A Global Review of Government Policy on Reverse Logistic based on Bibliometric Analysis

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ARTICLE INFO

JMB Jurnal Manajemen Bisnis

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Keywords:
Reverse Logistic, Government Policy, Bibliometric Analysis, VOS viewer, Publish or Perish.

ABSTRACT

Industrial progress and population growth are increasing the demand for food from rural to urban, requiring an efficient logistics system. Reverse logistics manages food waste by recycling unsold products, improving transportation efficiency and product quality, and supporting sustainability. However, policy fragmentation, a pressing issue, hinders effective implementation. Therefore, policy integration, a crucial step, is essential to achieve sustainability in reverse logistics systems, ensuring optimal coordination and use of resources. Limited studies offer a thorough understanding of government policy integration in reverse logistics, which bibliometric analysis can help address by providing a comprehensive overview of existing research. This study analyzed 268 documents from the Scopus database (1993-2024) using Ms Excel, Publish or Perish, and VOSviewer, revealing significant research interest growth since 2003 and identifying key contributors like Gupta S.M. and Liu Z. Network analysis identified four primary clusters: reverse logistics in developing countries, government intervention, policy-driven optimization, and environmental management.

ABSTRAK

Kemajuan industri dan pertumbuhan penduduk meningkatkan permintaan pangan dari pedesaan ke perkotaan sehingga memerlukan sistem logistik yang efisien. Logistik terbalik mengelola limbah makanan dengan mendaur ulang produk yang tidak terjual, meningkatkan efisiensi transportasi dan kualitas produk, serta mendukung keberlanjutan. Namun, fragmentasi kebijakan, yang merupakan masalah mendesak, menghambat implementasi yang efektif. Oleh karena itu, integrasi kebijakan, sebuah langkah penting, sangat penting untuk mencapai keberlanjutan dalam sistem logistik terbalik, memastikan koordinasi dan penggunaan sumber daya yang optimal. Studi terbatas menawarkan pemahaman menyeluruh tentang integrasi kebijakan pemerintah dalam logistik terbalik, yang dapat dibantu oleh analisis bibliometrik dengan memberikan gambaran komprehensif tentang penelitian yang ada. Penelitian ini menganalisis 268 dokumen dari database Scopus (1993-2024) menggunakan Ms Excel, Publish or Perish, dan VOSviewer, mengungkapkan pertumbuhan minat penelitian yang signifikan sejak tahun 2003 dan mengidentifikasi kontributor utama seperti Gupta S.M. dan Liu Z. Analisis jaringan mengidentifikasi empat kelompok utama: logistik terbalik di negara-negara berkembang, intervensi pemerintah, optimalisasi berbasis kebijakan, dan pengelolaan lingkungan.

INTRODUCTION

In the modern era, environmental challenges are a significant focus amid population growth, rapid urbanization, and mass consumption that increase pressure on natural resources and food waste management. Industrial progress and population growth increase the demand for food from villages to cities, requiring an efficient logistics system (Reardon et al., 2019). Reverse logistics helps manage food waste by recycling unsold products, improving transportation efficiency and product quality, and supporting sustainability. However, we face a pressing issue. Policy fragmentation between governments, companies, and other institutions often hampered effective implementation. This lack of coordination and harmonization of environmental policies, trade regulations, and business strategies hinder the optimization of reverse logistics processes (Kazancoglu et al., 2021). For example, local governments may have different regulations on recycling compared to national policies, and companies may need help adapting their strategies to diverse regulations. Therefore, policy integration is not just important, it is urgent, to ensure better coordination, regulatory harmonization, and optimal use of resources to optimize reverse logistics and encourage sustainable practices. Although much research has been conducted in the field of reverse logistics, the emphasis on the policy aspects of integration is still relatively minimal (R. Huscroft et al., 2013). Previous research has tended to focus on technology and operational practices without fully considering policy impacts and implications (Govindan et al., 2015). Therefore, a better understanding of how integrated policies can influence the efficiency and effectiveness of reverse logistics needs to be further researched. It is important to examine policy integration in the context of reverse logistics because of its broad impact on environmental sustainability, operational efficiency and social welfare (Agrawal & Singh, 2019). By optimizing the reverse logistics process through integrated policies, it can be hoped that there will be a reduction in waste, savings in resources, and increased efficiency in the supply chain. In addition, by considering sustainability aspects in policy formulation, new opportunities for innovation and sustainable economic growth can be created.

This research is also important in an increasingly connected global context, where policies in one country can have a significant impact on others. Therefore, through a better understanding of policy integration in reverse logistics, a universally applicable framework can be built to promote more sustainable and efficient practices worldwide. While there have been numerous studies on reverse logistics and government policies separately, there is still a gap in the literature specifically exploring the integration of government policies to optimize reverse logistics (Govindan & Bouzon, 2018). This research aims to fill this gap by providing a deeper understanding of how government policies can be effectively integrated to enhance reverse logistics performance and its impact on environmental sustainability. Bibliometric analysis is necessary to provide a comprehensive picture of trends and developments in the related literature. Through mapping the literature, we can identify areas where further research is needed, as well as gain a deeper understanding of changes in approaches and perspectives in recent years (Cuc, 2019). Additionally, bibliometric analysis can also help identify established understandings and points of confusion in the existing literature. This will allow researchers to direct their efforts in the most productive and relevant directions, while

also identifying knowledge gaps that need to be filled. Thus, bibliometric analysis is an important first step in filling research gaps in the context of integration policies to optimize reverse logistics. Thus, the following research questions are addressed by the development of this work: *RQ1.* What are the current advancements and publication trends in the field of government policy on reverse logistics? *RQ2.* whose researchers are at the forefront of the field of government policy on reverse logistics and whose countries do they come from? *RQ3.* Which papers in the field of government policy on reverse logistics have garnered the most citations? *RQ4.* What are the primary research topics of government policy regarding reverse logistic research?. The paper is organized in this manner. The next section outlines the methodologies employed in this bibliometric investigation of government policy on reverse logistic research. This collection includes a wide range of references and flowcharts for bibliometric analysis, utilizing Excel, Publish or Perish, and VOSviewer. The research questions are examined and answered in the results and discussion parts. These sections are subsequently followed by the conclusion and recommendations for future study.

