

A BIBLIOMETRIC REVIEW OF REVERSE INNOVATION: DISCIPLINARY EVOLUTION AND EMERGING RESEARCH FRONTIERS

Ters İnovasyonun Bibliyometrik Analizi: Disipliner Katkıları ve Ortaya Çıkan
Araştırma Sınırları

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Abstract

Reverse innovation (RI) is a strategic concept that inverts the traditional flow of innovation by enabling innovations to emerge from developing markets and spread to developed economies. Over the past decade, RI has attracted significant academic attention, particularly in domains such as healthcare, sustainability, and various sectors. RI is not only concerned with technology transfer from one country to another but is also connected to current global challenges. The purpose of this study is to conduct a comprehensive bibliometric

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How to cite this article/Atıf için: Karabulut, A. T., Sayan, İ., Pehlivanoglu, M. Ç., & Akdal, S. (2026). A bibliometric review of reverse innovation: Disciplinary evolution and emerging research frontiers. *Öneri Dergisi*, 21(66). DOI: 10.14783/maruoneri.1893202

Makale Gönderim Tarihi: 19.02.2026

Yayına Kabul Tarihi: 03.06.2026



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analysis of RI by examining publications indexed in the Web of Science database between 2010 and 2024. Two hundred thirty-two publications containing the term ‘RI’ in the title, abstract, keywords, or author keywords were analyzed using VOSviewer software. This article examines studies in the field of RI by exploring various elements, including publication years, indexing databases, citation metrics, most-cited articles, research fields, related concepts, authors, journals, institutions, and countries of origin for the conducted studies. It also examines the relationship between RI and the United Nations Sustainable Development Goals (SDGs). RI is related to SDG 9 (industry, innovation, and infrastructure), SDG 3 (good health and well-being), sustainability, reverse logistics, green supply chains, and the circular economy. This research presents a comprehensive overview of the current state of RI and provides guidance for both academics and industry leaders.

Keywords: Innovation, Reverse Innovation, Sustainable Development Goals, Bibliometric Analysis

JEL Codes: O30, O31, O33

Öz

Ters inovasyon (Reverse innovation, RI), yenilik akışının geleneksel yönünü tersine çevirerek yeniliklerin gelişmekte olan pazarlardan doğup gelişmiş ekonomilere yayılmasını sağlayan stratejik bir kavramdır. Son on yılda RI özellikle sağlık, sürdürülebilirlik ve çeşitli sektörlerde önemli akademik ilgi görmüştür. RI yalnızca ülkeler arası teknoloji transferi bağlamında değil, aynı zamanda güncel küresel sorunlarla da yakından ilişkilidir. Bu çalışmanın amacı, 2010–2024 yılları arasında Web of Science veri tabanında dizinlenen yayınları inceleyerek RI üzerine kapsamlı bir bibliyometrik analiz gerçekleştirmektir. Başlık, özet, anahtar kelimeler veya yazar anahtar kelimelerinde “RI” ifadesini içeren toplam 232 yayın, VOSviewer yazılımı kullanılarak analiz edilmiştir. Bu makale, RI alanındaki çalışmaları yayın yılları, indekslendiği veri tabanları, atıf metrikleri, en çok atıf alan makaleler, araştırma alanları, ilişkili kavramlar, yazarlar, dergiler, kurumlar ve ülkeler gibi çeşitli unsurlar bakımından incelemektedir. Ayrıca RI ile Birleşmiş Milletler Sürdürülebilir Kalkınma Amaçları (SDG’ler) arasındaki ilişki analiz edilmiştir. RI’nin SDG 9 (sanayi, inovasyon ve altyapı), SDG 3 (sağlık ve kaliteli yaşam), sürdürülebilirlik, ters lojistik, yeşil tedarik zincirleri ve döngüsel ekonomi ile bağlantılı olduğu görülmüştür. Bu araştırma, RI’nin mevcut durumuna ilişkin kapsamlı bir görünüm sunmakta ve hem akademisyenlere hem de sektör liderlerine yol gösterici nitelikte bulgular sağlamaktadır.

Anahtar Kelimeler: İnovasyon, Ters İnovasyon, Sürdürülebilir Kalkınma Hedefleri, Bibliyometrik Analiz

JEL Kodları: O30, O31, O33

1. INTRODUCTION

Reverse innovation (RI) has gained significance within the realm of global innovation dynamics. It challenges traditional notions that knowledge and technology flow unidirectionally from developed to developing countries. RI has become a focal point of academic research across multiple fields, including international business, management, economics, public policy, engineering, healthcare, and innovation. The growing interest from both scholars and practitioners highlights the increasing importance of the concept due to its interdisciplinary nature. Combining different disciplinary insights strengthens the theoretical basis of RI and emphasizes its strategic role in the global economy.

