

The research landscape of bureaucracy and sustainable development: A bibliometric analysis

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Abstract

Bureaucracy plays an important role in translating sustainable development goals into policies and administrative practices, yet its contribution to sustainability remains fragmented in the academic literature. This study aims to examine the development, thematic evolution, and collaboration patterns of research on bureaucracy and sustainable development. A bibliometric analysis was conducted using publications indexed in Scopus and analyzed with the Bibliometrix package in R. The analysis examined publication trends, authors, institutions, countries, keywords, thematic structures, and collaboration networks. The findings show a steady increase in scholarly publications, particularly following the adoption of the United Nations 2030 Agenda and the Paris Agreement. Bureaucracy emerges as a conceptually central but relatively underdeveloped theme compared with environmental policy, environmental protection, and climate change. Keyword trends also indicate a shift from governance and policy integration toward bureaucratic reform, digital transformation, innovation, and adaptive governance. Collaboration networks remain fragmented, while international research is largely concentrated in advanced economies, with developing countries playing a more limited role. These findings indicate that bureaucracy can function both as an enabler and a barrier to sustainable development depending on institutional capacity and governance context. The study highlights the need for stronger theoretical integration, context-sensitive research, and more inclusive international collaboration to strengthen the role of bureaucracy in advancing sustainable development.

Keywords

Bureaucracy, Sustainable Development, Governance, Institutional Reform, Adaptive Governance, Digital Transformation, Bibliometric Analysis.

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1 | INTRODUCTION

The purpose of this section, as the word itself indicates, is to provide readers with an introduction background to the study and hence to smoothly lead into a description of the methods employed in the current investigation. The introduction must therefore contain (shortly and consecutively) a general background of the problem that the authors investigate. It should give readers enough information to understand and consider authors' specific objectives within a larger theoretical framework or broader relevant discussion. While placing the current work in a broader context, authors should state clearly about the position of the current research among previous relevant research(es) in literature review (state of the art) as the basis of the brand-new research questions.

Bureaucracy has long been recognized as the backbone of public administration and the primary instrument for implementing development policies (Clare & Krogman, 2013; Popescu et al., 2018). As an institutional mechanism, bureaucracy is responsible for translating political decisions into administrative actions, managing resources, and ensuring that public services reach citizens effectively (Wagaba et al., 2023; Beddewela et al., 2017; Svyrydenko & Revin, 2023). Its efficiency and responsiveness largely determine the success or failure of development programs, making bureaucracy a central theme in governance and development studies (Singleton, 2024; Yin & Rui, 2023). In recent decades, sustainable development has emerged as a global paradigm emphasizing the integration of economic growth, social equity, and environmental protection. This paradigm requires states and their administrative systems to not only focus on short-term economic gains but also consider the long-term impacts of their policies (Jacobs, 2016; Meuleman, 2021). Within this context, bureaucracy plays a decisive role in designing, coordinating, and implementing strategies that ensure development efforts remain aligned with sustainability principles (Nedungadi et al., 2025).

The traditional characteristics of bureaucracy rigidity, hierarchy, and resistance to change are often considered obstacles to effective governance in sustainability transitions (Fallah et al., 2024; Olaniyi & Odhiambo, 2025). Scholars argue that administrative capacity is a critical determinant for achieving sustainable development goals, particularly in developing countries (Abbas et al., 2023). Local governments, in particular, are at the frontline of implementing sustainability initiatives, and their bureaucratic structures greatly influence outcomes. Salvador & Sancho (2021) stress that institutional capacities strategic, managerial, and collaborative are essential for municipalities to translate sustainability policies into practice. Other studies emphasize the importance of bureaucratic reform and innovation in advancing sustainable governance. De Matteis & Borgonovi (2021) propose sustainability management models for local governments, while Čičmancová & Soviar (2024) highlights the role of online communication in increasing transparency and accountability. Leuenberger (2006) also notes that sustainable development demands changes in bureaucratic practice to align administration with ecological and social imperatives.

At the same time, the literature suggests that bureaucracy can either act as an enabler or as a barrier to sustainability, depending on its institutional design and governance environment. Quinn (2022) describes this as a "new civic bureaucracy," one that must adapt to the challenges of climate change, digitalization, and public accountability. Ogu, (2019) similarly argues that the social consequences of bureaucratic arrangements must be reconsidered considering sustainability principles. The role of local governance is also emphasized in recent studies. Demonstrates that local administrative structures directly affect the implementation of sustainability programs. Ibeto & Kehinde (2021) highlight the normative challenges faced by public bureaucracies in Nigeria, pointing out issues of inefficiency and corruption as major barriers to sustainable development. Similarly, Luu (2019) emphasize the role of service-oriented bureaucracy in enhancing sustainable governance at the regional level.