METHOD

According to Kumar (2016), the bibliometric approach is a reliable way to monitor and analyze statistical information on certain terms or concepts that are published in a particular subject. This strategy is essential for precisely comprehending the existing knowledge inside the field using a scientific approach. Bibliometric analysis surpasses typical narrative evaluations by use objective data instead of subjective perceptions, so overcoming biases and yielding more informed outcomes. The tool allows academics to methodically analyze and document metadata, which helps in sharing knowledge and drawing reliable conclusions.

Bibliometric analysis is widely used to scientifically map the publishing database, helping researchers gain a better grasp of the area. To obtain a substantial amount of pertinent papers and articles, these assessments often rely on specialist online databases like Scopus or Web of Science (Ittmann, 2021). In addition, it should be highlighted that platforms like as Scopus have the capacity to search across many bibliographic fields, as mentioned by Hassan & Ahmi (2022).

IDENTIFICATION OF SOURCES

In May 2024, a comprehensive examination of published literature was conducted. This study utilized Scopus, a highly comprehensive database that contains academic citations and abstracts from several fields (Fahimnia et al., 2015). The Scopus database currently holds around 210,000 books and 39,743 titles. Among them, there are over 25,000 active titles and 14,558 inactive titles, which are primarily previous versions of the active titles. This sort of database has the capability to aggregate all scientific articles from around the world, providing a full and holistic view. Mansour et al. (2022) state that the Scopus database is widely recognized as a crucial source of pertinent information for scientists globally. This study employed Scopus, the preeminent online database for citations and abstracts in the domains of technology, social science, business, and management. In addition, Abuhassna et al. (2023) recommended obtaining data from the Scopus database because to its extensive collection of prestigious and high-quality articles. The search methodology and bibliometric analysis processes employed in this study are illustrated in Figure 1.

SEARCH STRATEGY

To enhance the retrieval of pertinent materials, we employed a combination of keywords derived from our research inquiries. A keyword is a specialized search term utilized to locate datasets within a specific field (Gökçe et al., 2024). In order to accomplish this, we employed the beginning keywords "reverse logistic" and "government policy" for the Scopus database query. More precisely, we created an extensive search method by using TITLE-ABS-KEY, together with synonyms or related terms, and boolean operators (AND, OR). Therefore, we conclude the search by employing the subsequent query:

(TITLE-ABS-KEY ("reverse logistic" OR "returns management" OR "reverse supply chain" OR "product returns" OR "aftermarket supply chain" OR "reverse distribution" OR "reverse flow logistics" OR "recycling logistics" OR "return logistics" OR "reverse fulfillment" OR "closed-loop supply chain") AND TITLE-ABS-KEY ("government policy" OR "public policy" OR "government regulation" OR "government directive" OR "government ruling" OR "government legislation" OR "government program" OR "government plan" OR "government strategy" OR "government guideline" OR "government decree" OR "government mandate" OR "government decision" OR "government framework" OR "government order" OR "government action"))

We did not use any inclusion and exclusion criteria to select the datasets that have been collected in this study. We didn't limit our search in term of periods, source type, document type or any languages. Thus, we obtained 268 documents were obtained from Scopus database from 1993 until 2024. To make sure there are no redundant data, we used Ms Excel to find any duplicate record. Lastly, the subsequent section will conduct a more thorough analysis of the 268 documents, as there are no duplicates in our dataset. The search method employed in this study and the detailed procedures for undertaking bibliometric analysis are illustrated in Figure 1.