Reverse innovation (RI), first introduced by Immelt et al. (2009), refers to innovations originating in emerging markets that are subsequently adopted by developed countries. Research from 2010 to 2024 has shown a growing academic focus on RI, particularly in healthcare, sustainability, and industrial sectors (Govindarajan & Trimble, 2012; von Zedtwitz et al., 2015). It plays a vital role in global business strategies, with companies like Philips and General Electric utilizing innovations developed in emerging economies. Scholars note that RI expands beyond technical adaptation, being influenced by socio-cultural factors and facing barriers such as risk aversion and resistance to change (Hashmi et al., 2023). Recent bibliometric studies have linked RI to the UN Sustainable Development Goals, particularly Good Health and Well-being (Goal 3) and Industry, Innovation, and Infrastructure (Goal 9), underscoring the need for future research on cultural, organizational, and policy factors that influence RI.

The article is divided into the following sections: Exploring RI, Methodology, Data Analysis, Findings, Discussion, and Implications. The first section explains the concept of RI by starting with its theoretical background. The research methodology is explained, and data analysis is presented. Next, the key findings are highlighted. The study concludes with an evaluation of the theoretical and practical implications, as well as recommendations for future research in the implications section.

2. EXPLORING REVERSE INNOVATION

RI has gained attention in innovation research recently. Govindarajan and Ramamurti (2011) define it as a process where innovations originating in developing countries are transferred to developed countries. RI requires a significant shift in the direction of innovation, unlike the traditional model, where innovation starts in developed countries and then moves to developing ones. It prompts global companies to revise their innovation strategies to accommodate this reverse flow of ideas. Evidence suggests that innovations developed in resource-constrained environments can provide competitive advantages when adapted to developed market settings. RI challenges traditional theories of innovation diffusion, foreign direct investment (FDI), and multinational enterprise management.

The concept was first introduced in Harvard literature through the work of Immelt et al. (2009), who illustrated it with the example of General Electric. RI has gained significance in the healthcare sector (Bhattacharyya et al., 2017) and the packaged consumer products industry (Corsi et al., 2014). The Global Value Chain theory situates RI within the framework of low-cost production and knowledge transfer (Wang & Wang, 2024). McCausland (2023) highlighted the strategic importance of regenerative innovation for multinational companies (MNCs) in improving long-term sustainability and competitive advantage, thereby integrating them into global value chains and adopting more sustainable business models. The adoption of low-cost, portable electrocardiogram (ECG) machines developed in India is used as an example in Western healthcare systems (Govindarajan & Trimble, 2012). McCausland (2023) pointed out that companies that effectively leverage limited resources can gain a strategic edge through frugal innovation (FI). Karabulut (2017) argued that MNCs successfully created market-specific solutions via R&D hubs in emerging markets and eventually expanded

them to global markets. RI is a process that goes beyond technology and includes cultural, managerial, and organizational aspects. Wang and Wang (2024) and Huang and Li (2019) emphasized that the effectiveness and reach of RI depend on knowledge transfer, local collaborations, and the strategic use of digital platforms.

RI has attracted growing academic interest in Türkiye as well. Yaşlıoğlu (2019) stated that the model serves as a tool for development, positioning emerging markets as contributors to global innovation ecosystems. Bardakcı et al. (2019) examined local perceptions of RI and provided insights into how the concept is interpreted and applied within the country. The expanding research literature on RI has prompted the use of bibliometric analysis methods to interpret its structure and development thoroughly. Gao et al. (2020) conducted a systematic mapping of structural patterns in the field, focusing on direct citation networks, keyword co-occurrences, and conceptual relationships to identify new trends and research gaps.

3. METHODOLOGY

Bibliometric analysis is a method for examining scientific data to understand the development of a field and identify emerging research areas (Donthu et al., 2021). This method analyzes trends, effects, and relationships within a field by gathering and organizing data from various sources. Bibliometric analysis has become popular for monitoring the growth of research disciplines (Passas, 2024).

The purpose of this study is to conduct a comprehensive bibliometric analysis of RI by reviewing publications indexed in the Web of Science database from 2010 to 2024. Two hundred thirty-two publications containing the term ‘RI’ in the title, abstract, keywords, or author keywords were analyzed using VOSviewer software. This article explores studies in the field of RI by examining factors such as publication years, indexing databases, citation metrics, most-cited articles, research areas, related concepts, authors, journals, institutions, and countries involved. It also examines the relationship between RI and the United Nations’ Sustainable Development Goals (SDGs). RI is related to SDG 9 (industry, innovation, and infrastructure), SDG 3 (good health and well-being), sustainability, reverse logistics, green supply chains, and the circular economy. This research provides a comprehensive overview of the current state of RI, guiding both academic and industry leaders.

This study aims to answer the following research questions:

- How has the volume of publications on RI changed over time?
- Which years have experienced the highest output in terms of publications and citations?
- Which universities and research organizations have produced the most publications on RI?
- Which countries contribute the most research on RI?
- What are the most cited journals, articles, and authors in the field of RI?
- What are the main research areas connected to RI?

- What emerging trends and gaps can be identified in RI research?

3.1. Data Analysis

This article examined academic literature on RI using bibliometric analysis. First, the literature in the field of RI was reviewed from the WoS and Scopus databases. There are 230 sources in Scopus and 232 in WoS. The overlapping sources in both databases were then removed, and the analysis focused on 232 sources from the WoS. Frequency tables were created using WoS analysis methods, showing the distribution of RI publications by field, institution, and document type. The VOSviewer software was used to analyze publications by searching for RI in titles, abstracts, keywords, and author keywords, to evaluate publication years, authors, top articles, journals, citations, indexing databases, institutions, countries, research fields, and their relations to the United Nations SDGs. The results were supported by frequency tables generated through WoS analysis tools, as well as network maps and clustering visuals provided by VOSviewer. This approach strengthened the study by providing numerical data, as well as visual and relational analyses. Overall, this method revealed trends in RI studies, academic collaborations, and the key factors driving the subject.

4. FINDINGS

This section highlights the key findings from the bibliometric analysis of RI literature. The results reveal publication trends over time, highlighting the most influential authors, institutions, journals, indexes, and countries, as well as notable research fields, thematic categories, and related subjects.

Table 1. Number of articles (Keyword: Reverse innovation)

Publication Year	Number of Publications in WoS	%	Number of Publications in Scopus	%
2024	7	3,02	13	5.652
2023	14	6,03	15	6.522
2022	18	7,76	17	7.391
2021	20	8,62	12	5.217
2020	25	10,78	19	8.261
2019	18	7,76	21	9.130
2018	19	8,19	18	7.826
2017	24	10,34	27	11.739
2016	22	9,48	20	8.696
2015	23	9,91	21	9.130
2014	17	7,33	15	6.522
2013	12	5,17	15	6.522
2012	7	3,02	11	4.783
2011	4	1,72	4	1.739
2010	2	0,86	2	0.870
Total	232	100	230	100

Table 1 illustrates the distribution of academic publications featuring the keyword ‘RI’ by year, including their counts in the databases and the percentage of each year’s total in the overall total. Publications on RI have steadily increased in both WoS and Scopus since 2010. The number of publications experienced a significant rise, especially between 2017 and 2020. Although a relative decline in publication numbers is seen after 2021, interest in the topic appears to have continued into 2023 and 2024. This distribution suggests that the topic has garnered increased attention, particularly over the last decade, and has gradually become more significant in academic literature.

Figure 1. Publications and citations by year on WoS

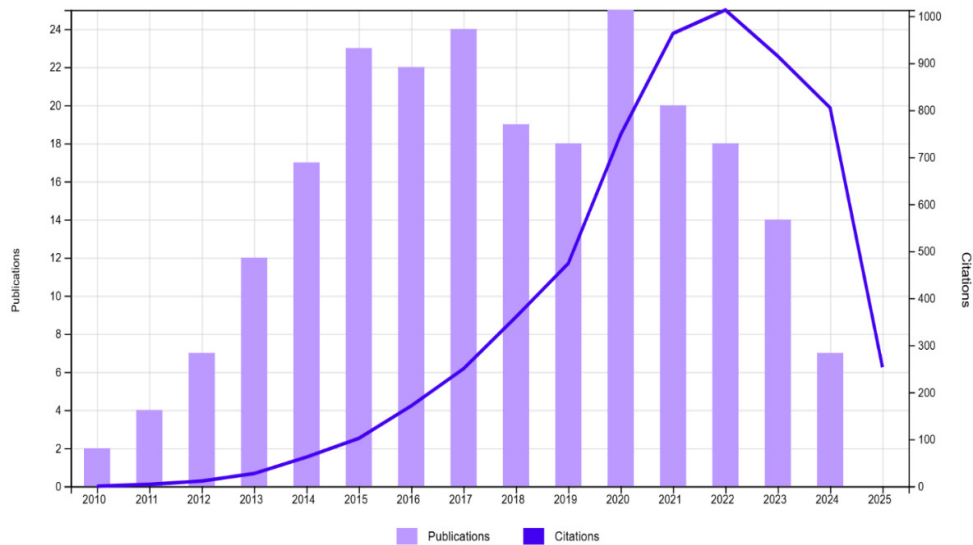


Figure 1 depicts the temporal distribution of academic publications and citations on the concept of RI from 2010 to 2024. The number of publications has grown since 2010, reaching a peak in 2020 with 24 publications. This upward trend signifies growing academic interest in the concept, especially during the latter half of the 2010s. Citations increased significantly after 2015, peaking in 2021 with over 1,000 citations, reflecting a lag and growing impact of earlier high-output research. Publication and citation rates have declined since 2021, especially in 2024, suggesting topic saturation or diffusion into related innovation fields. RI has transitioned from an emerging field to a more established field in innovation research.

Table 2. Documents by affiliation

Affiliation	Record Count	%
Imperial College London	14	6.034
Harvard University	13	5.603
Johns Hopkins University	7	3.017
Dartmouth College	6	2.586

University of St. Gallen	6	2.586
Lappeenranta Lahti University of Technology Lut	5	2.155
Pennsylvania Commonwealth System of Higher Education	5	2.155
Pcshe		
Universidade De Sao Paulo	5	2.155
University of California System	5	2.155
University of London	5	2.155
Brigham Women's Hospital	4	1.724
Escola Superior De Propaganda E Marketing ESPM	4	1.724
Harvard Medical School	4	1.724
Harvard T H Chan School of Public Health	4	1.724
Harvard University Medical Affiliates	4	1.724
Johns Hopkins Bloomberg School of Public Health	4	1.724
New York University	4	1.724
Qatar University	4	1.724
Royal Melbourne Institute of Technology RMIT	4	1.724
Scuola Superiore Sant Anna	4	1.724
Tsinghua University	4	1.724
University of California, Los Angeles	4	1.724
Zhejiang University	4	1.724
Aalborg University	3	1.293
Aalto University	3	1.293
Total	232	100

Table 2 shows the institutions that publish academic works on RI. The analysis reveals that leading universities and research institutions worldwide have made significant contributions to this field. Imperial College London is the top institution, with 14 publications accounting for 6.034% of all documents. Harvard University is close behind with 13 publications (5.603%). Further, parts of Harvard University have an additional 12 publications (5.172%). Other major contributors include Johns Hopkins University (7 publications), Dartmouth College (6 publications), and the University of St. Gallen (6 publications), emphasizing the role of both American and European institutions in shaping RI research and literature.

Institutions contributing to RI research include universities from both developed and emerging markets. While many universities from the United States and Europe are on the list, it also includes universities from emerging markets, such as Universidade de São Paulo in Brazil and Tsinghua and Zhejiang Universities in China. This distribution highlights the increasing global importance of RI. The growing involvement of universities from developing countries shows that RI is a priority in high-income countries and is gaining scholarly attention worldwide. The participation of prominent U.S. universities, such as the University of California System, Harvard Medical School, and Johns Hopkins Bloomberg School of Public Health, emphasizes the importance of interdisciplinary research. Universities focused on management and technology, such as the Royal Melbourne Institute of Technology and Lappeenranta-Lahti University of Technology, collaborate with institutions from North America, Europe, Asia, and South America, demonstrating that RI is not just an academic

concept but also a practical approach. Therefore, RI is viewed as a vital field of study that connects economic development, technological innovation, and global knowledge sharing.

Table 3. Citation report

Number	Author	Year	Name of the Article	Name of the Journal	Citations
1	Govindarajan & Ramamurti	2011	Reverse innovation, emerging markets, and global strategy	Global Strategy Journal	390
2	Ford et al.	2017	Obesity in low – and middle-income countries: burden, drivers, and emerging challenges	Annual Review of Public Health	316
3	Zeschky et al.	2014	From cost to frugal and reverse innovation: mapping the field and implications for global competitiveness	Research-Technology Management	183
4	Rosca et al.	2017	Business models for sustainable innovation – an empirical analysis of frugal products and services	Journal of Cleaner Production	172
5	Agarwal et al.	2017	A systematic literature review of constraint-based innovations: state of the art and future perspectives	IEEE Transactions on Engineering Management	153
6	Hossain, M.	2018	Frugal innovation: a review and research agenda	Journal of Cleaner Production	147
7	Pisoni et al.	2018	Frugal approach to innovation: state of the art and future directions	Journal of Cleaner Production	129
8	von Zedtwitz et al.	2015	A typology of reverse innovation	Journal of Product Innovation Management	123
9	Farrer et al.	2015	Advocacy for health equity: a synthesis review	Milbank Quarterly	120
10	Hossain et al.	2016	Can frugal go global? Diffusion patterns of frugal innovations	Technology in Society	113
11	Winterhalter et al.	2017	Business models for frugal innovation in emerging markets: the study of the medical device and laboratory equipment industry	Technovation	111
12	Khan, R.	2016	How frugal innovation promotes social sustainability	Sustainability	111
13	Sartor & Beamish	2014	Offshoring innovation to emerging markets: organizational control and informal institutional distance	Journal of International Business Studies	107
14	Yapa & Bärnighausen	2018	Implementation science in resource-poor countries and communities	Implementation Science	98
15	Agnihotri, A.	2015	Low-cost innovation in emerging markets	Journal of Strategic Marketing	97

Govindarajan and Ramamurti (2011) redefined RI as innovations developed and adopted in low-income or emerging markets before spreading to high-income or developed countries. They identified types of innovations originating from developing markets, their transfer mechanisms to

developed countries, the competitive advantages these innovations provide, and the implications for global strategies and organizational structures. Ford et al. (2017) reviewed excess weight characteristics, causes, and prevention strategies, highlighted research gaps, and recommended future studies, especially in LMICs. They suggested that expanding research in these regions could benefit both LMICs and obesity prevention efforts in high-income countries. Zeschky et al. (2014) examined how low-cost solutions tailored to local needs in emerging markets could enhance the competitiveness of MNCs through reverse and frugal innovation.

Table 4. Research areas about ‘reverse innovation’

Research Areas	Record Count	%
Business and Economics	121	52.155
Engineering	38	16.379
Public Environmental Occupational Health	38	16.379
Science Technology Other Topics	23	9.914
Environmental Sciences Ecology	16	6.897
Operations Research Management Science	9	3.879
Health Care Sciences Services	8	3.448
Social Sciences Other Topics	8	3.448
General Internal Medicine	7	3.017
Development Studies	6	2.586
Public Administration	6	2.586
Social Issues	6	2.586
Surgery	4	1.724
Biomedical Social Sciences	3	1.293
Computer Science	3	1.293
Education Educational Research	3	1.293
Pharmacology Pharmacy	3	1.293
Information Science Library Science	2	0.862
Biotechnology Applied Microbiology	1	0.431
Chemistry	1	0.431
Energy Fuels	1	0.431
Geriatrics Gerontology	1	0.431
Government Law	1	0.431
Agriculture	1	0.431
Anthropology	1	0.431
Total	232	100

Table 4 shows the frequency distribution of research areas related to RI. The distribution of Reverse innovation (RI) research reveals its multidisciplinary nature, with most studies focused on Business and Economics (52.16%), highlighting its role in market strategies, economic growth, and global competition. Engineering (16.38%) and public health (16.38%) also contribute significantly, reflecting the importance of technology and healthcare in innovation. Other notable fields include science and technology (9.91%), environmental sciences (6.90%), and operations research (3.88%), which demonstrate the impact of RI on sustainability and operational

efficiency. Smaller contributions come from medicine, social sciences, and public administration (1.7%–3.5%), showing a growing focus on societal and policy issues. The most cited works are mainly in Business and Economics, including influential studies by Govindarajan and Ramamurti (2011), Zeschky et al. (2014), and Haden-gue et al. (2017). Empirical research, such as that by Malodia et al. (2020) and Giannetti and Rubera (2020), examines the drivers, outcomes, and moderating factors that influence innovation success and market diffusion. Recent studies, such as those by Tsai et al. (2022) and Ma and Xu (2023), have advanced the field by examining knowledge sharing, strategic frameworks, and contingency-based approaches to effective RI adoption.

Table 5. Research categories for ‘reverse innovation’

Research Categories	Record Count	%
Management	72	31.034
Business	43	18.534
Public Environmental Occupational Health	22	9.482
Industrial Engineering	16	6.897
Green Sustainable Science Technology	15	6.465
Environmental Sciences	15	6.465
Economics	11	4.741
Operations Research and Management Science	9	3.879
Environmental Studies	8	3.448
Engineering Environmental	7	3.017
Engineering Multidisciplinary	7	3.017
Health Care Sciences Services	7	3.017
Total	232	100

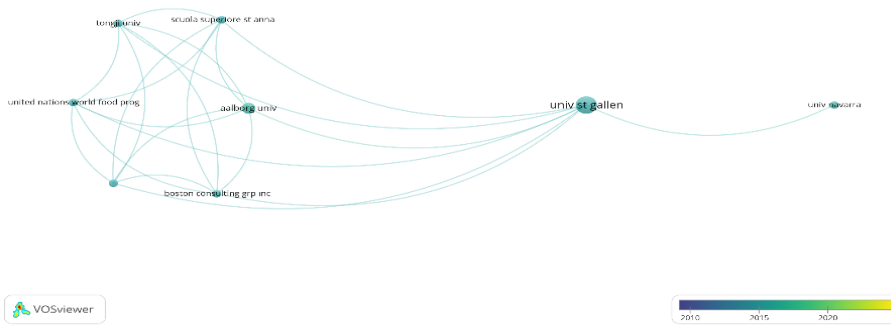
Table 5 categorizes research on RI across various academic disciplines, highlighting its multidisciplinary nature with a focus on management, business, and public health. The management category leads with 72 publications (31.03%), emphasizing the importance of organizational strategies, leadership, and innovation management in the adoption and spread of RI. Business (43 publications, 18.53%) follows closely, emphasizing market strategies, global competition, and entrepreneurial approaches to RI. The table shows that RI is studied not only in the management and business fields but also extends into environmental, engineering, healthcare, and economic disciplines. The top articles in management are also those with the highest number of citations, authored by Govindarajan and Ramamurti (2011), DePasse and Lee (2013), Zeschky et al. (2014), Von Zedtwitz et al. (2015), and Huang and Li (2019). Additionally, the following articles have received a higher number of citations: Winter and Govindarajan (2015) discussed engineering RIs and proposed principles for creating impactful products for emerging markets, while Le Bas (2016) explored three emerging innovation types — namely, RI, FI, and sustainable innovation (SI) — by defining and examining their roles.

Table 6. Sustainable development goals for ‘reverse innovation’

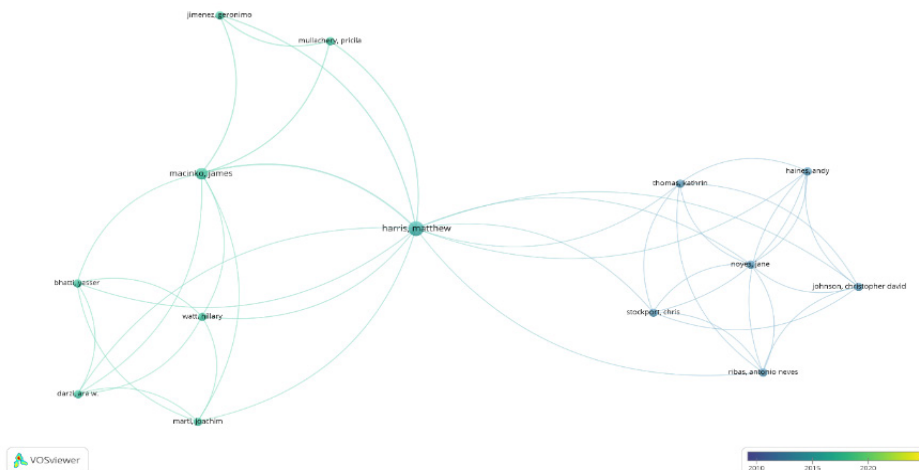
Sustainable Development Goals	Record Count	%
09 Industry Innovation and Infrastructure	125	53.879
03 Good Health and Well-being	51	21.983
17 Partnerships for the Goals	12	5.172
05 Gender Equality	11	4.741
13 Climate Action	6	2.586
10 Reduced Inequality	5	2.155
11 Sustainable Cities and Communities	5	2.155
07 Affordable and Clean Energy	4	1.724
01 No Poverty	3	1.293
04 Quality Education	2	0.862
08 Decent Work and Economic Growth	2	0.862
12 Responsible Consumption and Production	2	0.862
14 Life Below Water	2	0.862
02 Zero Hunger	1	0.431
15 Life on Land	1	0.431
Total	232	100

As shown in Table 6, RI aligns with the United Nations SDGs, mainly emphasizing SDG 9 (Industry, Innovation, and Infrastructure), with 125 publications (53.88%). This suggests that RI is primarily studied in the fields of technological progress, industrial transformation, and infrastructure development, underscoring its role in driving economic growth and enhancing global competitiveness in emerging markets. The second most cited SDG is Good Health and Well-being (SDG 3), with 51 publications (21.98%). It emphasizes RI’s leadership in healthcare through the development of affordable medical technologies and increased access to care for underserved populations.

Von Zedtwitz et al. (2015) conceptualized reverse innovation (RI) as a multidimensional process influenced by international collaboration, sustainability, and changing consumer expectations, rather than a one-way flow of innovation. Shan and Khan (2016) described that Firoz et al. (2017) analyzed the adaptation of innovations from outside advanced economies, identifying key success and failure factors. Rowthorn et al. (2016) emphasized that transferring healthcare innovations from low-resource to high-income settings requires addressing policy and regulatory barriers. Skopec et al. (2019) demonstrated that RI enables cost-effective, scalable healthcare solutions through bidirectional knowledge exchange. Zhou et al. (2020) examined early pregnancy termination services in LMICs, identifying adaptable models that improve efficiency and access in developed systems. Collectively, these studies highlight that realizing RI’s full potential in global healthcare requires removing perceptual and structural barriers, promoting two-way learning, and enhancing knowledge transfer to improve quality, reduce costs, and optimize resource use.

Figure 2. Organizations ‘reverse innovation’

In the method phase, co-authorship was selected as the approach. This method is used to analyze academic studies and collaborations between different institutions. Organizations were chosen for the analysis. This indicates that the focus is on collaboration between institutions rather than individual authors. Studies exceeding a specific co-authorship limit can be excluded. The minimum number of articles an institution must have and the minimum number of citations it must receive were established. The thresholds for minimum document count and citations were set to zero, meaning all organizations were included without restrictions. As shown in Figure 2, the “University of St. Gallen” is at the center. Other nodes represent various universities, international organizations, and companies. The connections between these organizations reveal the knowledge transfer pathways of RI.

Figure 3. Authors for ‘reverse innovation’

Harris (2013) examined community health workers as a key part of RI to show their roles in bridging communication gaps, identifying needs, and providing basic health promotion in primary care. Harris et al. (2015) conducted interviews with experts in innovation, social and health policy, leadership, and international policy. They found that innovations from low-income countries were often dismissed early due to assumptions of irrelevance or inferiority. Harris et al. (2016) interviewed professionals across several fields to explore RI in the U.S., revealing that while the term engaged policy-makers, it could be seen as inferior and harm its credibility in higher-resource settings. Harris et al. (2020) prepared a commentary for globalization and health's reverse innovation series in 2012 to review the topic critically, reflect on key insights, and suggest future directions for empirical research, business model development, process improvements, and theoretical advancements in RI.

The analysis in Figure 4 focused on examining collaborations between organizations to see how RI was evolving in terms of academic partnerships across different countries. It aimed to identify which universities, companies, or research centers were more active in these nations by mapping the connections between institutions. The USA is the largest hub, while Germany, France, China, and the UK have strong interactions.

Figure 4. Countries where the 'reverse innovation' is studied the most



Borini et al. (2016a) highlighted the importance of trust, cooperation, and knowledge sharing in reverse knowledge transfer and organizational learning. Borini et al. (2016b) found that RI was connected to integration, headquarters support, and autonomy, as well as strategic alignment between headquarters and subsidiaries, in a study of 167 Brazilian companies. Borini et al. (2022) examined the roles of organizational ambidexterity and innovation in supporting reverse knowledge transfer (RKT) across 289 MNE subsidiaries, noting that innovation improved subsidiary transfers, while ambidexterity promoted knowledge creation. Jiménez-Jiménez et al. (2019) studied the relationship between RKT and innovation at the headquarters of a Spanish multinational corporation. They identified a positive relationship when organizational distance was larger, and the knowledge transferred

was tacit. They also observed that the absorptive capacity of headquarters and coordination mechanisms aided RKT.

Huang and Li (2019) noted that patents granted for technologies from emerging markets, such as China, indicate both commercial viability and technological potential, thereby reducing information asymmetries between countries. This effect is more significant in complex technological fields and in institutions with underdeveloped market intermediaries. Their findings were supported by difference-in-differences analyses of 4,226 China-U.S. patent dyads and showed that patent grants helped facilitate technological adoption in developed economies. Su et al. (2021) examined the impact of political ties and internationalization on the competence contributions of headquarters and the extent of RI transfer in subsidiaries of Chinese MNEs. They observed that higher internationalization strengthened the entrepreneurial role of headquarters and promoted the transfer of RI, but strong political ties hindered internationalization and subsidiary development. Hou and Li (2023) indicated that RI patents increased company value by signaling capabilities, improving market performance, and raising the market valuation of Chinese public companies in developed economies.

5. DISCUSSION

The bibliometric analysis of RI shows a sharp increase in academic interest since 2010, peaking between 2017 and 2020. This growth reflects RI's relevance in addressing market inequalities and promoting innovation in resource-limited settings. A decline after 2021 may indicate shifting academic priorities or saturation; however, continued interest in 2023–2024 suggests that RI is still developing with new technologies and strategies. Leading research is carried out by top universities in North America, Europe, China, and Brazil. The prominence of institutions such as Harvard University, Johns Hopkins University, and Imperial College London suggests that highly ranked research centers are at the forefront of their respective fields. The inclusion of public health-focused institutions highlights the application of RI in healthcare, reinforcing its role in adopting cost-effective medical technologies in developed countries. Furthermore, the involvement of business schools and technology-focused universities reflects a multidisciplinary approach where management, organization, engineering, and public health intersect in shaping perspectives on RI.

Bibliometric analysis reveals a significant increase in research on Reverse Innovation (RI) after 2010, with a peak between 2017 and 2020, highlighting its global recognition and relevance in resource-limited settings. The slight decrease in publications after 2021 suggests a shift in focus or saturation in specific areas; however, ongoing studies in 2023–2024 indicate an adaptation to new technologies and business models. Leading institutions, such as Harvard, Johns Hopkins, and Imperial College London, have played a pioneering role, particularly in applying RI to affordable healthcare technologies. Additionally, collaborations among universities, international organizations, and companies emphasize the importance of knowledge transfer between developed and developing economies, providing valuable insights for future research on policy, technology, and innovation models.

6. IMPLICATIONS

The findings indicate that RI has garnered significant academic attention, particularly since 2010, with a notable increase in publications and citations between 2017 and 2020. Although a decline is observed after 2021, recent publications suggest that interest in the topic persists. Imperial College London and Harvard University are among the most influential institutions, while contributions from universities in Brazil and China highlight global research interest. Many studies are published in social sciences and science indexes, with a special focus on Business and Economics, as well as related fields in Engineering and Public Health. Co-authorship and institutional collaboration analyses confirm that the University of St. Gallen and researchers like Matthew Harris play central roles in the academic network. Country-level collaborations indicate that the USA is the most active country, with strong ties to European and Chinese institutions. These findings suggest that RI is a multidisciplinary area with growing research interest, especially in business strategy, technological advances, and policymaking. At the same time, collaborations between researchers and institutions continue to influence its development.

An analysis of annual RI publications in WoS and Scopus exhibits an apparent rise in research since 2010, with a sharp rise between 2017 and 2020, reaching the peak in publication volume on both platforms. Although a slight decline is observed after 2021, academic interest in RI remains strong in 2023 and 2024, indicating the growing significance of the topic in the academic literature over the past decade. Similarly, an analysis of contributing institutions reveals the strong presence of many of the world's leading universities and research centers, which are actively involved in RI research. Imperial College London leads with 14 publications, making up 6.034% of the total, closely followed by Harvard University with 13 publications (5.603%). Other key contributors include Johns Hopkins University (7 publications), Dartmouth College (6 publications), and the University of St. Gallen (6 publications). While American and European institutions mainly drive research in this field, the participation of the University of São Paulo in Brazil, along with Tsinghua and Zhejiang Universities in China, shows that RI is also drawing global academic attention from developing economies.