There is also increasing evidence that bureaucratic innovation, digitalization, and dynamic governance are essential for advancing sustainability. Studies on Indonesian bureaucratic reform highlight the need for

adaptability in volatile, uncertain, complex, and ambiguous (VUCA) environments, while digital transformation in public administration offers new opportunities to align bureaucratic processes with sustainability objectives (Syamsir et al., 2025). Despite these contributions, the explicit academic mapping of how bureaucracy has been studied in relation to sustainable development remains limited. Much of the study is fragmented across disciplines public administration, political science, environmental studies without a comprehensive synthesis (Gonzales-Iwanciw et al., 2023; Piltz et al., 2024; Salvador & Sancho, 2021). Therefore, a bibliometric approach is needed to systematically analyze the intellectual landscape of this research area. Bibliometric analysis enables the identification of influential authors, institutions, journals, and thematic clusters, thus providing both descriptive and conceptual insights into the evolution of the field (Zhu & Yan, 2016).

By conducting such an analysis, this study aims to clarify how bureaucracy and sustainable development are interconnected in academic literature, to reveal the trends and gaps in current research, and to propose future directions for strengthening the bureaucratic contribution to sustainable development.

2 | LITERATURE OF REVIEW

The literature on bureaucracy and sustainable development is broad and multidisciplinary, spanning public administration, political science, and environmental studies (Múnera et al., 2024; Nyambara & Nyandoro, 2019; Wong & Heijden, 2022). To situate this study, it is important to review how scholars have conceptualized bureaucracy in governance, the role of sustainability as a policy agenda, and the implications of institutional reform. This section synthesizes these debates and highlights the intersections where bureaucracy and sustainability meet, while also identifying the fragmentation that justifies a bibliometric approach.

2.1 | Bureaucracy and Governance

The role of bureaucracy has long been central in shaping the governance structures of modern states. Classical perspectives, such as Max Weber's theory of rational-legal authority, emphasize bureaucracy as a mechanism of efficiency, predictability, and impartiality in public administration (Chen, 2025; Colenbrander & Bavinck, 2017). However, contemporary study increasingly highlights the dual nature of bureaucracy: while it provides organizational stability, it may also perpetuate rigidity, inefficiency, and corruption in governance (Funder & Mweemba, 2019; Singleton, 2024). In the context of sustainable development, bureaucracies are expected not only to enforce regulatory frameworks but also to adapt flexibly to emerging global challenges, including climate change, environmental degradation, and socioeconomic inequality (Arévalo-Royo et al., 2025; Esposito et al., 2021; Fu et al., 2024; Ibeto & Kehinde, 2021; Karki et al., 2021). Thus, the debate centers on whether bureaucratic institutions function as enablers or barriers to effective governance reforms.

In some contexts, bureaucratic structures are deeply embedded in historical legacies, shaping how governance reforms unfold. For instance, postcolonial states often inherited rigid administrative systems that struggle to adapt to participatory and sustainability-oriented governance models (Holler et al., 2020; Kaul & Thornton, 2014; Maharjan, 2019). This raises important questions about whether bureaucratic reform is primarily a technical process of efficiency improvement or a broader political struggle over power and legitimacy.

2.2 | Sustainable Development and Policy Integration

Sustainable development, formally popularized through the Brundtland Report on the year 1987, has evolved into a global normative framework, culminating in the United Nations' 2030 Agenda for Sustainable Development (Hajian & Jangchi Kashani, 2021). The implementation of sustainability policies often demands cross-sectoral coordination and long-term planning, which directly intersects with bureaucratic capacity. Studies show that the success of sustainable development initiatives depends on how effectively bureaucracies integrate environmental, economic, and social objectives into policy frameworks (Heinrichs & Laws, 2014; Singleton, 2024). For instance, climate action, biodiversity protection, and green growth require bureaucracies to transcend traditional siloed structures and promote collaborative governance across ministries, agencies, and civil society actors.

2.3 | Institutional Reform and Public Sector Transformation

Institutional reform has become a recurring theme in addressing the governance challenges of sustainability. Many governments have undertaken administrative reforms to improve transparency, accountability, and responsiveness in public bureaucracies (Heinrichs & Laws, 2014). Reforms such as e-governance, decentralization, and performance-based management are often positioned as solutions to bureaucratic inertia. Scholars argue that these reforms are not merely technical adjustments but reflect deeper political and institutional dynamics that shape the state's ability to respond to sustainable development imperatives (Karimi et al., 2024; Kuitert et al., 2024). Importantly, institutional reforms are often contested, as they require balancing efficiency with legitimacy, and global policy norms with local political realities.

A growing stream of literature also links bureaucratic reform with the notion of adaptive governance. Rather than pursuing one-size-fits-all solutions, scholars emphasize the capacity of institutions to experiment, learn, and adjust to uncertainties in complex sustainability environments (Baum et al., 2021). This perspective contrasts with more rigid approaches to reform, suggesting that the resilience of bureaucracies may lie in their ability to balance rules with flexibility.

2.4 | Linking Bureaucracy, Governance, and Sustainable Development

The intersection of bureaucracy, governance, and sustainable development represents a growing field of inquiry within political science, public administration, and development studies. