

## Mapping Research Trends on Open Innovation Strategies in Multinational Collaboration

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### ABSTRACT

This bibliometric analysis study explores the evolving landscape of open innovation strategies within multinational collaborations over the last two decades. Utilizing data extracted from the Scopus database, this research maps out the thematic and collaborative networks to understand how open innovation has been integrated into different research areas and industries. Key themes such as knowledge management, technology transfer, and sustainable development were identified as closely linked to open innovation. The study also highlights significant geographic distributions, pinpointing the United States, China, and several European countries as central nodes in the global research network. These countries not only dominate the field in terms of publications but also in their roles in fostering international academic collaborations. The findings suggest that open innovation is a vibrant and integral part of modern business strategies and research, benefiting significantly from multinational and interdisciplinary collaborations. This study contributes to the literature by providing a comprehensive overview of the field's evolution, highlighting influential researchers and identifying emerging trends that could guide future research directions.

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## 1. INTRODUCTION

The concept of open innovation emphasizes the strategic use of external and internal ideas and paths to market as firms look to advance their technology and expand their markets [1]. This approach marks a significant shift from the traditional, closed innovation models that relied heavily on

internal research and development efforts. In today's highly interconnected and technologically advanced business environment, open innovation has emerged as a pivotal strategy for firms seeking sustained competitive advantage, especially in sectors characterized by rapid technological changes [2].

Multinational collaborations offer a fertile ground for the implementation of open innovation strategies, as they blend diverse resources, knowledge bases, and capabilities from various geographical and cultural backgrounds. These collaborations can drive more efficient and effective innovation processes by harnessing varied customer insights, technological expertise, and market knowledge [3]. The cross-border nature of these partnerships often necessitates novel approaches to collaboration and co-creation, further highlighting the relevance of open innovation in a global context [4].

Despite the growing recognition of open innovation's benefits, there remain considerable challenges in its implementation, particularly in the context of multinational collaboration. These challenges include managing intellectual property rights, aligning organizational cultures, and ensuring effective communication across diverse teams [5]. The complexity increases as firms must navigate different national innovation systems, regulatory landscapes, and competitive dynamics, which can significantly affect the success of open innovation strategies [6].

The research on open innovation in multinational settings has evolved over time, reflecting shifts in business practices and technological advancements. A bibliometric analysis provides a systematic method to map out the research trends and patterns in this domain, identifying the most influential studies, authors, and journals, and highlighting the evolution and trajectory of research themes [7]. Such an analysis can offer valuable insights into the critical aspects of open innovation that have garnered significant scholarly attention, and those that remain underexplored.

Despite the recognized importance of open innovation strategies in multinational collaborations, there is a lack of comprehensive synthesis of the research in this area. Many studies have explored various facets of open innovation, yet the overall landscape of how these strategies are implemented across borders remains fragmented. This gap in literature synthesis

hampers the ability of scholars and practitioners to fully understand the dynamics and outcomes of open innovation in multinational contexts. It also limits the development of robust frameworks that can guide effective strategy implementation and address the inherent challenges of these complex collaborations.

The objective of this study is to conduct a comprehensive bibliometric analysis to map the research trends on open innovation strategies in multinational collaborations. By identifying the key themes, evolutionary trajectories, and gaps in the literature, this analysis aims to provide a structured overview of the field. This will not only enhance our understanding of how open innovation has been integrated into multinational strategies but also serve as a foundation for future research to build upon, particularly in addressing the challenges and optimizing the outcomes of such collaborations.

## 2. LITERATURE REVIEW

### 2.1 Theoretical Foundations of Open Innovation

The concept of open innovation was first articulated by [8], who argued that companies could and should use external ideas as well as internal ideas, and internal and external paths to market, as the firms look to advance their technology. This approach contrasts with the traditional closed innovation paradigm, which suggests that companies should generate, develop, and commercialize their own ideas. As [9] note, open innovation is a more dynamic model as it allows for the flow of knowledge to move more freely across the organization's boundaries. This paradigm shift has been further explored by authors like [10], who identify three core processes of open innovation: outside-in, inside-out, and coupled processes, each facilitating different flows of knowledge and aiming to enhance a company's innovation potential.

## 2.2 *Open Innovation in Multinational Collaboration*

Multinational collaboration introduces complex dynamics into open innovation efforts. As [3] point out, leveraging external sources of knowledge becomes crucial when companies operate across diverse geographical and cultural landscapes. The literature suggests that multinational collaborations can enhance innovation capabilities by providing access to diverse pools of ideas, skills, and technologies [4], [6]. Furthermore, [11] discuss how multinational firms use open innovation to adapt to local market conditions and accelerate the development of new products and services. This adaptation is critical as firms must navigate varying consumer preferences, regulatory environments, and competitive pressures across different countries.

## 2.3 *Challenges of Open Innovation in Multinational Settings*

While the benefits of open innovation in multinational settings are well-documented, several challenges persist. One major issue is the management of intellectual property (IP) when innovation processes are spread across borders. As [5] explore, the difficulty lies in balancing the protection of IP rights with the need for openness and collaboration. Cultural differences and disparate organizational practices can also hinder effective collaboration. As [12] illustrate in their study on alliance capabilities, differing organizational cultures can impede knowledge sharing and integration, essential components of successful open innovation. Another significant challenge is the alignment of goals and strategies among diverse partners, which [13] notes as crucial for the success of any collaborative effort. Managing this alignment can be particularly complex when partners operate under different competitive

conditions and regulatory frameworks, as noted by [10].

## 2.4 *Technological Advancements and Open Innovation*

Technological advancements have also reshaped the landscape of open innovation in multinational collaborations. Digital technologies, such as big data analytics, artificial intelligence, and cloud computing, have created new opportunities for collecting and analyzing vast amounts of data, facilitating more profound insights and innovation [14]. As [15] discuss, these technologies enable real-time collaboration across borders, allowing multinational teams to work more effectively despite physical distance. Moreover, the rise of digital platforms has provided firms with new ways to engage with external stakeholders, including customers, researchers, and other businesses, further enhancing their innovation potential [16].

## 3. METHOD

This study employs a bibliometric analysis focusing solely on literature sourced from the Scopus database to explore trends and patterns in open innovation strategies within multinational collaborations. Bibliometric methods provide a quantitative approach to map the scientific field through various metrics such as citation analysis, co-citation analysis, and co-word analysis. To conduct this analysis, a detailed search was performed in Scopus using specific keywords including "open innovation," "multinational collaboration," and "cross-border innovation." Articles published between 2004 and 2024 were selected to ensure a comprehensive view of both the early foundations and recent advancements in the field. The dataset comprises publication year, citation counts, journal details, authorship, and keywords, which will be systematically analyzed to identify the most influential authors, works, and emerging trends.

## 4. RESULT AND DISCUSSION

### 4.1 Results

#### a. Document by Year

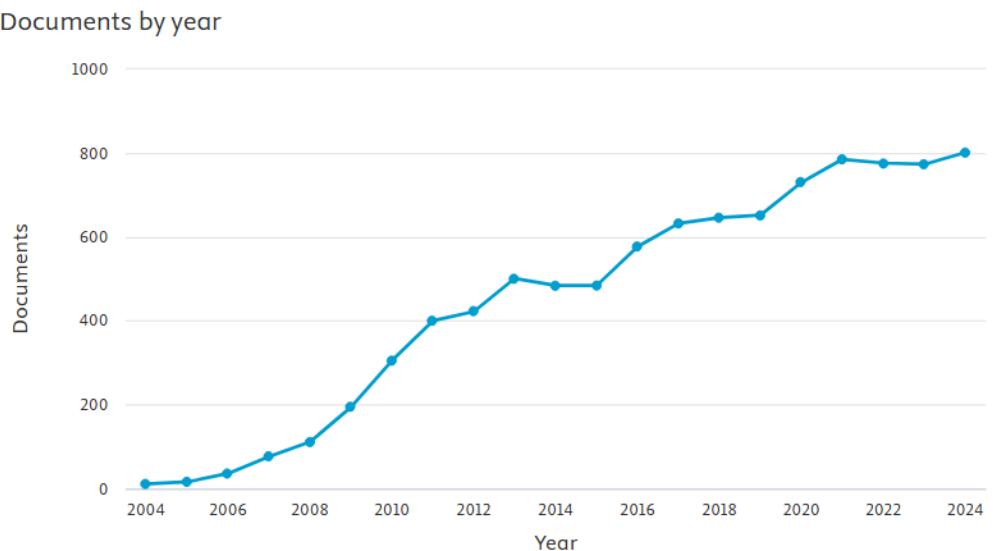


Figure 1. Documents by Year

Source: Scopus, 2025

The Figure 1 above illustrates a consistent upward trend in the number of documents published from 2004 to 2024. Starting from below 100 documents in 2004, there is a notable increase in publications each year, reaching around 200 by 2008. The growth in publications accelerates notably from 2008, reaching approximately 600 documents by 2016. After 2016, the curve continues to rise, though at a

somewhat steadier rate, peaking close to 800 documents by 2020. From 2020 to 2024, the trend shows a slight plateau, maintaining a level close to 800 publications per year. This pattern indicates sustained interest and ongoing research activity in the field over the two decades, with a particularly sharp increase in focus and output observed in the first 12 years depicted.

#### b. Document by Affiliation

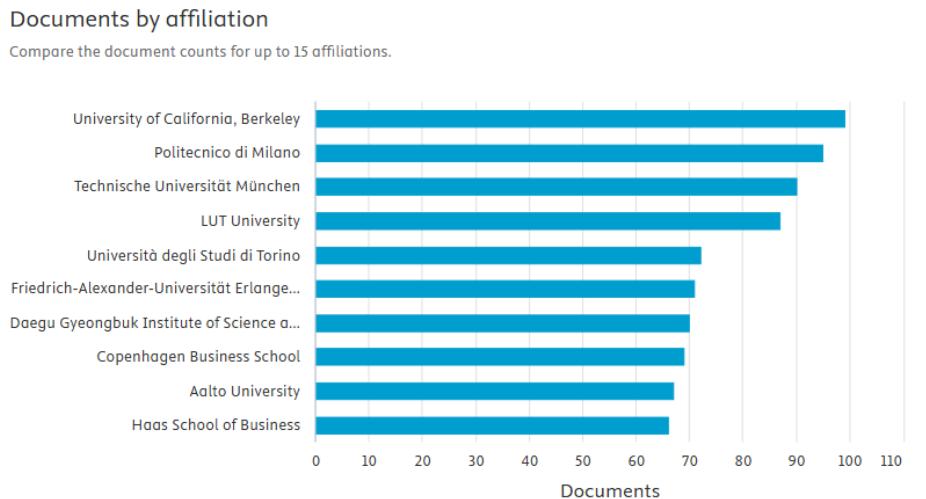


Figure 2. Documents by Documents

Source: Scopus, 2025

The figure displays the number of documents produced by different educational institutions. The University of California, Berkeley, leads with approximately 110 documents, closely followed by Politecnico di Milano and Technische Universität München, each with just slightly fewer contributions. LUT University, Università degli Studi di Torino, and Friedrich-Alexander-Universität Erlangen... (presumably Erlangen-Nürnberg), also show significant academic output, each

with around 50 to 75 documents. Lesser contributions, though still notable, come from Daegu Gyeongbuk Institute of Science and..., Copenhagen Business School, Aalto University, and the Haas School of Business, with each ranging roughly between 20 and 50 documents. This distribution indicates a robust engagement with the topic at hand from these institutions, with a marked dominance by UC Berkeley in this specific field of study.

### c. Co-Word Analysis

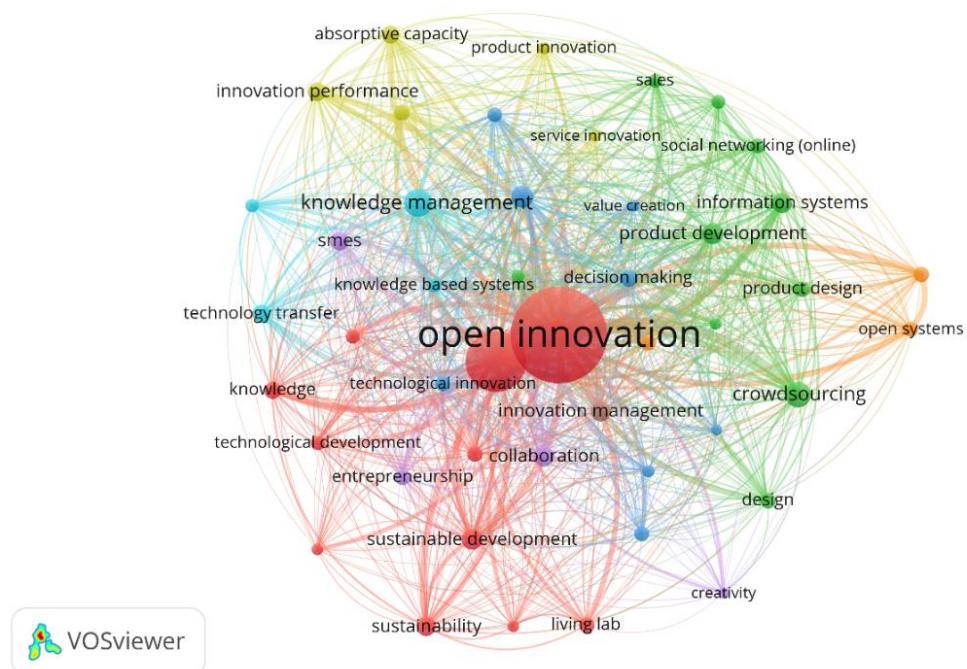


Figure 3. Network Visualization

Source: Data Analysis, 2025

The VOSviewer network visualization presented in the graph depicts the thematic landscape of research related to "open innovation." This graphical representation is created using co-word analysis, where nodes (dots) represent specific terms frequently used in the literature, and the links (lines) between nodes signify the strength of the relationship between these terms, indicating how often they are mentioned together in the literature.

The central, largest node, labeled "open innovation," highlights its pivotal role in the network, suggesting it is a highly central and frequently researched topic.

Around the central node, several other significant nodes and clusters can be seen, each color-coded to represent different thematic groups or related concepts. For instance, the nodes related to "technological innovation," "knowledge management," and "collaboration" are

closely linked to the central theme of open innovation, suggesting that these areas are frequently explored in conjunction with open innovation in research studies. These links imply an interdependence between open innovation processes and the management of knowledge and technology within organizational contexts. Another cluster of interest involves terms like "sustainability" and "sustainable development," which are connected yet slightly distinct from the core open innovation themes. This indicates an emerging trend in the literature where sustainability concerns are increasingly being integrated with open innovation strategies. This cluster's proximity to "entrepreneurship" and "living lab" suggests a practical application of open innovation in creating sustainable solutions within entrepreneurial ventures and real-world experimental settings.

The graph also shows nodes like "product development" and "crowdsourcing" on the periphery, linked to "open systems" and "design." These connections indicate specialized areas within open innovation research that focus on how open approaches to innovation can influence product design and development processes, often leveraging crowdsourcing as a tool to gather insights and ideas from a broad community. This illustrates how open innovation transcends traditional R&D boundaries, incorporating wider community involvement and external inputs to enhance innovation outcomes. This network visualization serves as a strategic tool for identifying key focus areas within the field of open innovation and understanding how various concepts interact within this research domain.

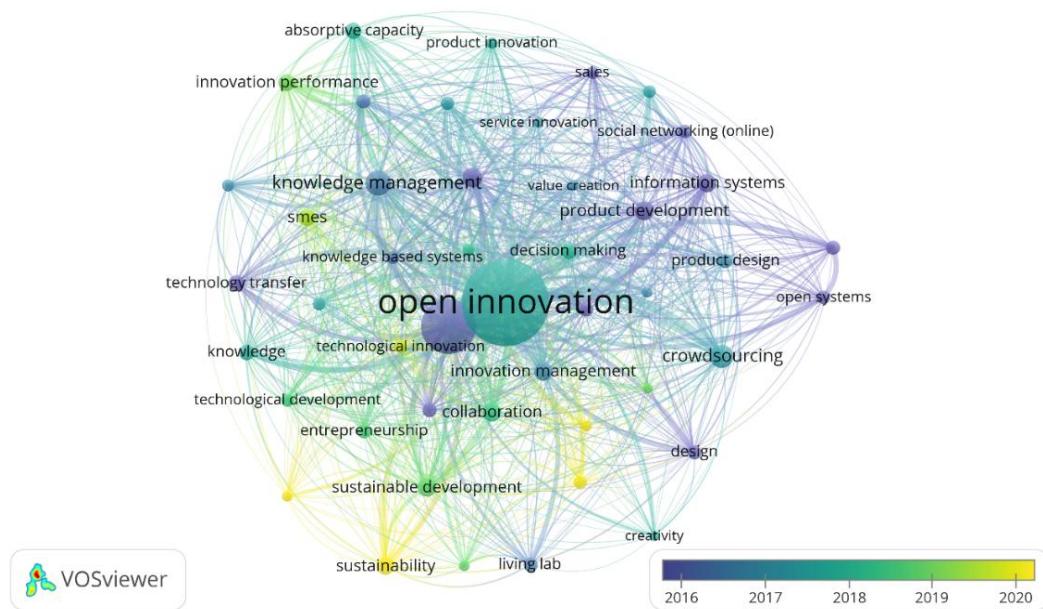


Figure 4. Overlay Visualization  
Source: Data Analysis, 2025

This VOSviewer network visualization illustrates the research landscape of "open innovation" over

time, as represented by various connected nodes and color-coded by years from 2016 to 2020. Each node

stands for a specific concept frequently associated with open innovation, while the links show the co-occurrence of these terms in academic literature. The temporal color gradient, shifting from yellow to blue, allows us to discern the focus of research themes over the observed years. Central themes such as "open innovation," prominently located at the center of the network, have remained consistently relevant through the years, evidenced by the deep green color indicating a blend of all the years' colors.

Around the central node, various clusters indicate thematic concentrations in research. For instance, "knowledge management," "technology transfer," and "technological development" form a cohesive cluster, colored mostly in green and yellow, suggesting these topics were especially prevalent from 2016 to 2018. Another interesting cluster is formed by "sustainability" and "sustainable development," which display a mix of colors leaning towards yellow, highlighting heightened attention around 2016

and gradually transitioning into other areas like "entrepreneurship" and "living lab" by 2020. These transitions might indicate an expanding scope of open innovation applications into more diverse and practical fields, integrating sustainability concerns.

Moreover, the presence of emerging or evolving themes can be observed in areas such as "crowdsourcing," "product design," and "open systems," predominantly highlighted in blue, indicating these topics have gained traction more recently, in 2019 and 2020. This shift towards the edges of the network, particularly with "product design" and "open systems," may suggest a diffusion of open innovation principles into more specialized domains such as design thinking and systems engineering. The evolution of these themes over time also reflects the dynamic nature of open innovation research but also underscores the expanding integration of open innovation concepts across different domains and industries, adapting to newer challenges and technologies.



Figure 5. Density Visualization

Source: Data Analysis, 2025

The VOSviewer visualization showcases a thematic mapping of key concepts associated with "open innovation" in the context of academic and research literature. The central placement of "open innovation" underscores its role as a core concept interconnected with a variety of other research themes, which are distributed around it, forming a cohesive network. The surrounding terms such as "knowledge management," "technology transfer," "sustainable development," and "entrepreneurship" suggest these are critical areas frequently discussed in conjunction with open innovation. The visualization uses a singular color, indicating a unified theme or focus area rather than temporal changes or thematic variations over time, highlighting the intrinsic relationships between open innovation and these diverse but related concepts.

Further exploring the layout, terms like "technological innovation," "collaboration," and "sustainability" are closely connected to the central node, indicating strong interdependencies in research discussions that explore how open innovation strategies can be applied to drive technology advancements, collaborative ventures, and sustainable practices. The positioning of "crowdsourcing" and "social networking (online)" towards the outer regions suggests emerging areas that are becoming increasingly relevant in the discourse on open innovation. This map illustrates the expansive and interconnected nature of open innovation research, demonstrating how it overlaps with and influences various domains and industries, driving new business models and transformative strategies in a connected world.

#### d. Co-Citation Analysis

Table 1. Most Cited Article

Citations	Author and Year	Title
5733	[17]	The Correlates of Entrepreneurship in Three Types of Firms
5621	[6]	Open for innovation: the role of openness in explaining innovation performance among U.K. manufacturing firms
2897	[18]	An Introduction to Varieties of Capitalism
1742	[19]	Building organizational culture that stimulates creativity and innovation
1343	[20]	Anaerobic Biotechnology for Industrial Wastewaters
1297	[21]	Why the Lean Start-Up Changes Everything
1257	[5]	Open Innovation and Strategy
1232	[22]	The renaissance of dye-sensitized solar cells
1107	[23]	Challenges of Open Innovation: The Paradox of Firm Investment in Open-Source Software
1083	[24]	Smart Cities and the Future Internet: Towards Cooperation Frameworks for Open Innovation

Source: Scopus, 2024

### e. Co-Authorship Analysis

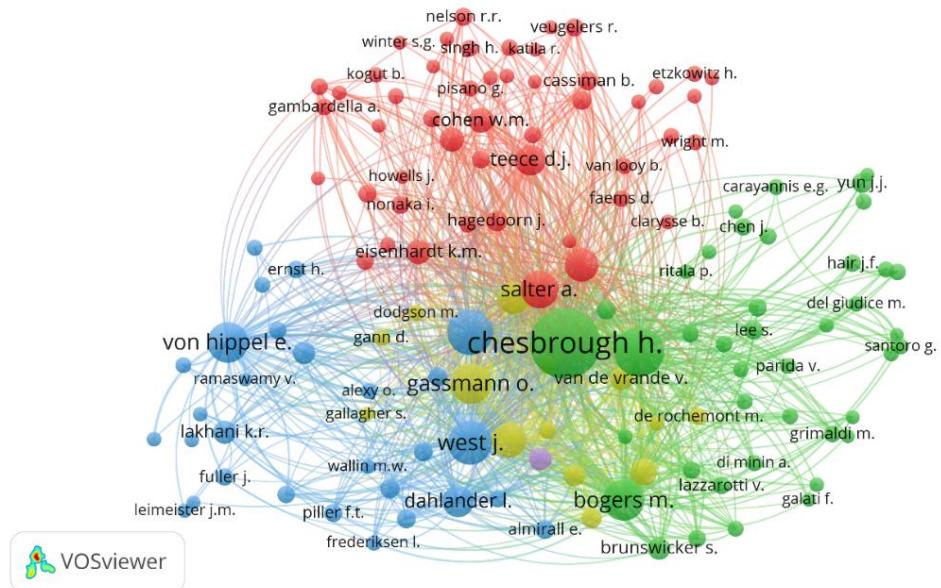


Figure 6. Author Visualization

Source: Data Analysis, 2025

The VOSviewer visualization above shows a co-authorship network of scholars in the field of open innovation. The nodes represent individual researchers, and their size indicates the relative volume of publications or influence in the field, while the lines signify collaborative relationships between them. The central and largest node, Henry Chesbrough, who is well recognized

as the progenitor of the open innovation concept, indicates his central role in the development and dissemination of this research area. Surrounding him, other prominent researchers like West J., Gassmann O., and Bogers M. are also highlighted, showing dense interconnections that suggest robust collaborations and significant contributions to the field.

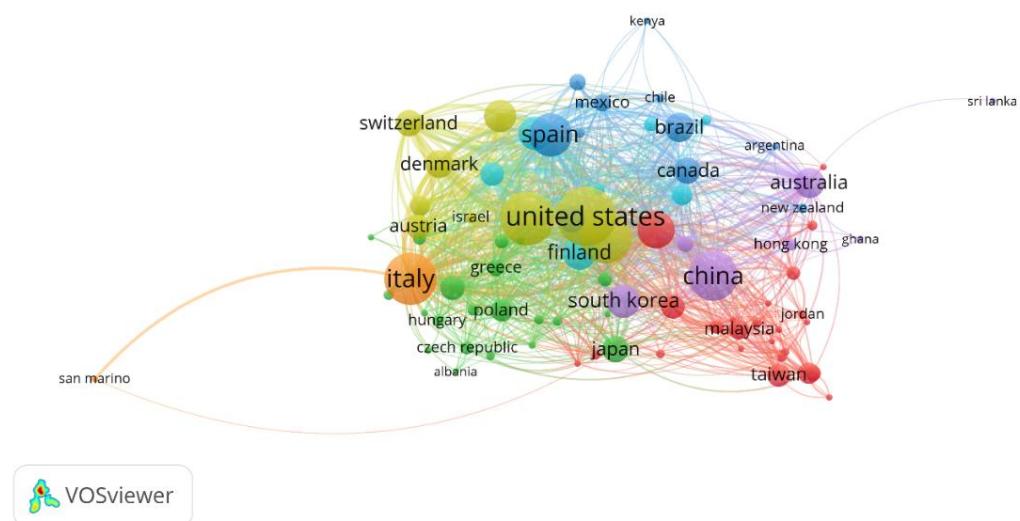


Figure 7. Country Visualization

Source: Data Analysis, 2025

This VOSviewer visualization presents a global co-authorship network, indicating the collaborative relationships between researchers across various countries based on their contributions to a particular academic field. The nodes represent different countries, with their size reflecting the volume of research output or number of collaborations, and the lines illustrate the connections between them, signifying joint research efforts. The United States, prominently positioned at the center with a large node, likely serves as a major hub in this network, indicating its significant role in international research collaborations. Surrounding the United States are other notably large nodes such as China, Germany, and the United Kingdom, suggesting these countries also have substantial contributions and collaborations in the field.

#### 4.2 Discussion

##### a. Synthesis of Findings

The bibliometric analysis conducted in this study has provided a comprehensive overview of the research trends on open innovation strategies in multinational collaborations. The findings have highlighted significant patterns, key contributors, and thematic evolutions that have shaped this field over the past two decades. Central to our discussion is the role of open innovation as a transformative approach in business and technology management, which facilitates the leveraging of external and internal knowledge across borders.

##### b. Evolving Research Themes

The thematic mapping through VOSviewer has indicated a dense interconnectivity between open innovation and various adjacent areas such as knowledge management, technology transfer, and sustainable development. This interconnectivity

suggests an interdisciplinary approach in the research community, focusing on how open innovation can be integrated with different organizational and technological processes to enhance innovation outcomes. Notably, the increasing linkage between open innovation and sustainability topics reflects a shift towards more responsible and sustainable business practices. This trend is indicative of the broader industry move towards sustainability, echoing global concerns about environmental and social impacts.

##### c. Geographic Distribution and Collaboration

The global co-authorship network has underscored the United States, China, and several European countries as pivotal nodes in the research on open innovation. These nations not only contribute significantly to the literature but also play a crucial role in forming international research collaborations. The extensive collaboration patterns suggest that knowledge on open innovation is highly disseminated and collaboratively developed, crossing national and continental boundaries. This global perspective is essential, as open innovation inherently benefits from diverse inputs and the integration of varied cultural and market insights, which multinational partnerships can uniquely provide.

##### d. Key Contributors and Intellectual Leadership

The visualization of co-authorship among researchers reveals that certain scholars, like Henry Chesbrough, have been central to the development of open innovation as a field of study. Their extensive networks suggest that these individuals are not just contributors but also intellectual leaders whose work has spawned further studies

and explorations into open innovation. The analysis of such networks helps in identifying potential experts and thought leaders whose insights can drive future research directions.

#### 4.3 Practical Implications

From a practical standpoint, the findings from this study have several implications for business leaders and policymakers. Understanding the trends and networks in open innovation can help organizations better strategize their R&D activities and collaboration efforts. Companies looking to adopt open innovation strategies can learn from the geographic and thematic insights provided, tailoring their approaches to leverage international collaborations and interdisciplinary research for enhanced innovation performance.

#### 4.4 Limitations and Future Research

While this study provides extensive insights into open innovation, it is not without limitations. The reliance on bibliometric data from Scopus may omit relevant publications not indexed within the database, potentially skewing the thematic and geographic analyses. Future research could expand to include more diverse databases or integrate qualitative data to provide deeper insights into the causal relationships and impacts of open innovation strategies. Furthermore, the field could benefit from more granular

studies focusing on specific industries or technologies, exploring how open innovation strategies can be optimized in different contexts. As new technologies such as artificial intelligence and the Internet of Things continue to evolve, their intersection with open innovation strategies presents a fruitful area for future research.

## 5. CONCLUSION

This study has mapped the landscape of open innovation research, identifying key themes, geographic distributions, and central figures in the field. The growth of open innovation literature, its interdisciplinary nature, and its global dissemination highlight the relevance and dynamism of this research area. As companies increasingly look towards open innovation as a strategy to remain competitive in a globalized market, understanding these trends and networks becomes crucial. The insights provided by this study not only contribute to academic knowledge but also offer practical guidance for implementing effective open innovation strategies in multinational settings. Moving forward, it will be important to continue tracking these trends as the global economic and technological landscapes evolve, ensuring that open innovation strategies remain robust and effective in fostering sustainable and collaborative growth.

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