Citation analyses conducted in WoS from 2010 to 2024 offer insights into how academic interest in RI has evolved. A steady increase in publications and citations was observed, starting in 2010, and reached a peak between 2017 and 2020. The decline in citations after 2020 may be attributed to topic saturation or a shift in research focus to other areas. The dip in 2024 is likely due to the year not being complete and limitations in data collection. When exploring the link between RI research and the United Nations SDGs, a strong connection is evident, especially with “Industry, Innovation and Infrastructure” (SDG 9). This area indicates that RI is extensively studied within the context of technological progress, industrial processes, and infrastructure development, with 125 publications, accounting for 53.88% of all. Additionally, there is a notable relationship with “Good Health and Well-being” (SDG 3), with 51 publications, representing 21.98% of the total, which highlights RI's

vital role in the health sector by aiding the development of affordable medical technologies and healthcare solutions. The weaker connections with other SDGs suggest that RI's potential in sustainability, education, and poverty reduction has yet to be fully explored.

Future studies may expand the scope of Reverse Innovation (RI) research by incorporating additional databases such as Scopus, Dimensions, and Google Scholar to provide broader bibliometric coverage and comparative analyses. Researchers are also encouraged to investigate the role of digital transformation technologies, including artificial intelligence, big data, and Industry 4.0 applications, in accelerating the diffusion and adoption of RI across global markets. In addition, further empirical studies focusing on developing economies may contribute to a deeper understanding of how cultural, institutional, and policy-related factors shape RI processes and innovation transfer mechanisms. Since the existing literature is primarily concentrated on business and healthcare contexts, future research may explore RI applications in areas such as education, environmental sustainability, agriculture, and public governance to diversify the field. Finally, comparative longitudinal and cross-country studies may provide deeper insights into how collaboration networks, knowledge transfer, and sustainable development goals influence the evolution of RI across different economic and industrial environments.

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A BIBLIOMETRIC REVIEW OF REVERSE INNOVATION: DISCIPLINARY EVOLUTION AND EMERGING RESEARCH FRONTIERS

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Reverse Innovation (RI) has emerged as a transformative concept that challenges the traditional unidirectional flow of innovation from developed to developing economies. Instead, RI emphasizes innovations that originate in emerging markets and subsequently diffuse to advanced economies, reshaping global innovation dynamics and multinational strategies. Since its introduction by Immelt et al. (2009), RI has evolved into a multidisciplinary research domain spanning business, management, engineering, healthcare, sustainability, and public policy. Given its increasing relevance in addressing global inequalities, technological adaptation, and sustainable development challenges, a systematic and comprehensive mapping of the field is necessary. This study aims to provide a bibliometric review of RI literature to examine its disciplinary evolution, intellectual structure, and emerging research frontiers.

The study analyzes 232 publications indexed in the Web of Science (WoS) database between 2010 and 2024. Using VOSviewer software, the research evaluates publication trends, citation patterns, influential authors and institutions, leading journals, collaboration networks, research areas, and conceptual clusters. Frequency analyses, co-authorship networks, and citation mapping techniques were employed to uncover structural relationships within the field. In addition, the study explores the alignment of RI research with the United Nations Sustainable Development Goals (SDGs), identifying thematic intersections with sustainability, healthcare innovation, industrial development, reverse logistics, and green supply chains.

The findings reveal a substantial increase in RI research after 2010, with publication and citation peaks occurring between 2017 and 2020. Although a slight decline is observed after 2021, the topic

continues to evolve, indicating a transition from an emerging to a more established research domain. Leading contributions originate primarily from institutions in the United States and Europe, such as Imperial College London, Harvard University, and Johns Hopkins University, while growing participation from emerging economies, including Brazil and China, reflects the global diffusion of RI scholarship. The most cited works are concentrated in business strategy, frugal innovation, health-care innovation, and global value chain research, demonstrating the field's multidisciplinary character.

The disciplinary distribution shows that RI research is predominantly situated within Business and Economics, followed by Engineering and Public Health. This indicates that RI is closely linked to global competitiveness, technological adaptation, and healthcare accessibility. The analysis of SDG alignment highlights strong connections with SDG 9 (Industry, Innovation and Infrastructure) and SDG 3 (Good Health and Well-being), confirming RI's strategic role in fostering inclusive industrial growth and affordable healthcare solutions. However, comparatively weaker links to SDGs related to education, poverty reduction, and environmental sustainability suggest underexplored research avenues and opportunities for future expansion.

Overall, this bibliometric review demonstrates that Reverse Innovation has developed into a dynamic and globally interconnected research field with increasing theoretical sophistication and practical relevance. The results contribute to the literature by clarifying the intellectual foundations, collaboration networks, and thematic evolution of RI. The study provides valuable insights for scholars seeking to identify emerging research gaps, as well as for policymakers and industry leaders aiming to leverage RI for sustainable development and global competitiveness. Future research should focus on integrating digital transformation, policy frameworks, and socio-cultural determinants into RI models to further expand its theoretical and practical impact.