMs and Sustainable Development

Finally, in the same manner, as with any other area of economics, SEBMs have been affected by the COVID-19 pandemic, as have the sharing economy ecosystem and people's behaviors [132,133]. Therefore, it is imperative to examine how COVID-19 impacts the sharing economy and the sustainable development. The results from the current research on the subject were inconsistent [100,134] in terms of the positive and negative effects from COVID-19. Although the end of COVID-19 might be in sight, its effects will not disappear overnight. How would SEBMs be able to attain a competitive advantage in terms of sustainability in the post-COVID-19 era? What modeling strategies still exist and create new sustainable development value: partnership or confrontation, nurturing or destructive, open or closed innovation, or empathetic or uncaring, in the post-COVID era from an economic, social and environmental perspective?

6. Discussion

This timely study was designed to investigate the state-of-the-art of the SEBM literature through the use of sociometric indicators as well as content analysis (mainly keywords) by applying a bibliometric analysis. It examined a dataset of 951 articles from 552 sources between 2014 and mid-2022, extracted from WoS and Scopus. As a matter of fact, the database searches did not return any SEBM-relevant articles prior to 2014, even though the search query did not contain a year limitation. It indicated that SEBM research started in 2014. This research provides a statistic and visual analysis of the sources, authors, affiliations and affiliated countries in the SEBM literature through the indicators of production, relevance, impact, collaboration and historic dynamic analyses. Keyword dynamic and thematic maps and evolution landscapes were deployed to determine the intellectual and social structure in the area with the purpose of forecasting future research directions from the perspective of sustainable development.

The analysis of the SEBM sources revealed the top 20 most relevant sources by the number of publications (*Sustainability*, *Journal of Cleaner Production*, etc.) as well as the top 20 most impactful sources (*Journal of Cleaner Production*, *Sustainability*, etc.). The *Journal of Cleaner Production* and the *Journal of Business Research* ranked as the most locally cited sources. After conducting a Bradford's law analysis, the top two journals were still these two sources. This knowledge supplier mapping and ranking provides a one-stop literature overview of the critical SEBM information sources.

In regard to the analyses of authors, affiliation and country activities, this study discovered the top 20 most relevant authors, affiliations and countries. K, Frenken, N. Bocken and S. Kraus were ranked as the top authors based on the authors' h-index. Lund

University, University of Utrecht and Bucharest University of Economic Studies were the top three universities in SEBM research. China, the USA and Germany were the top three countries in the SEBM area. The results (authors, affiliations and countries) indicated that SEBM studies were mainly conducted in Asia, North America and Europe. These scientific production results imply the status of sharing economy development.

The co-authoring or collaboration networks were relatively small compared to other areas of sharing economy studies [3,38] at the author, affiliation and country levels. This small collaboration network of researchers in SEBM investigation may imply that the business model practices are geographically oriented. It may also indicate that SEBMs have the same characteristics as other digital commerce business models that are entrepreneurial-ecosystem-determined [135,136], and entrepreneurial ecosystems are determined by economic, political, cultural, infrastructural and social factors [137]. The results of this study can help scholars to identify research focuses and gaps from an entrepreneurial ecosystem perspective to investigate SEBMs.

A number of research themes were detected through the thematic analysis for the entire dataset to forecast future research directions. To summarize, the current themes in SEBMs studies were (1) "business models, innovation, and consumption" (between motor and basic), (2) "trust, satisfaction, and model" (motor), (3) "sharing economy, business model innovation, and cities" (basic), (4) "business modeling, sustainable development, and commerce" (basic), (5) "strategies, industry, and dynamic" (between niche and motor), (6) "economics, new business models" (emerging), (7) "information systems, information use, and ride-sharing" (emerging), (8) "energy-storage, choice, and risk" and (9) "digital business, social networking (online)" (niche). Based on the four-quadrant strategic map method, each theme had its current status of research and future research requirements, as explained in a subsection of the previous section.

Each theme contained a number of topics (keywords) related to different disciplines and research subjects, and nine themes were components of an analytical framework for comprehensive SEBM analysis. The first theme was strongly associated with consumption and SEBM innovation. The second was related to trust in and satisfaction with SEBMs from a sharer perspective. The third was concentrated on location-specific SEBM innovation. The fourth emphasized the relationship among sustainable development, sharing economy and commerce. The fifth focused on industry dynamics and strategies. The sixth stressed economic development and SEBMs. The seventh was related to the ride-sharing business model and information management. The eighth was related to energy storage, a collaborative consumption model, and its choice and risks. The last one was about how social networks and digital business affects the sharing economy. These nine themes further confirmed that SEBM studies need to be comprehensively conducted from multi- and inter-disciplinary perspectives. More importantly, these themes can be treated as constructs of an SEBM conceptual/analytical framework.

