

ORIGINAL

Knowledge transformation in policy innovation and sustainable development: a bibliometric analysis of collaborative governance

Transformación del conocimiento en la innovación política y el desarrollo sostenible: un análisis bibliométrico de la gobernanza colaborativa

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ABSTRACT

This study explores global research on collaborative governance through a bibliometric analysis of 604 Scopus-indexed articles published between 2015 and 2024. The objective is to identify dominant themes, research gaps, and directions for future inquiry in the field. Using theoretical perspectives on governance, cooperation, and evolutionary game theory, the analysis reveals digital transformation, emergency management, and environmental resource management as the most prominent themes, with frequently occurring keywords including cooperation, governance, and local government. Despite these advances, the role of local governments as key catalysts in collaborative governance remains underexplored, highlighting a critical gap in the literature. The findings underscore the importance of integrating digital technologies, enhancing cross-sector collaboration, and employing innovative analytical approaches to address complex societal challenges such as climate change, pandemics, and sustainable development. This research contributes originality by mapping knowledge transformation in the field, highlighting underexamined areas, and offering insights with both theoretical and practical relevance, providing valuable perspectives for scholars and practitioners and reinforcing collaborative governance as a strategic framework for policy innovation, sustainable development, and more adaptive governance systems at global and local levels.

Keywords: Collaborative Governance; Digital Transformation; Emergency Management; Environmental Resource; Bibliometric Analysis.

RESUMEN

Este estudio explora la investigación global sobre gobernanza colaborativa mediante un análisis bibliométrico de 604 artículos indexados en Scopus, publicados entre 2015 y 2024. El objetivo es identificar temas dominantes, lagunas de investigación y direcciones para futuras investigaciones en este campo. Utilizando perspectivas teóricas sobre gobernanza, cooperación y teoría de juegos evolutiva, el análisis revela la transformación digital, la gestión de emergencias y la gestión de recursos ambientales como los temas más destacados, con palabras clave frecuentes como cooperación, gobernanza y gobierno local. A pesar de estos avances, el papel de los gobiernos locales como catalizadores clave en la gobernanza colaborativa sigue sin explorarse, lo que pone de relieve una laguna crítica en la literatura. Los hallazgos subrayan la importancia de integrar las tecnologías digitales, mejorar la colaboración intersectorial y emplear enfoques analíticos innovadores para abordar desafíos sociales complejos como el cambio climático, las pandemias y el desarrollo sostenible. Esta investigación aporta originalidad al mapear la transformación del conocimiento en el campo, destacando áreas

poco examinadas y ofreciendo perspectivas con relevancia tanto teórica como práctica, brindando perspectivas valiosas para académicos y profesionales y reforzando la gobernanza colaborativa como un marco estratégico para la innovación de políticas, el desarrollo sostenible y sistemas de gobernanza más adaptativos a nivel global y local.

Palabras clave: Gobernanza Colaborativa; Transformación Digital; Gestión de Emergencias; Recursos Ambientales; Análisis Bibliométrico.

INTRODUCTION

Collaborative governance has become a crucial approach in addressing the growing complexity of public issues, involving actors from the public, private, and civil sectors in consensus-based decision-making.⁽¹⁾ This approach aims to formulate more inclusive and effective public policies while managing public resources more efficiently. While collaborative governance is widely accepted, a deeper understanding of the fundamental principles and theories underpinning it is essential for grasping its mechanisms.⁽²⁾

A foundational theoretical framework is the Ansell & Gash Collaborative Governance Model⁽³⁾, which highlights the role of trust, shared understanding, and iterative decision-making in ensuring the success of cross-sector collaboration. Collaborative governance denotes a governance framework in which one or more public institutions actively involve non-state stakeholders in formal, consensus-driven, and deliberative collective decision-making processes designed to formulate or execute public policies or manage public programs or assets. According to Ansell and Gash, effective collaboration depends on the willingness of stakeholders to engage in continuous dialogue, establish common ground, and maintain mutual trust throughout the governance process. This model is particularly relevant to our discussion, as it underscores the necessity of building strong relationships between diverse actors to address the complex issues of governance.

Another pivotal theory is Ostrom's Polycentric Governance framework⁽⁴⁾, which stresses the importance of multiple, overlapping centers of authority at different levels of governance. Ostrom's work is particularly relevant in the context of local governance, where different actors—including governments, communities, and non-governmental organizations—collaborate to address both global and local challenges. Polycentric governance provides insight into the dynamics of decentralized decision-making, which is vital for fostering adaptive and responsive governance systems. The integration of these diverse levels of authority enhances the effectiveness of collaborative governance in solving issues such as climate change, pandemics, and sustainable development.

By grounding collaborative governance in these theoretical models, this study aims to provide a deeper understanding of how collaborative frameworks can be employed to tackle complex societal challenges. These theories offer a lens through which we can better explore the evolution of collaborative governance and its potential for fostering more inclusive, adaptive, and sustainable public policies. This study employs a bibliometric analysis approach to explore research trends in collaborative governance, analyzing 604 Scopus-indexed articles published between 2015 and 2024. The primary aim of this study is to map dominant themes, identify research gaps, and provide insights for future research directions in this field. This bibliometric analysis seeks to uncover the transformation of knowledge in collaborative governance, thereby making a substantial contribution to the development of more adaptive and effective public policies.

Significant advancements in the study of collaborative governance have been shown by earlier bibliometric analyses, both in relation to developing countries and the accomplishment of the Sustainable Development Goals (SDGs). The research conducted by Mutia et al.⁽¹⁾ examined collaborative governance strategies in underdeveloped countries. Their analysis of 4 472 papers from the Scopus database spanning 2010-2022, utilizing bibliometric approaches, demonstrated that collaborative governance is essential for enhancing governance, especially within the health sector and sustainable development. This collaborative strategy has arisen as a tactical instrument to tackle the issues encountered by developing countries, including resource constraints and the necessity for sustainability across several sectors. According to research by Hilman et al.⁽²⁾, there has been an increase in the amount of literature on this subject, particularly after 2010, with an emphasis on urban development and crisis management in relation to the COVID-19 epidemic. Their analysis of 201 publications emphasized the value of cooperative governance in tackling environmental change. Based on 172 documents from 1998 to 2022, Rahayu⁽⁵⁾ discovered trends in collaborative governance research aimed at achieving social development within the SDG framework. Their analysis found a significant increase in publications in 2021 that focused on sustainable development and governance strategies.

However, none of these studies provide a comprehensive exploration of the role of local governments as key actors in the implementation of collaborative governance. While they address governance issues broadly, they fail to examine how local governments—key players in resource management, public service provision, and

regional development—are involved in these strategies. This gap is significant because local governments play a critical role in achieving SDGs at the grassroots level. Additionally, the bibliometric methods employed in these studies primarily focus not only publication trends and citation analysis, but also keyword co-occurrence and thematic clustering to identify how local governments are involved in sustainable development and resource management. This specific lens, combined with the detailed examination of local governance strategies, differentiates our study from the previous works reviewed. Thus, our study aims to address this gap by offering a targeted bibliometric analysis focused specifically on the role of local governments in collaborative governance across multiple sectors, with a particular emphasis on sustainable development and resource management.

METHOD

Study Design

This study utilizes bibliometric and content analysis to provide a comprehensive understanding of global publishing patterns in collaborative governance and identify research gaps in the field. The bibliometric analysis specifically includes both performance analysis and science mapping. Performance analysis, which includes productivity and citation analysis, quantitatively assesses the impact and scholarly attention of research papers, authors, and journals in the field of collaborative governance. Science mapping techniques, including co-word analysis and co-occurrence mapping, were employed to explore the relationships between research themes, identify emerging topics, and map the development of the field. Citation analysis evaluates the influence of specific papers and authors, while co-occurrence mapping identifies key research areas based on authors' keywords. These combined methods provide an objective, data-driven view of the research landscape, minimizing researcher bias and offering a clearer depiction of trends and future research directions.⁽⁶⁾

The research adheres to the methodology established by Zupic & Čater⁽⁷⁾, commencing with a literature survey on the subject and creating inquiries to be examined by bibliometric analysis. Content analysis was utilized to enhance the bibliometric approach by offering a deeper understanding of the thematic contexts and key concerns in collaborative governance research. Through thematic analysis, we systematically identified and analyzed the dominant research themes within the collaborative governance literature. This process involved categorizing key topics, such as the role of local governments, sustainable development, and crisis management, to uncover trends and shifts in the research focus over time. The content analysis allowed us to not only quantify the occurrence of specific themes but also explore their underlying contexts and interrelationships.

Data Collection

The Scopus database was employed on September 2024, to obtain papers pertinent to collaborative governance research. Scopus was selected for its status as the largest and most extensive database of academic literature, encompassing STEM fields, social sciences, and the arts.⁽⁸⁾ Numerous prior research had employed Scopus for bibliometric analysis.⁽⁹⁾ The data collection focused on the key terms "Collaborative Governance" and "Public Administration." To ensure a comprehensive set of relevant results, Boolean operators (AND, OR) were employed, incorporating synonyms of the keywords to capture a broader spectrum of related studies. The following search string was used:

TITLE ("collaborative governance") AND TITLE ("public administration" OR "public sector" OR "government").

The use of the TITLE field ensures that the search is limited to articles where these key terms appear in the title, thereby increasing the precision and relevance of the results by prioritizing studies that explicitly focus on the core concepts of the research.

The search was confined to papers published within the past decade (2015-2024). This period was selected primarily to capture the most recent and relevant literature, crucial for analyzing the current state of the art in collaborative governance, ensuring both timeliness and manageability.⁽¹⁰⁾ Contextual factors, such as the role of AI in enhancing inter-organizational collaboration through improved data management and transparency, contribute to more effective responses to complex societal challenges. AI also fosters better policy solutions by facilitating collaboration between government, academia, and the private sector, as demonstrated in the UK.⁽¹¹⁾ Additionally, global challenges like climate change have driven international governance efforts, notably the Paris Agreement of 2015,⁽¹²⁾ which further underscores the significance of this period. This study exclusively included journal articles published in English, as peer-reviewed journal articles are deemed more reputable than other publishing formats.⁽¹³⁾

After obtaining data from Scopus, 1 097 documents were obtained. The data was subsequently filtered according to the following criteria: publications between 2015 and 2024, the inclusion of the terms "Public Administration" or "Collaborative Governance," and a restriction on the document category to articles as seen in figure 1. The eligibility criteria for analysis were satisfied by 604 records, as 493 documents were excluded during the data extraction procedure. The keywords were subsequently refined by harmonizing terms with identical meanings but varying forms, orthography, grammatical variations (singular or plural), or abbreviations. The VOSviewer application's thesaurus feature was employed to expedite the data cleansing process.

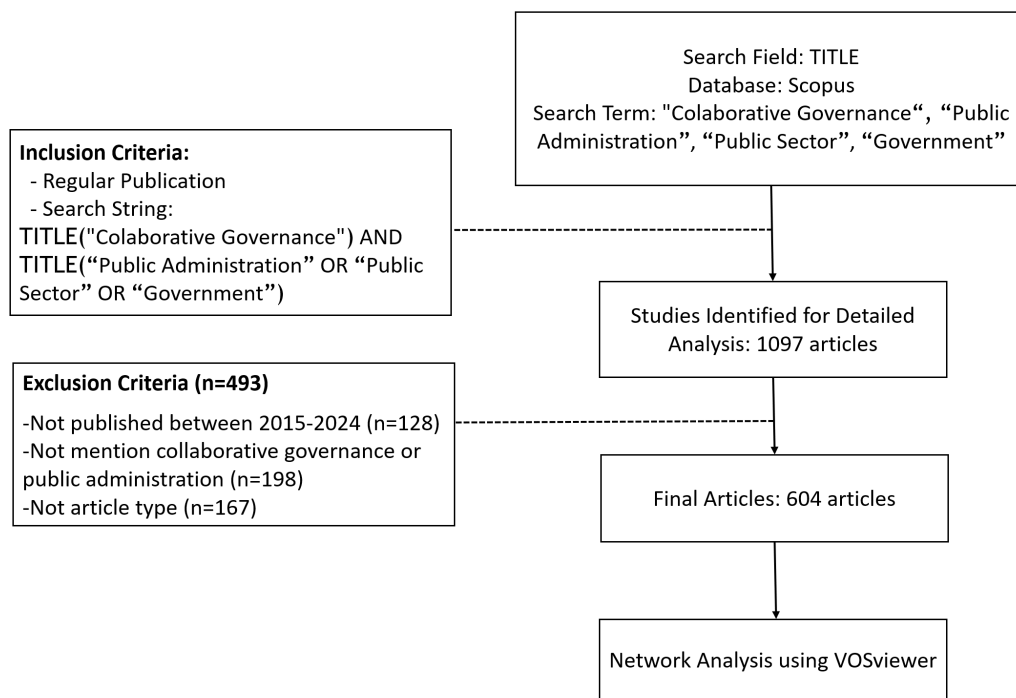


Figure 1. The Stages of Data Extraction

Data Analysis

The data analysis in this study uses a mixed-methods approach that combines bibliometric analysis and content analysis to provide a comprehensive understanding of collaborative governance research trends. The VOSviewer software was used to produce primary network type which is co-occurrence analysis based on author keywords. This was chosen to examine the relationships between the most frequently occurring terms within the literature, providing insights into the key themes and research topics in collaborative governance. To ensure consistency, this study applied association strength normalization using the Linlog method to ensure balanced clustering, which reduces the effect of high-frequency terms and enhances the clarity of the analysis. For the mapping technique, the co-occurrence threshold was set at five, and unassociated keywords, along with nation or area names, were excluded. This resulted in a final dataset of 93 keywords, with 33 keywords appearing at least five times. Four keyword clusters were identified, each comprising a minimum of six terms. This clustering method enabled us to reveal thematic groups within the research landscape, providing a clear depiction of the dominant trends and areas of focus in collaborative governance.

In this study, content analysis was conducted alongside bibliometric methods to deepen the understanding of the thematic contexts and key concerns in the field of collaborative governance. The unit of analysis in the content analysis was the full text of the articles included in the study, specifically focusing on the results and conclusion of each article. These sections were selected because they typically present the core research objectives, theoretical frameworks, and key findings, which are essential for identifying the dominant themes and research gaps. Subsequently, we employed an inductive coding approach as we reviewed the full texts of the articles, allowing new, emerging codes to naturally develop from the data. This flexible method enabled us to identify novel topics and unexplored areas within the field, revealing insights that were not directly guided by pre-existing theories, thus providing a more comprehensive understanding of the evolving landscape of collaborative governance. For example, themes around emergency management emerged as critical areas of interest. To ensure coding reliability, two independent researchers coded a sample of articles, and their coding results were subsequently compared. Any discrepancies that emerged during this process were thoroughly discussed, and consensus was reached through collaborative dialogue. Moreover, the bibliometric analysis provided quantitative insights into dominant research trends and keyword relationships, while the content analysis allowed for a deeper qualitative understanding of the themes and theoretical contexts behind these trends.⁽¹⁴⁾ The integration of these two methods allowed us to cross-validate the findings and provide a comprehensive answer to the research question.

RESULTS

The data indicates a steady growth trend in research publications on collaborative governance since 2018, with a notable rise observed in the years 2023 to 2024. The total citation count (TC) exhibits fluctuations, with earlier publications from 2019 and 2016 demonstrating a significantly higher citation impact than more recent works. This indicates that earlier studies generally exert a stronger influence, whereas more recent

publications have not had adequate time to gather citations, resulting in citation lag.

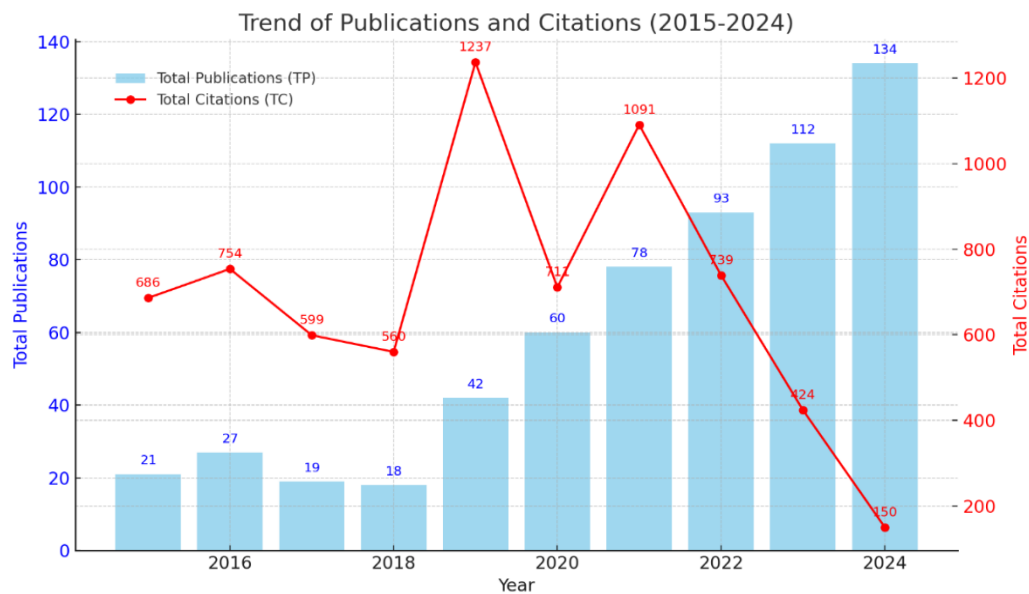


Figure 2. The Trend of Citation and Publication in Collaborative Governance

The Most Influential And Productive Authors

Table 1. The Top Ten Productive Authors in Collaborative Governance

Author Name	Affiliation	Country	TP	Rank
Torfig, J.	Roskilde Universitet	Denmark	6	1
Warsono, H.	Universitas Diponegoro	Indonesia	5	2
Ran, B.	Penn State Harrisburg	United States	4	3
Wu, L.	Jiangnan University	China	4	4
Ansell, C.	University of California	United States	3	5
Hui, I.	Stanford University	United States	3	6
Lee, H.	University of Cincinnati	United States	3	7
Liu, Y.	Syracuse University	United States	3	8
Sørensen, E.	Roskilde Universitet	Denmark	3	9
Wu, J.	Shanghai Jiao Tong University	China	3	10

Note: TP=Total Publications.

Table 2. The Top Ten Influential Authors in Collaborative Governance

Author Name	Affiliation	Country	TC	Rank
Frantzeskaki, N.	Universiteit Utrecht	Netherlands	420	1
Torfig, J.	Roskilde Universitet	Denmark	230	2
Ansell, C.	University of California	United States	117	3
Fliervoet, J.M.	Van Hall-Larenstein University of Applied Sciences	Netherlands	111	4
Sullivan, A.	Boston University	United States	97	5
Lambin, E.F.	Stanford University	United States	86	6
Amsler, L.B.	Indiana University	United States	78	7
Wu, J.	Shanghai Jiao Tong University	China	71	8
Li, H.	School of Economics and Management	China	67	9
Yi, H.	Florida State University	United States	65	10

Note: TC=Total Citations.

The analysis indicates a non-linear relationship between productivity and research impact within

collaborative governance (table 1). J. Torfing has the highest number of publications ⁽⁶⁾ and a substantial impact with 230 citations, whereas N. Frantzeskaki, although less prolific, achieves the greatest impact with 420 citations. Researchers from the United States, Denmark, the Netherlands, and China are predominant in this field, underscoring the significance of cross-national collaboration. The findings suggest that the quality and relevance of research are often more significant in determining its impact than the quantity of publications (table 2).

The Most Influential Articles

The most cited articles in collaborative governance research pertain to global solutions, interdisciplinary approaches, and practical significance (table 3). ⁽¹⁵⁾ work, which has garnered 411 citations, underscores the importance of nature-based solutions in urban design. ^(16,17) illustrate the evolution of concepts and analytical instruments through their exploration of innovative methodologies and the notion of co-creation. Journals focused on environmental and public policy dominate, underscoring the ongoing significance and extensive impact of global issues such as sustainability, health, and case-based governance within academic discourse.

Table 3. The Ten Most Cited Papers

No	Author	Title	Pub. Year	Source Title	Cited
1	Frantzeskaki ⁽¹⁵⁾	Seven lessons for planning nature-based solutions in cities	2019	Environmental Science and Policy	411
2	Fliervoet et al. ⁽¹⁷⁾	Analyzing Collaborative Governance Through Social Network Analysis: A Case Study of River Management Along the Waal River in The Netherlands	2016	Environmental Management	101
3	Ansell & Torfing ⁽¹⁶⁾	Co-creation: the new kid on the block in public governance	2021	Policy and Politics	99
4	Heilmayr & Lambin ⁽¹⁸⁾	Impacts of nonstate, market-driven governance on Chilean forests	2016	Proceedings of the National Academy of Sciences of the United States of America	84
5	Amsler ⁽¹⁹⁾	Collaborative Governance: Integrating Management, Politics, and Law	2016	Public Administration Review	74
6	Sullivan et al. ⁽²⁰⁾	Designing collaborative governance: Insights from the drought contingency planning process for the lower Colorado River basin	2019	Environmental Science and Policy	72
7	Li et al. ⁽²¹⁾	Routes and clustering features of PM2.5 spillover within the Jing-Jin-Ji region at multiple timescales identified using complex network-based methods	2019	Journal of Cleaner Production	53
8	Emerson ⁽²²⁾	Collaborative governance of public health in low- and middle-income countries: Lessons from research in public administration	2018	BMJ Global Health	50
9	Jing & Hu ⁽²³⁾	From Service Contracting to Collaborative Governance: Evolution of Government-Nonprofit Relations	2017	Public Administration and Development	46
10	Chen & Lee ⁽²⁴⁾	Collaborative data networks for public service: governance, management, and performance	2018	Public Management Review	43

The Leading Journal In Collaborative Governance Publications

The graph delineates the difference between the total number of publications (TP) and their influence as measured by total citations (TC) among the leading 10 journals in collaborative governance (figure 3). Journals like Sustainability Switzerland exhibit the highest publication count (30) although possess a comparatively lesser impact (236 citations). Conversely, journals such as Public Management Review (13 publications, 513 citations) and Environmental Science and Policy (6 publications, 493 citations) have significant influence through a high citation-per-publication ratio, indicating the relevance and quality of the published works. Other journals, including the Journal of Cleaner Production and Land Use Policy, are notable for their high citation counts despite a lower volume of publications.

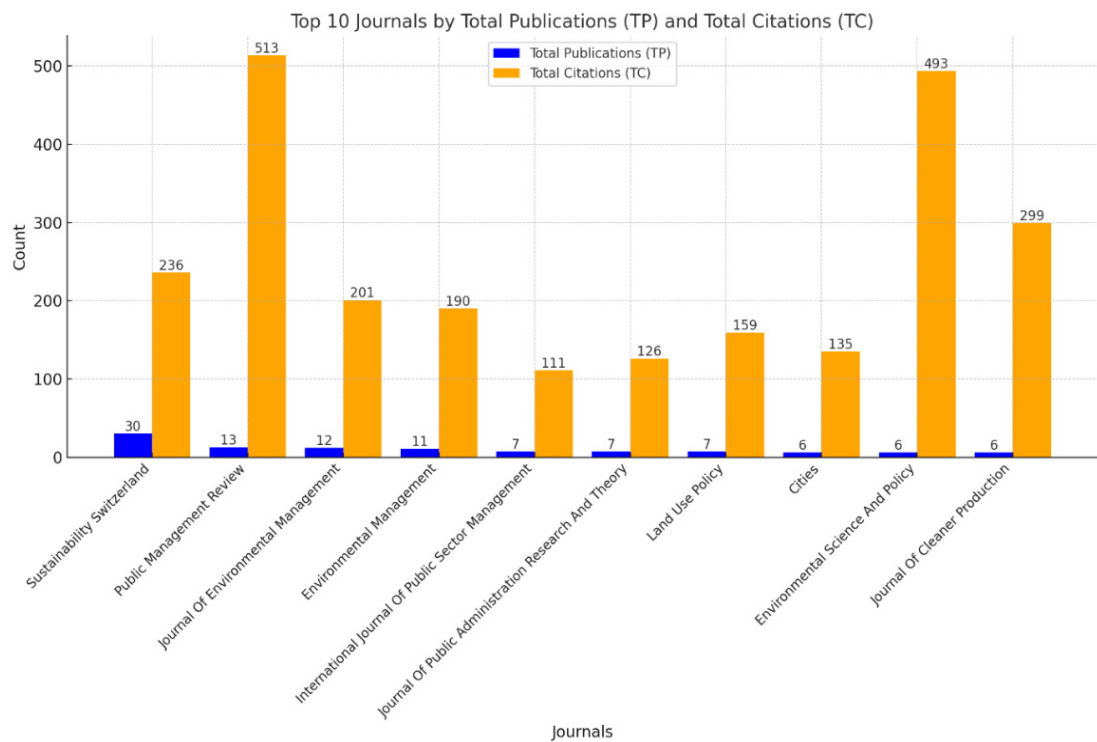


Figure 3. The Top Ten Journals From 2015 to 2024

Top Ten Contributing Institutions

The graph illustrates the contributions of the leading 10 institutions in collaborative governance research, measured by total publications (TP) and total citations (TC) as seen in figure 4. Roskilde Universitet has the highest number of publications (12) and a substantial impact with 303 citations, followed by Tsinghua University with 9 publications and 228 citations, reflecting good research quality. Fudan University and Shanghai Jiao Tong University significantly contribute with 116 and 200 citations, respectively, despite a lower number of articles. Conversely, entities like Peking University and the Ministry of Education of the People's Republic of China exhibit a commendable volume of publications but diminished citation impacts, with 49 and 44 citations, respectively.

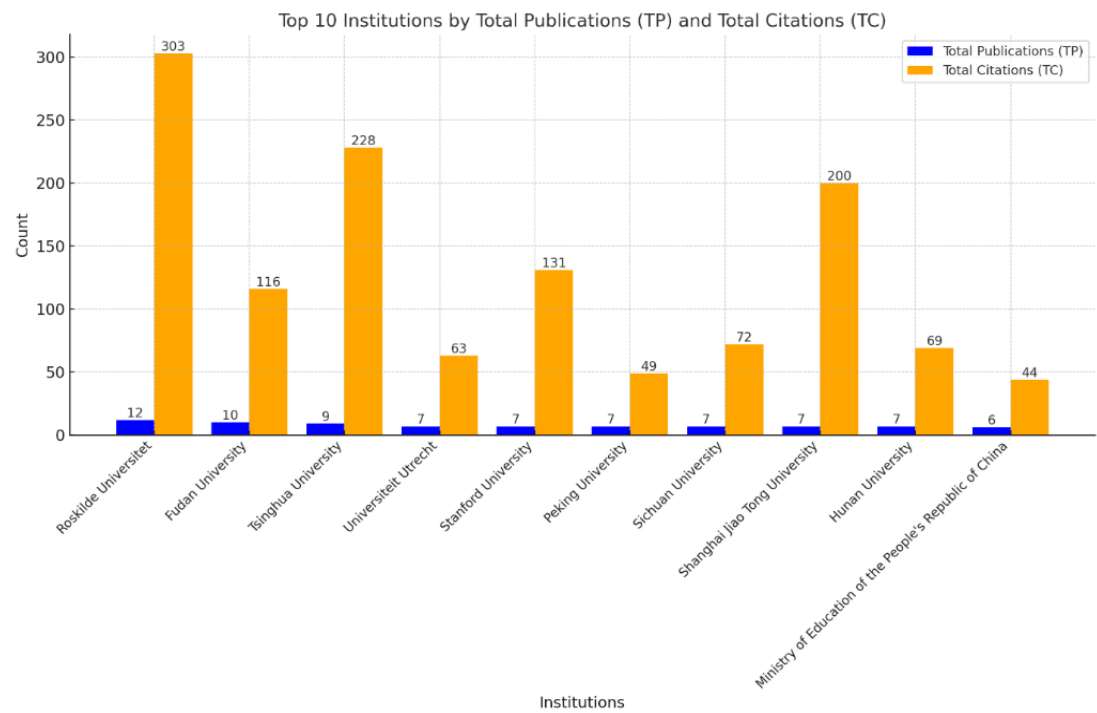


Figure 4. The Top Ten Institutions From 2015 to 2024

Top Ten Contributing Countries

China and the United States lead in collaborative governance research, both in the volume of publications and their citation impact, underscoring their substantial global contributions and influence (table 4). European nations, such as the United Kingdom and the Netherlands, exhibit a strong focus on high-quality research, despite producing a relatively lower number of publications. Conversely, Indonesia shows commendable progress in publication output but requires further efforts to enhance its global scholarly impact. Countries such as Australia, Canada, and others display a balanced contribution to the field, with significant potential to expand their academic influence in the future.

Table 4. The Top Ten Contributing Countries to Collaborative Governance					
Country	TP	Rank	Country	TC	Rank
China	221	1	China	1998	1
United States	110	2	United States	1540	2
Indonesia	50	3	United Kingdom	778	3
United Kingdom	35	4	Netherlands	750	4
Australia	33	5	Canada	399	5
Canada	32	6	Australia	337	6
Netherlands	25	7	South Korea	301	7
South Korea	22	8	Italy	205	8
Italy	19	9	Indonesia	90	9
Sweden	18	10	Sweden	85	10

Note: TP = Total Publications; TC = Total Citations.

The Most Frequent Keywords In Collaborative Governance Publications

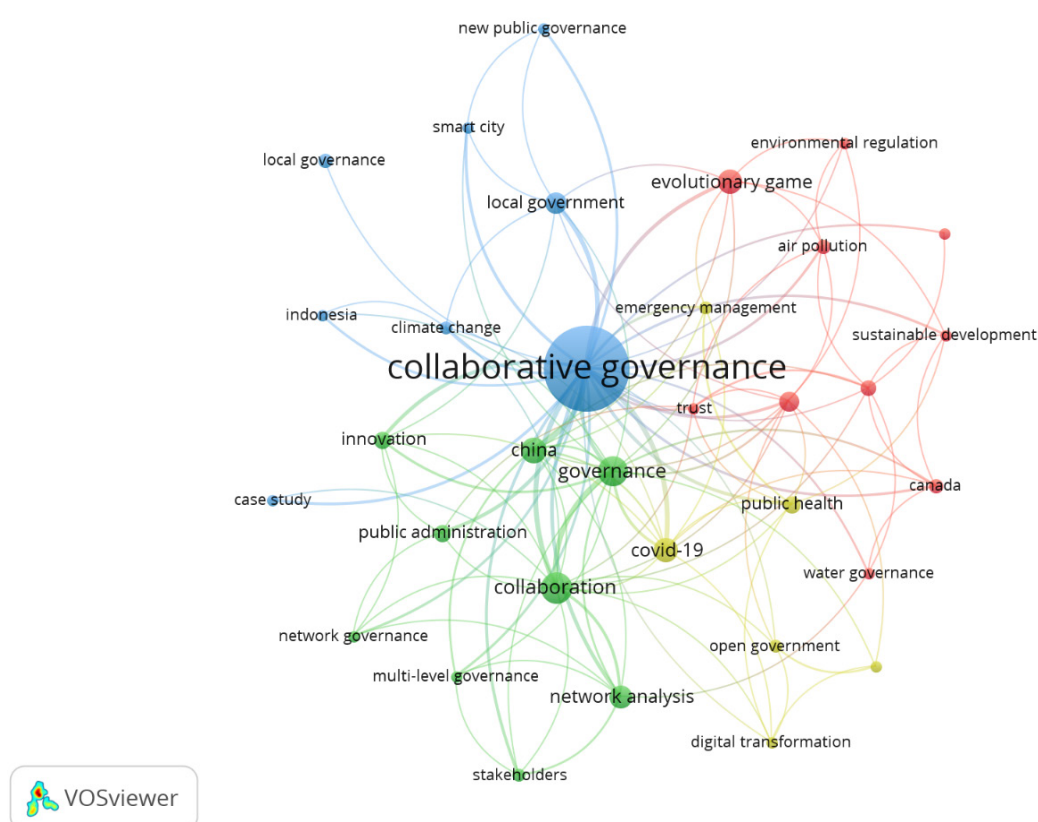


Figure 5. Thematic Cluster of Collaborative Governance Publication

Keywords denote the subjects of articles, core concepts, or significant themes within a particular research domain.⁽²⁵⁾ Following data cleaning, a total of 1 906 keywords were identified. Keywords with a co-occurrence

frequency of less than five and those with synonymous meanings were excluded, yielding 33 mappable keywords, as illustrated in figures 5 and figure 6. Circles (nodes) denote specific keywords or topics, where the circle size indicates the frequency of co-occurrence, and the link size represents the strength of the network. Figure 5 presents the ten keywords exhibiting the highest co-occurrence frequencies: collaborative governance (249), collaboration (36), governance (33), China (24), COVID-19 (21), evolutionary game (20), network analysis (19), local government (17), participation (14), and public administration (11). The keywords are organized into distinct themes or clusters according to their interrelations. Figure 5 presents four clusters of collaborative governance publications, denoted by red, green, blue, and yellow dashed circles, which represent distinct thematic areas within the research.

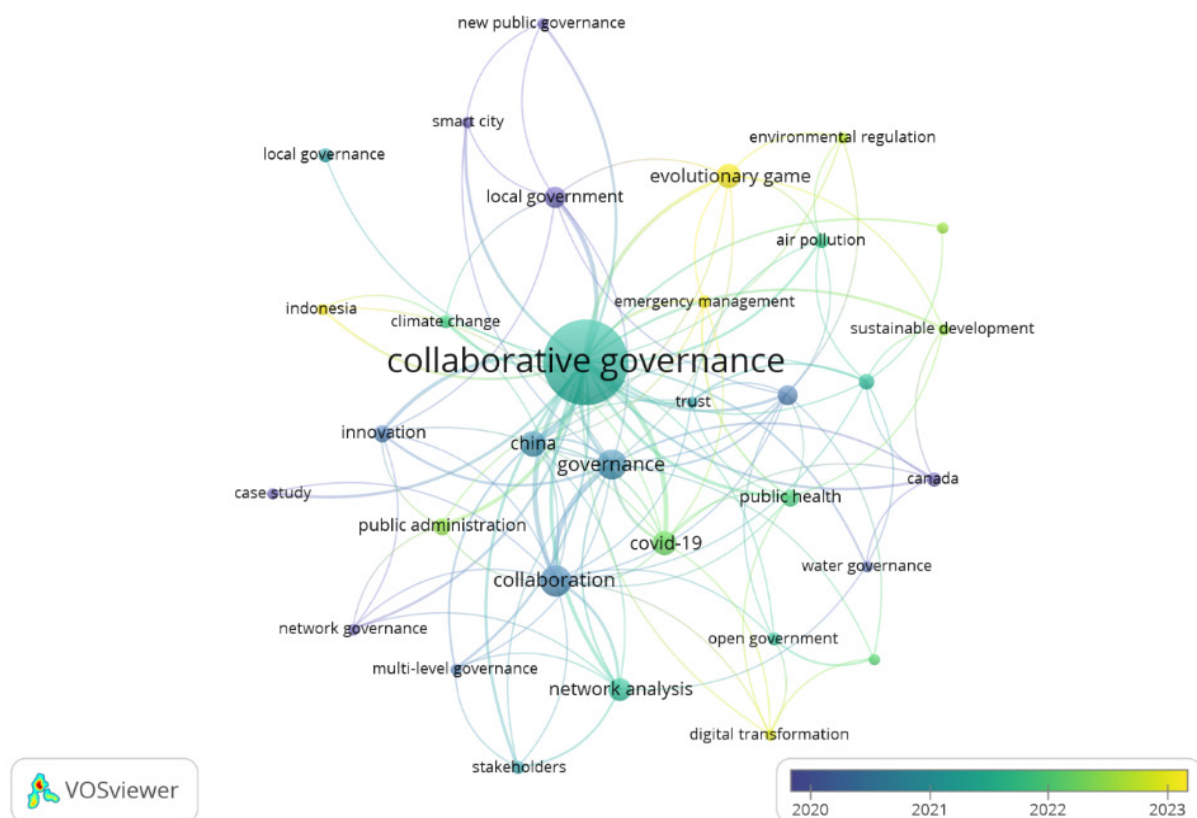


Figure 6. The Overlay Visualization in Collaborative Governance Publication

DISCUSSION

Publication Trends in Collaborative Governance

The bibliometric trend analysis demonstrates a continuous increase in publications on collaborative governance over the last decade, with a notable surge after 2019. This acceleration reflects the growing scholarly attention to governance challenges amid crises such as the COVID-19 pandemic and the parallel advancement of digital technologies. This surge can be attributed to multiple factors, including the disarray prompted by the COVID-19 pandemic and the concurrent integration of digital technologies into governance processes. The health crisis has catalyzed a shift in scholarly focus toward collaborative governance as an essential element in addressing complex societal challenges.

Research has shown that collaborative governance is instrumental in managing crises effectively. For instance, Amir et al.⁽²⁶⁾ highlighted the role of collaborative governance in managing COVID-19 in Makassar, revealing that effective public health responses necessitate inclusive stakeholder engagement, which is a core tenet of collaborative governance. This perspective is echoed by studies suggesting that such governance frameworks facilitate open communication and resource sharing, which are critical for successful disaster management.^(27,28) Moreover, the empirical analysis by Guo and Li emphasizes that collaborative dynamics can significantly improve performance in community safety governance during crises, underscoring the practicality of collaborative frameworks in addressing emergent challenges.⁽²⁹⁾

J. Torfing is the most productive author with six publications, but N. Frantzeskaki has the highest impact with 420 citations, indicating that research quality and relevance are more crucial than quantity. Frantzeskaki's

most cited paper, “Seven lessons for planning nature-based solutions in cities,” identifies critical insights for effectively integrating nature-based solutions (NbS) into urban planning.⁽¹⁵⁾ Frantzeskaki outlines seven key lessons for integrating NbS into urban planning. NbS should be contextualized to the social, cultural, and ecological characteristics of each city, involve active stakeholder participation, and remain flexible to adapt to dynamic urban environments and challenges such as climate change, biodiversity loss, and social cohesion. Evidence-based approaches and cross-sectoral integration are essential for effective implementation. Ensuring financial sustainability is also critical, while continuous monitoring and the sharing of best practices support long-term learning and adaptation.⁽³⁰⁾ Thus, this study provides an essential framework for urban planners and policymakers seeking to leverage nature-based solutions effectively within their cities. It underscores the multidisciplinary and collaborative nature of urban governance necessary for addressing contemporary urban challenges through NbS.

The trend in collaborative governance research reveals a significant geographical bias, predominantly stemming from the outputs of China and the United States. This concentration emphasizes certain paradigmatic theories closely aligned with the policy frameworks of these countries while overshadowing diverse perspectives critical for addressing local governance challenges in other regions, particularly in the Global South. Many researchers have highlighted the importance of diversifying the sources of collaborative governance insights to enrich the field’s understanding of governance practices globally.⁽³¹⁾

Consequently, the progress of collaborative governance research could greatly benefit from the active inclusion of methodologies and perspectives originating from underrepresented countries. Such endeavors not only stand to enhance theoretical robustness but also have the potential to lead to more equitable governance frameworks that reflect and respond to community needs across different geopolitical contexts.⁽³²⁾ Scholars further suggest that greater academic collaboration across borders might stimulate the emergence of novel governance strategies more representative of the global consensus on sustainable and participatory governance practices.⁽³³⁾

Journals specializing in environmental and public policy dominate the field, underscoring the centrality of global issues such as sustainability and public health in contemporary academic discourse. Outlets such as *Environmental Science and Policy* & *Public Management Review* demonstrate substantial influence, reflected in their high citation-per-publication ratios, which signal both the quality and the enduring relevance of the scholarship they publish. Among the most cited works is Frantzeskaki’s article in *Environmental Science and Policy* on nature-based solutions in urban design,⁽¹⁵⁾ which highlights not only the importance of addressing global challenges but also the value of interdisciplinary approaches and the practical significance of research in advancing effective governance solutions.

Thematic Cluster In Collaborative Governance Publication

Cluster 1 (red), themed “Participatory Environmental Governance, Sustainability, and Evolutionary Game Dynamics,” explores how evolutionary game theory can be employed to understand the dynamic interactions among stakeholders in environmental governance. This approach aids in mapping adaptive strategies that evolve based on participation, trust, and incentives, thereby enabling collaboration among governments, communities, and the private sector in addressing environmental challenges. In the context of air pollution, the Evolutionary Game model illustrates the dynamics among corporations, the public, and governments in resolving conflicts and fostering sustainable cooperation.⁽³⁴⁾ By placing sustainability as the primary objective, the Evolutionary Game approach provides insights into how sustained participation can be established while overcoming institutional barriers in achieving the SDGs.⁽³⁵⁾

Cluster 2 (Green): The theme of “Collaboration and Network Analysis in Multi-Level Governance” highlights the importance of cross-sectoral cooperation and the involvement of various stakeholders to enhance the effectiveness of public governance. Using network-based approaches, such as network analysis and governance, the relationships among actors within governance systems can be mapped and managed more efficiently. Network analysis provides insights into how information, power, and resources are exchanged among stakeholders and how these relationships can be optimized to improve accountability and governance effectiveness.⁽³⁶⁾ Additionally, collaboration between the public and private sectors, combined with the use of network analysis, strengthens multi-level governance. By mapping the flow of information and power connecting different stakeholders, network analysis enables more efficient collaboration and better policy integration.⁽³⁷⁾

Cluster 3 (Blue): The theme of “Collaborative Governance and the Role of Local Governments in Addressing Global and Local Challenges” emphasizes the critical role of collaboration in enhancing the effectiveness of local governments in managing complex and multidimensional issues. It underlines the importance of engaging local actors in creating inclusive and adaptive solutions to rapidly changing circumstances.⁽³⁸⁾ Local governments act as the front line in implementing collaborative governance practices, involving various stakeholders—such as communities, private sectors, and nongovernmental organizations in decisionmaking and policy implementation processes. Through multistakeholder collaboration, local governments can address increasingly complex

environmental challenges while ensuring that implemented policies are relevant to the local context. This form of collaboration builds local capacity to respond to global changes and strengthens the legitimacy and effectiveness of policies at the regional level.⁽³⁹⁾

Cluster 4 (Yellow): The theme of "Government Collaboration in Addressing Global Health Crises through Technology, Transparency, and Emergency Management" examines how governmental and non-governmental sectors work together to tackle global health crises, such as the COVID-19 pandemic, by utilizing technology, transparency, and emergency management. Through technology, governments can enhance communication and coordination among various institutions and provide clear and accurate information to the public. Transparency in decision-making strengthens public trust, while collaborative approaches in emergency management enable stakeholders to design and implement more effective solutions to pandemics.⁽⁴⁰⁾ Effective collaboration relies heavily on the application of technology and structured emergency management to accelerate decision-making and strengthen inter-stakeholder cooperation.⁽⁴¹⁾

One of the key findings from this analysis is the importance of the role of local governments in collaborative governance, a topic that has often been underexplored in the existing literature. While there has been progress in areas like digital transformation and emergency management, the contribution of local governments as key actors in implementing collaborative governance is often overlooked. This analysis reveals that local governments play a central role in managing environmental issues, health crises, and sustainable development challenges, yet much of the literature tends to focus on national or international levels. In Cluster 3, which examines the role of local governments in addressing global and local challenges, we found that while local governments are actively involved in collaborative policymaking, their role in shaping adaptive and innovative policies remains underexplored. Additionally, in Cluster 4, which highlights government collaboration in global health crises, we discovered that digital technology plays a crucial role in enhancing the capacity of local governments for knowledge transformation and policy innovation, improving inter-sectoral coordination and decision-making transparency, and driving innovation in delivering public services that are more responsive to local community needs.

The evolution of topics in collaborative governance, as shown in figure 6, reflects a shift in research focus in response to global challenges and technological advancements. Initially, research focused on sustainability and environmental governance, but it has since shifted toward digital transformation, which now dominates discussions in collaborative governance. While technology offers great potential for efficiency and coordination, challenges such as the digital divide still hinder equitable access. Since 2022, the focus has further shifted toward emergency management, particularly following the COVID-19 health crisis, highlighting the importance of cross-sector collaboration in managing global crises. Additionally, evolutionary game theory has increasingly been used to model collaboration dynamics between various actors, both in environmental governance and disaster management.^(34,42) Overall, this shift demonstrates how collaboration, technology, and adaptive strategies are increasingly central to collaborative governance research, though challenges related to equitable access to technology and inclusive stakeholder engagement remain key obstacles.

Future Research Trends

Bibliometric analysis on collaborative governance identifies several key trends for future research development. First, environmental issues, such as environmental governance, air pollution, and water governance, have become significant focal points, with factors like trust and participation playing crucial roles. This indicates a need for further research on participatory approaches to address environmental challenges, including applying evolutionary game theory concepts. Second, collaboration and network aspects (collaboration and network governance) continue to garner attention, particularly in countries like China, where network analysis is employed to strengthen multi-level governance. Future studies may delve deeper into innovations and stakeholder roles in public administration to achieve sustainable development goals. Third, collaborative governance remains relevant in local contexts, including local governance and case studies, offering opportunities to explore the integration of new public governance concepts and smart city initiatives in response to climate change. Fourth, the relevance of collaborative governance is increasingly evident in emergency contexts, such as the COVID-19 pandemic, emergency management, and digital transformation. This opens pathways for further research on open government and open data utilization to enhance the effectiveness of public responses. Future research is expected to integrate findings from these clusters to realize more inclusive and adaptive collaborative governance capable of addressing global challenges.

CONCLUSION

This study provides a comprehensive overview of the development and research trends in collaborative governance globally during the period 2015-2024. Based on bibliometric analysis of 604 articles, it was found that collaborative governance continues to evolve as a strategic approach to addressing various global challenges, particularly in the contexts of public administration, sustainable development, and responses to global crises.

The study also identifies significant research gaps, especially concerning the role of local governments and the utilization of digital technology in collaborative governance.

The findings reveal four main thematic clusters: participatory environmental governance, collaboration and network analysis in multi-level governance, the role of local governments in addressing global and local challenges, and cross-sector collaboration in emergency management. These clusters demonstrate that collaborative governance serves not only as a tool for enhancing policy efficiency but also as a framework to foster participation and trust among government actors, communities, and the private sector.

Recent publication trends indicate a significant increase, particularly in issues such as digital transformation, evolutionary game theory, and emergency management. However, citation lag suggests that more recent studies take longer to achieve significant citation impact. The study also notes that contributions from developing countries, including Indonesia, are still dominated by publication quantity rather than global impact.

This research makes a significant contribution to strengthening the theoretical and practical foundations of collaborative governance through strategic recommendations for future research. These include the development of technology integration in public governance, enhanced participation of local communities, and strengthened cross-sector collaboration in addressing multidimensional challenges. Future research is expected to fill existing gaps, support the implementation of more effective policies, and foster more inclusive and adaptive collaborative governance to address both global and local challenges.

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