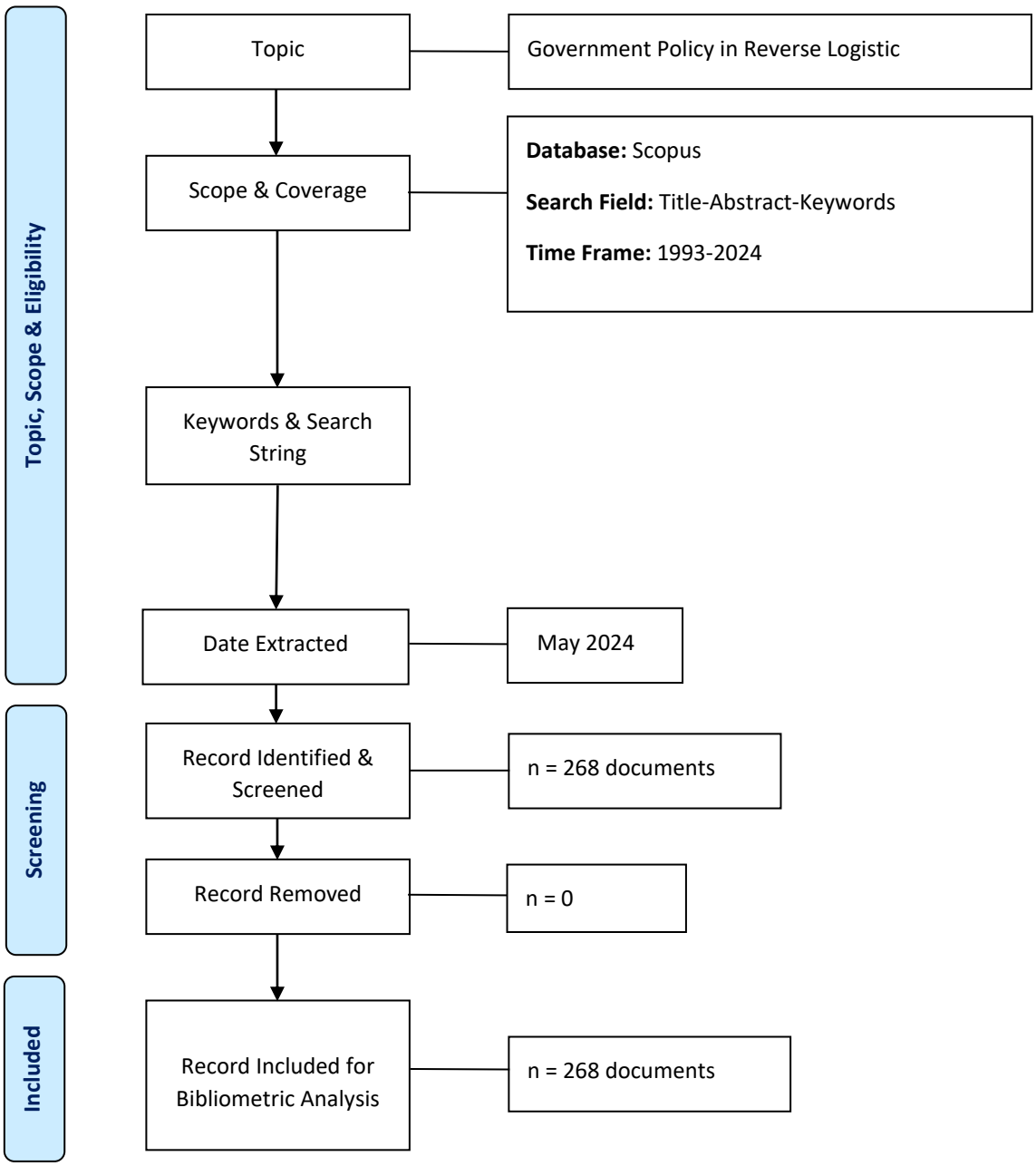

Figure 1. Flow diagram of the Search Strategy (Zakaria et al., 2021)

ANALYSIS OF DATA

This study utilizes the following instruments to achieve its objectives and deliver responses to its research inquiries: 1) VOSviewer (version 1.6.20) is used to create and visualize bibliometric net-works. 2) Publish or Perish is used to calculate the impact and performance of publications using se-lected metrics. 3) Microsoft Excel is used to calculate the frequency and percentage of each publica-tion and to create appropriate visual representations. To answer the research questions (RQs) stated in the introduction, this paper utilizes two different types of analyses: descriptive and net-work. VOSviewer was used for network analysis, while Microsoft Excel and Publish or Perish were used for descriptive analysis.

According to a study by (Donthu et al., 2021), thorough bibliometric analysis can be conducted using two main approaches: performance analysis and science mapping. The main aim of performance analysis is to examine the different components within a given subject.

However, scientific mapping primarily emphasizes the linkages between these aspects. Therefore, a total of 268 documents were examined in accordance with the research conducted (Wahyudi et al., 2022). The initial analysis focused on studying the trend of publications to address research question 1 (RQ1). To satisfy RQ2, the second analysis involved presenting the contributions of the writers and countries. The third re-search question (RQ3) was answered by presenting the findings of the 20 papers with the highest number of citations. To address RQ4, we conducted network visualization map analysis using the author keywords.

Prior to doing the analysis, we thoroughly cleaned and standardized the data. Adhering to this step is crucial in bibliometric analysis to ensure the accuracy of the findings (Punj et al., 2023). The utilization of a VOSviewer thesaurus file is a highly valuable instrument for successfully standardizing and enhancing the quality of data. In order to construct a map utilizing bibliographic data, one can employ a thesaurus file, which is a text file, to organize the data. In this study, we amalgamated several spelling variations and inconsistent data, including terms such as "closed loop supply chain," "closed-loop supply chain," and "closed-loop supply chains." A thesaurus file consists of two columns: one for labels and one for replacement terms. Thesaurus files start with a header line that includes the titles for each column. A thesaurus file is composed of lines that, except the first line, provide a label and an alternative label. The label is situated in the label column, while the replace by column specifies that the alternative label shall substitute the original label. Data analysis is conducted after to data cleansing.

RESULTS AND DISCUSSION

This section covers the findings that were highlighted in the introduction and are relevant to the research topics. In this study, we conducted science mapping and performance analysis based on the methodology proposed (Donthu et al., 2021). Performance analysis examines the contributions of various research components, such as authors, institutions, countries, and publications, to a specific topic. The objective of this study is to gather information about the current state of research on government policy in reverse logistic, including its impact on the landscape of knowledge and progress in this field. Therefore, we provide extensive data on the patterns of publication, notable authors, nations with the highest level of activity, and works that have received significant citations in this particular field.

THE TRENDS IN PUBLICATION

Table 1 displays the patterns of publishing and citation in the field of government policy on reverse logistics. It demonstrates a significant and rapid growth in research interest and impact over time. Starting in 2003, there has been an increasing trend in the number of publications, with notable rise in recent years, especially from 2007 to 2024. of 2021, there was a surge of publications, reaching a peak with the largest number of articles (TC=30), which suggests a significant increase in interest in the issue. Citation trends exhibit significant fluctuations, with prominent spikes observed in 2010, where famous articles received 1525 citations (TC=11), indicating the highest level of influence for those works. Similarly, in both 2007 and 2017, there were a significant amount of citations, with 869 citations in 2007 and 820 citations in 2017. This highlights the importance of the study published in both years. Nevertheless, there is a minor decrease in the number of lower publications, with a total of 16, in the year 2024. This arises from two primary factors. Initially, the data were gathered in May 2024, so excluding any further publications from the analysis. Furthermore, during the data collection period, there could have been numerous papers that had not yet been included in

the Scopus database. In recent years, there has been a steady growth in the number of studies focusing on government policy in reverse logistic research. This trend reflects the growing interest of scholars in this topic.

Table 1. The Trends in Publication

Year	TP	%	NCP	TC	C/P	C/CP	*h*	*g*
2024	16	5,97%	3	12	0,75	4,00	3	3
2023	29	10,82%	20	175	6,03	8,75	7	12
2022	29	10,82%	21	366	12,62	17,43	9	19
2021	30	11,19%	27	708	23,60	26,22	16	26
2020	24	8,96%	24	823	34,29	34,29	15	24
2019	21	7,84%	19	778	37,05	40,95	15	21
2018	16	5,97%	16	431	26,94	26,94	10	16
2017	16	5,97%	16	820	51,25	51,25	11	16
2016	8	2,99%	7	82	10,25	11,71	4	8
2015	9	3,36%	7	393	43,67	56,14	6	9
2014	6	2,24%	5	141	23,50	28,20	4	6
2013	9	3,36%	9	612	68,00	68,00	5	9
2012	6	2,24%	3	229	38,17	76,33	3	6
2011	6	2,24%	6	395	65,83	65,83	5	6
2010	11	4,10%	10	1525	138,64	152,50	6	11
2009	4	1,49%	4	631	157,75	157,75	2	4
2008	2	0,75%	1	143	71,50	143,00	1	2
2007	10	3,73%	7	869	86,90	124,14	5	10
2006	3	1,12%	3	104	34,67	34,67	2	3
2005	1	0,37%	1	41	41,00	41,00	1	1
2004	6	2,24%	4	357	59,50	89,25	3	6
2003	3	1,12%	1	140	46,67	140,00	1	3
2002	1	0,37%	1	9	9,00	9,00	1	1
2001	1	0,37%	1	1	1,00	1,00	1	1
1993	1	0,37%	1	3	3,00	3,00	1	1
Total	**286**							

Notes: TP=total number of publications; TC=total citations; NCP=number of cited publications; C/P=average citations per publication; C/CP=average citations per cited publication; h=h-index; and g=g-index.

MOST ACTIVE CONTRIBUTORS

Table 2 is a compilation of the top ten authors in the field of government policy on reverse logistics, each of whom has published at least three times. The list showcases a broad group of contributors hailing from different nations and organizations. Gupta, S.M. from the College of Engineering in Boston, United States, is the leading researcher in this field, with the maximum number of publications (TP=5) and citations (TC=958), demonstrating a substantial effect. Liu, Z. from Anhui Polytechnic University, Wuhu, China has a same amount of publications (TP=5) and high citations (TC=159) as him. On the other hand, Govindan, K. from The University of Adelaide in Adelaide, Australia has a significant number of citations (TC=380) while having a smaller number of publications (TP=3). Bashiri, M. from Coventry University in Coventry, United Kingdom has made significant contributions to high-impact publications (TC=344; C/P=114.67). It is worth noting that these contributions were made with only three articles.

Table 2. Top Ten Contributors with Minimum 3 Publications

Author's Name	Affiliation	Country	TP	NCP	TC	C/P	C/CP	*h*	*g*
Gupta, S.M.	College of Engineering, Boston	United States	5	5	958	191,60	191,60	4	5
Liu, Z.	Anhui Polytechnic University, Wuhu	China	5	5	159	31,80	31,80	4	5
Cao, J.	University of Iowa, Iowa City	United States	4	3	62	15,50	20,67	3	4
Jha, P.C.	University of Delhi, New Delhi	India	4	4	209	52,25	52,25	3	4
Agarwal, V.	Apeejay School of Management, New Delhi	India	3	3	153	51,00	51,00	2	3
Bagherinejad, J.	Alzahhra University, Industrial Engineering, Tehran	Iran	3	3	38	12,67	12,67	2	3
Bashiri, M.	Coventry University, Coventry	United Kingdom	3	3	344	114,67	114,67	3	3
Darbari, J.D.	Lady Shri Ram College for Women, New Delhi	India	3	3	153	51,00	51,00	2	3
Gen, M.	Tokyo University of Science, Tokyo	Japan	3	3	127	42,33	42,33	2	3
Govindan, K.	The University of Adelaide, Adelaide	Australia	3	3	380	126,67	126,67	3	3

Notes: TP=total number of publications; TC=total citations; NCP=number of cited publications; C/P=average citations per publication; C/CP=average citations per cited publication; h=h-index; and g=g-index.

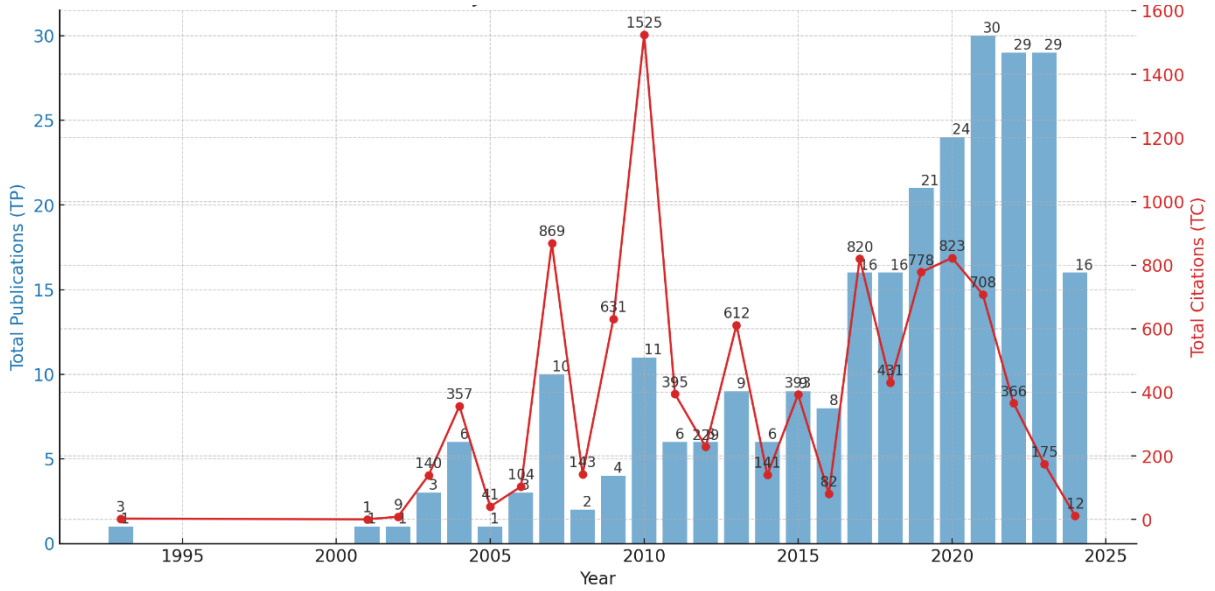

Figure 2. Yearly Publications and Citations

MOST PROMINENT COUNTRIES

Focusing on the prominent countries that have made significant contributions to the field of government policy on reverse logistics, the bibliometric data of this research offers valuable insights into the global research landscape and its impact. A total of 47 nations were included in this bibliometric analysis, based on papers retrieved from the Scopus database. We have compiled a list of the top 10 influential countries (Table 3) that have published at least 8 articles. This list showcases the enormous contributions made by these countries across different continents. China is at the forefront in terms of the biggest number of publications (TP=102) and important citations (TC=1787), which highlights its major contributions in the field of government policy on reverse logistics. Despite having a smaller number of publications (TP=44), India has the highest number of citations (TC=2816) among other countries, indicating its significant and influential contribution in this sector. The United States also distinguishes itself with a large number of publications (TP=33) and citations (2285). Asia has emerged as a prominent leader, with strong support from nations such as China, India, Iran, Indonesia, and Taiwan, which have made significant contributions in the field of publication and citation. North America, comprising the United States and Canada, has significant research productivity, with a notable number of publications and citations.

Table 3. Top 10 Prominent Countries with Minimal 8 Publications

Country	TP	NCP	TC	C/P	C/CP	h	g	Continent
China	102	79	1787	17,52	22,62	26	40	Asia
India	44	41	2816	64,00	68,68	21	44	Asia
United States	33	28	2285	69,24	81,61	18	33	North America
Brazil	24	18	484	20,17	26,89	10	22	South America
Iran	14	14	1051	75,07	75,07	10	14	Asia
United Kingdom	12	11	414	34,50	37,64	9	12	Europe
Canada	10	8	541	54,10	67,63	6	10	North America
Indonesia	9	6	89	9,89	14,83	5	9	Asia
Denmark	8	8	1493	186,63	186,63	8	8	Europe
Taiwan	8	7	353	44,13	50,43	5	8	Asia

Notes: TP=total number of publications; NCP=number of cited publications; TC=total citations; C/P=average citations per publication; C/CP=average citations per cited publication; h=h-index; and g=g-index.

FREQUENTLY CITED WORKS

Table 4 presents the top 10 often referenced publications in the field of government policy on reverse logistic research. These works have made substantial contributions to our understanding of the intricate relationship between leadership and innovation. The publication titled "Environmentally conscious manufacturing and product recovery (ECMPRO): A review of the state of the art" by M.A. Ilgin and S.M. Gupta (2010) has received significant attention, with a total citation count of 872 and an average of 6229 citations per year. A thorough assessment of environmentally conscious manufacturing and product recovery (ECMPRO) was carried out. They emphasize that the successful execution of reverse logistics relies on supportive government laws that require and promote the adoption of environmentally friendly practices. Stringent environmental rules, financial incentives for recycling, and efforts to raise knowledge about the environmental consequences of manufacturing and waste disposal are essential policies. The authors highlight the importance of strong government intervention in order to prevent manufacturers from being overwhelmed by the responsibility of autonomously implementing reverse logistics. Without such assistance, manufacturers may resort to suboptimal techniques and have lower compliance rates. Therefore, the incorporation of government policy serves as a stimulant for the extensive use of reverse logistics procedures. The article titled "A hybrid approach using ISM and fuzzy TOPSIS for the selection of reverse logistics provider" by G. Kannan, S.

Pokharel, P.S. Kumar (2009) ranked second in terms of citations, with a total of 540 citations and an average of 3600 citations per year. Their study highlights the significance of government policies in influencing the environment for reverse logistics providers. Through the establishment of explicit criteria and benchmarks, governments can optimize the process of selecting companies, guaranteeing that only providers who meet the necessary requirements and possess the necessary skills are chosen. The paper proposes that the integration of government policies with company objectives improves the efficiency and efficacy of reverse logistics, ultimately resulting in superior environmental and economic benefits. The work titled "Reverse and closed loop supply chain coordination by considering government role" by J. Heydari, K. Govindan, A. Jafari (2017) has a high average citation per year (C/Y=3271) but a lower total number of citations (TC=229). The statement emphasizes the crucial role of the government in effectively organizing reverse and closed-loop supply chains in order to maximize the efficiency of reverse logistics. Government policies can promote the use of effective reverse logistics systems by firms through the implementation of rules and the provision of financial incentives. The government has the ability to construct infrastructure that can assist in reverse logistics and promote cooperation between the public and private sectors, resulting in advantageous synergies. Integrating these rules can improve operational efficiency, lower expenses, and promote environmental sustainability by encouraging the reuse of materials and products within a circular economy.