The keyword dynamic analysis detected the important topics of the SEBM conversation in the past and at present. It indicated that the most current topics in 2021 and 2022 are "drivers", "location" and "competition". These topics have the potential to be research trends in the near future.

To synthesize the research direction analysis regarding sustainability, further studies should be conducted considering (1) the driving forces or determinants of SEBM development from developed and emerging economy perspectives, (2) the effects of the country- or region-specific entrepreneurial ecosystem on SEBM development (incl. social effects) in addition to the company-focused business ecosystem, (3) systematic studies from SEBM deployment to the long-term effects on sustainable socioeconomic and environmental development, (4) collaborative consumption, since this can blur the study of SEBMs in the post-pandemic era and (5) competition among SEBMs and between private and public practices.

This research contributes to the sharing economy literature by identifying and developing a more comprehensive view of SEBM studies while encouraging new research

directions for sustainability. Studies conducted on the sharing economy should anticipate multiple research contexts, given that SEBMs are a complex phenomenon, which requires the involvement of various parties [8]. The bibliometric analysis allowed for the formation of a foundation that represents the most comprehensive normality research possible on SEBMs, providing a research shortcut on the themes and publications most prevalent in the temporal space.

The new knowledge gained from this study benefits not only the scholastic sphere but also has important implications for policymaking and practice. The uncovered driving forces and mechanisms are believed to provide a major implication for the SEBM subject. In particular, the discovery of the significant role played by country-, region-, and city-specific and culture-oriented SEBMs provides clear paths for policymakers and practitioners to deploy localized business models. Furthermore, the results provide significant implications for SEBM development practices, uncovering the existing tensions between context and internal operations, particularly when internationalizing; therefore, based on this bibliometric analysis, practitioners will be able to develop a risk-minimization framework beforehand.

7. Conclusions

The sharing economy is growing in terms of the number of enterprises as well as wealth creation and job generation. Consequently, it has become a significant driver in fostering sustainable economic development [138]. The current economic crisis caused by the COVID-19 pandemic can promote the concept and practice of the sharing economy due to the increased frugality within some customer segments [8]. Therefore, synthesizing the current scientometrics, detecting thematic research trends and forecasting the future research agenda will help to enhance current SEBM studies. This work will also help to develop new business models that might become necessary in the current socioeconomic environment.

This research successfully answered the paper's seven research questions. The results showed the number of publications has grown exponentially from four in 2014 to one hundred and seventy-one in 2021. The bibliometric analysis successfully identified the most influential articles, the most impactful sources, and the most-contributing affiliations and countries. Considering the entire dataset (2014–2022), the results showed that "business models-innovation-consumption" was the most important theme. To summarize, the emerging trends of SEBM research include sustainability, organization, customers and socioeconomics-related areas. Notably, this research indicated that studying SEBMs in a location-specific entrepreneurial ecosystem is one of the critical directions for regional sustainability.

This study illustrated that SEBMs as a research field within the information system discipline is an important area that is not well-developed due to its small author networks. The bibliometric analyses indicated that research activity on SEBMs occurs globally; however, there is a lack of collaboration across country lines, especially between authors and affiliations of developed and developing countries. Research on SEBMs has focused on sustainability, sustainable development, tourism, technologies and business and management, with less attention being paid to social effects and acceptance, the determinants of success, national entrepreneurial ecosystems and cognition. Based on the current thematic map and evolution, this paper concluded by suggesting seven potential research directions. By providing new knowledge, this research theoretically contributes to related disciplines because of the multi- and inter-disciplinary features of SEBM studies. It also has numerous implications for policymakers and practitioners.

This study faced limitations. By its nature, a bibliometric study focuses on the accumulated scientific production of a given theme or field within a given period. As the results showed, in the SEBMs field, the period was very recent (2014–2022). Thus, the field can be understood as still being in the emerging phase; that is, its foundations have not been entirely established. Meanwhile, this study only retrieved bibliographic information from the WoS and Scopus databases. Another limitation is that some studies may have

been omitted from this research due to the inclusion and exclusion criteria established by the authors.

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