Table 4. Top 10 Frequently Cited Works

Title of Documents	Author(s)	TC	C/Y
"Environmentally conscious manufacturing and product recovery (ECMPRO): A review of the state of the art"	M.A. Ilgin, S.M. Gupta (2010)	872	6229
"A hybrid approach using ISM and fuzzy TOPSIS for the selection of reverse logistics provider"	G. Kannan, S. Pokharel, P.S. Kumar (2009)	540	3600
"A genetic algorithm approach for solving a closed loop supply chain model: A case of battery recycling"	G. Kannan, P. Sasikumar, K. Devika (2010)	349	2493
"A system dynamics model for dynamic capacity planning of remanufacturing in closed-loop supply chains"	D. Vlachos, P. Georgiadis, E. Iakovou (2007)	344	2024
"A new multi-objective stochastic model for a forward/reverse logistic network design with responsiveness and quality level"	M. Ramezani, M. Bashiri, R. Tavakkoli-Moghaddam (2013)	307	2791
"Competitive strategy in remanufacturing and the impact of take-back laws"	S. Webster, S. Mitra (2007)	271	1594
"Reverse and closed loop supply chain coordination by considering government role"	J. Heydari, K. Govindan, A. Jafari (2017)	229	3271
"Factors for implementing end-of-life computer recycling operations in reverse supply chains"	S. Rahman, N. Subramanian (2012)	203	1692
"Sustainable supply chain management: Review and research opportunities"	S. Gupta, O.D. Palsule-Desai (2011)	192	1477
"The impact of carbon pricing on a closed-loop supply chain: An Australian case study"	B. Fahimnia, J. Sarkis, F. Dehghanian, N. Banihashemi, S. Rahman (2013)	177	1609

Notes: TC = total citations; C/Y = total citations per year

NETWORK ANALYSIS

Co-occurrence analysis is a widely utilized tool in bibliometrics, particularly in the context of network analysis. Donthu et al. (2020) defined science mapping as an approach that explores the interconnections among different research elements. The analysis focuses on the intellectual and structural relationships among the study constituents. Goyal et al. (2021) state that VOSviewer is one of the most widely used tools for network research. The subsequent part will discuss the examination of clusters and co-occurrence in ambidextrous leadership research.

Comerio & Strozzi (2019) assert that keyword analysis operates on the assumption that the keywords chosen by the author accurately reflect the content of the article. When two terms co-occur in the text, it implies a correlation between the two concepts. We utilize VOSviewer's co-occurrence and cluster analysis functionalities to address the last research question (RQ4). We employed VOSviewer, a software tool for constructing and displaying bibliometric networks, to perform keyword analysis and associate the given keywords with each article. Figure 3 displays a network representation of authors' keywords, developed using VOSviewer. The graphic employs color, circle size, text, and line thickness to depict the intensity of the connection between terms. A conventional approach is to categorize interconnected terms by employing a consistent color scheme. As a term or object becomes more frequent, its circle will expand, reflecting its increasing significance. The size of things is determined by their frequency of occurrence. The authors of this study identified a total of 781 words as keywords. Table 5 presents the cluster-analyzed keywords that are most frequently observed, with a minimum occurrence of three times.

According to cluster analysis, the field of government policy on reverse logistic is primarily focused on four primary areas —cluster 1 has total 15 items. Most frequent keywords in this cluster are sustainability, government regulations, circular economy and developing countries. The theme of this cluster is "Reverse Logistic in Developing Countries". This theme examines how government policies can optimize reverse logistics to support sustainability and the circular economy in developing countries. The main focus is on understanding the role of regulations in promoting better recycling, remanufacturing, and waste management practices. By highlighting the unique challenges and opportunities faced by developing countries, the studies in this cluster provide insights into effective policy strategies for achieving global sustainability goals through the circular economy.

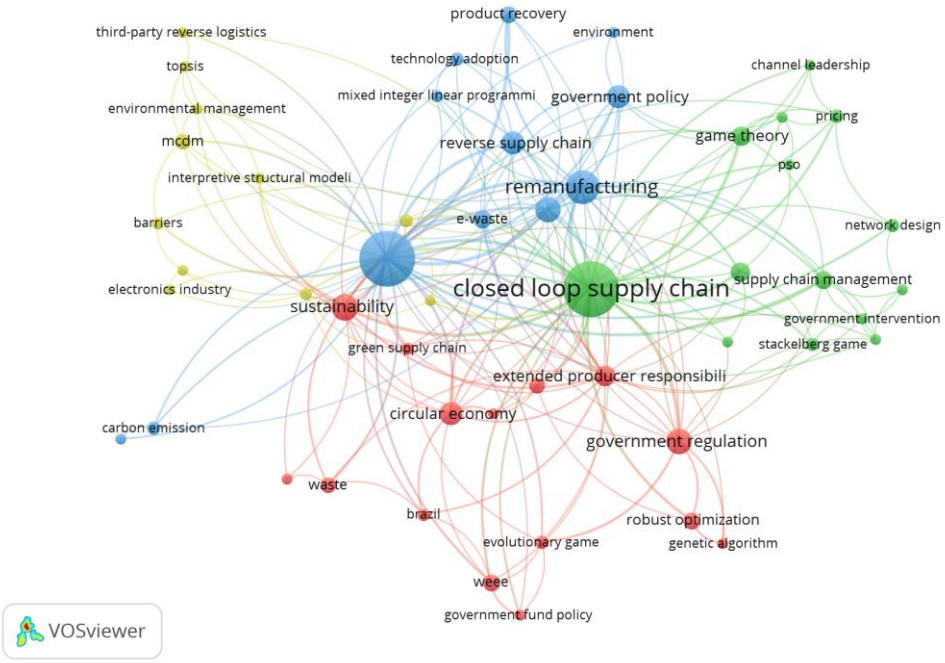

Figure 3. Network Visualisation

Table 5. Cluster Analysis

Most Frequent Keywords	Cluster	Occurrences	Total Link Strength	Total Keywords (Items)
Sustainability	1	18	33	15
Government regulations	1	16	25	
Circular economy	1	14	21	
Developing countries	1	3	3	
Close loop supply chain	2	75	97	14
Government subsidy	2	10	14	
Supply chain management	2	8	15	
Government intervention	2	3	6	
Reverse logistic	3	75	100	12
Remanufacturing	3	29	47	
Recycling	3	16	26	
Government policy	3	13	14	
Environmental sustainability	4	4	8	11
Barrier	4	4	6	
Environmental management	4	3	6	
Third party reverse logistic	4	3	4	

Cluster 2 – with 14 keywords. the main keywords are close loop supply chain, government subsidy, supply chain management and government intervention. We label this cluster's theme with "Government Intervention in Reverse Logistics". This theme focuses on exploring how government interventions and subsidies can enhance the efficiency and effectiveness of closed-loop supply chains within overall supply chain management. The study identifies the crucial role of government policies in promoting sustainable reverse logistics

practices, including how subsidies can incentivize companies to engage more actively in remanufacturing and recycling processes. Additionally, this research theme examines the mechanisms of government intervention that can address barriers to the implementation of reverse logistics, such as high costs and logistical complexities, thereby creating a more efficient and environmentally friendly supply chain system. Consequently, the integration of government policies not only fosters sustainability but also helps companies achieve competitive advantages through supply chain optimization.

Cluster 3 consist of 12 items. Reverse logistic, remanufacturing, recycle and government policy are the main keywords. The theme of this cluster is labelled with "Policy-Driven Optimization of Reverse Logistics Systems". This theme focuses on exploring how government policies can optimize reverse logistics systems, including remanufacturing and recycling, to achieve sustainability and efficiency goals. By integrating policies that support the management of product return flows, this study will analyze the role of regulations, incentives, and government strategies in encouraging companies to adopt more effective remanufacturing and recycling practices. It will also evaluate the impact of various government policies on operational efficiency, waste reduction, and resource reutilization within the context of reverse logistics. This research theme provides valuable insights for policymakers and practitioners in designing and implementing policies that support sustainable and responsive reverse logistics systems in the face of environmental challenges.

Cluster 4 has 11 keywords, with environmental sustainability, barrier, environmental management, third party reverse logistic are the most occurrent keywords in this cluster. The theme of this cluster is Policy Integration and Environmental Management in Reverse Logistics. This theme focuses on how the integration of government policies can optimize reverse logistics through effective environmental management and collaboration with third parties. In the context of environmental sustainability, this research explores the barriers faced in implementing reverse logistics and how appropriate policies can overcome these challenges. Additionally, the theme highlights the role of environmental management in ensuring that reverse flows of products are conducted with minimal negative environmental impact. By involving competent third parties in reverse logistics, this research also discusses how government policies can promote better and more efficient cooperation among various stakeholders. Ultimately, the existing research aims to identify effective policy strategies to achieve environmental sustainability through the optimization of reverse logistics.

CONCLUSIONS

This bibliometric analysis provides a comprehensive overview of the current state of research on government policy integration to optimize reverse logistics. Through the use of various bibliometric tools such as VOSviewer, Publish or Perish, and Microsoft Excel, the study successfully mapped the scientific landscape of this topic, revealing significant trends and insights. The analysis highlights an exponential increase in research interest and publication trends from 2003 onwards, with notable peaks in 2010, 2017, and 2021. This indicates a growing recognition of the importance of integrating government policies to enhance the efficiency and sustainability of reverse logistics. Key contributors to this field, such as Gupta S.M. and Liu Z., have been identified, showing the impact of their work in advancing understanding and implementation of reverse logistics policies. Furthermore, the study underscores the importance of government policies in shaping the landscape of reverse logistics. Effective policies, such as strict environmental regulations, financial incentives, and public awareness

campaigns, are crucial in promoting eco-friendly practices and supporting the adoption of reverse logistics. The involvement of third parties and the establishment of clear guidelines and standards by governments can streamline processes and ensure that only compliant and capable providers are chosen, leading to better environmental and economic outcomes.

The network analysis conducted using VOSviewer revealed four primary clusters: reverse logistics in developing countries, government intervention in reverse logistics, policy-driven optimization of reverse logistics systems, and policy integration and environmental management in reverse logistics. These clusters emphasize the diverse areas of focus within the field and highlight the critical role of government intervention and policy integration in promoting sustainable practices. Overall, this study demonstrates that integrating government policies into reverse logistics is essential for achieving environmental sustainability and optimizing resource utilization. Future research should continue to explore the interplay between policy, technology, and management practices to further enhance the effectiveness of reverse logistics systems. This will not only contribute to environmental preservation but also provide economic benefits through improved efficiency and reduced waste.

Based on our results, we suggest recommendations for future research. Firstly, developing frameworks for policy integration. Future research should delve into the mechanisms for better integration of government policies to avoid fragmentation in governmental actions related to reverse logistics. Fragmentation often leads to inefficiencies and inconsistencies in policy application, hampering the overall effectiveness of reverse logistics systems. Studies should investigate how unified and comprehensive policies can be designed and implemented to create a seamless and effective reverse logistics system. This includes examining the roles of different governmental agencies, the interplay between local, regional, and national policies, and the mechanisms for effective inter-agency communication and collaboration. Secondly, scenario planning for logistics systems. Scenario planning is crucial for preparing logistics systems to handle future uncertainties and dynamic changes. Further research should explore various scenario planning methodologies tailored to reverse logistics. This involves analysing potential future scenarios that could impact reverse logistics operations, such as technological advancements, regulatory changes, market fluctuations, and environmental challenges. By developing robust scenario planning models, policymakers and practitioners can better anticipate and respond to changes, ensuring that reverse logistics systems remain resilient and adaptable.

This bibliometric analysis, while comprehensive, has several limitations that should be acknowledged. Firstly, the analysis relied exclusively on the Scopus database for sourcing publications. While Scopus is one of the most extensive databases available, it may not cover all relevant studies, particularly those published in less prominent journals or regional publications. This limitation could result in a potential bias in the dataset and affect the generalizability of the findings. Secondly, the study also primarily focused on quantitative metrics such as publication and citation counts, which, while informative, do not capture the full scope of research impact or the qualitative aspects of the studies analysed. Future research could incorporate more qualitative such as systematic literature review analyses to provide a deeper understanding of the content.

REFERENCE

Abuhassna, H., Yahaya, N., Zakaria, M. A. Z. M., Zaid, N. M., Samah, N. A., Awae, F., Nee, C. K., & Alsharif, A. H. (2023). Trends on Using the Technology Acceptance Model (TAM) for Online Learning: A Bibliometric and Content Analysis. *International Journal of Information and Education Technology*, *13*(1), 131–142. https://doi.org/10.18178/ijiet.2023.13.1.1788

Agrawal, S., & Singh, R. K. (2019). Analyzing disposition decisions for sustainable reverse logistics: Triple Bottom Line approach. *Resources, Conservation and Recycling*, *150*, 104448. https://doi.org/10.1016/j.resconrec.2019.104448

Comerio, N., & Strozzi, F. (2019). Tourism and its economic impact: A literature review using bibliometric tools. *Tourism Economics*, *25*(1), 109–131. https://doi.org/10.1177/1354816618793762

Cuc, J. E. (2019). Trends of Business Model Research. *Journal of Business Models*, *7*(5), 1–24.

Donthu, N., Kumar, S., Mukherjee, D., Pandey, N., & Lim, W. M. (2021). How to conduct a bibliometric analysis: An overview and guidelines. *Journal of Business Research*, *133*, 285–296. https://doi.org/10.1016/j.jbusres.2021.04.070

Donthu, N., Kumar, S., & Pattnaik, D. (2020). Forty-five years of Journal of Business Research: A bibliometric analysis. *Journal of Business Research*, *109*, 1–14. https://doi.org/10.1016/j.jbusres.2019.10.039

Fahimnia, B., Sarkis, J., & Davarzani, H. (2015). Green supply chain management: A review and bibliometric analysis. *International Journal of Production Economics*, *162*, 101–114. https://doi.org/10.1016/j.ijpe.2015.01.003

Gökçe, Y., Çavuşoğlu, S., Göral, M., Bayatkara, Y., Bükey, A., & Gökçe, F. (2024). A bibliometric analysis of the technology acceptance model and the use of robots in tourism studies. *Worldwide Hospitality and Tourism Themes*, *ahead-of-p*(ahead-of-print). https://doi.org/10.1108/WHATT-03-2024-0057

Govindan, K., & Bouzon, M. (2018). From a literature review to a multi-perspective framework for reverse logistics barriers and drivers. *Journal of Cleaner Production*, *187*, 318–337. https://doi.org/10.1016/j.jclepro.2018.03.040

Govindan, K., Soleimani, H., & Kannan, D. (2015). Reverse logistics and closed-loop supply chain: A comprehensive review to explore the future. *European Journal of Operational Research*, *240*(3), 603–626. https://doi.org/10.1016/j.ejor.2014.07.012

Goyal, S., Chauhan, S., & Mishra, P. (2021). Circular economy research: A bibliometric analysis (2000–2019) and future research insights. *Journal of Cleaner Production*, *287*, 125011. https://doi.org/10.1016/j.jclepro.2020.125011

Hassan, S., & Ahmi, A. (2022). Mapping the state of the art of scientific production on requirements engineering research: A bibliometric analysis. *International Journal of Information Technologies and Systems Approach*, *15*(1), 1–23. https://doi.org/10.4018/IJITSA.289999

Ittmann, H. W. (2021). A bibliometric analysis of the journal of transport and supply chain management. *Journal of Transport and Supply Chain Management*, *15*, 15. https://doi.org/10.4102/jtscm.v15i0.577

Kazancoglu, I., Sagnak, M., Kumar Mangla, S., & Kazancoglu, Y. (2021). Circular economy and the policy: A framework for improving the corporate environmental management in supply chains. *Business Strategy and the Environment*, *30*(1), 590–608. https://doi.org/10.1002/bse.2641

Kumar, A. (2016). a Bibliometric Study of Supply Chain Management. *Management Research and Practice*, *8*(1), 25–38.

Mansour, A. Z., Ahmi, A., Popoola, O. M. J., & Znaimat, A. (2022). Discovering the global landscape of fraud detection studies: a bibliometric review. *Journal of Financial Crime*, *29*(2), 701–720. https://doi.org/10.1108/JFC-03-2021-0052

Punj, N., Ahmi, A., Tanwar, A., & Abdul Rahim, S. (2023). Mapping the field of green manufacturing: A bibliometric review of the literature and research frontiers. *Journal of Cleaner Production*, *423*, 138729. https://doi.org/10.1016/j.jclepro.2023.138729

R. Huscroft, J., T. Hazen, B., J. Hall, D., B. Skipper, J., & B. Hanna, J. (2013). Reverse logistics: past research, current management issues, and future directions. *The International Journal of Logistics Management*, *24*(3), 304–327.

Reardon, T., Echeverria, R., Berdegué, J., Minten, B., Liverpool-Tasie, S., Tschirley, D., & Zilberman, D. (2019). Rapid transformation of food systems in developing regions: Highlighting the role of agricultural research & innovations. *Agricultural Systems*, *172*, 47–59. https://doi.org/10.1016/j.agsy.2018.01.022

Wahyudi, M., Ahmi, A., & Herianingrum, S. (2022). Examining trends, themes and social structure of zakat literature: a bibliometric analysis. *Global Journal Al-Thaqafah*, *12*(1), 40–67.

Zakaria, R., Ahmi, A., Ahmad, A. H., & Othman, Z. (2021). Worldwide melatonin research: a bibliometric analysis of the published literature between 2015 and 2019. *Chronobiology International*, *38*(1), 27–37. https://doi.org/10.1080/07420528.2020.1838534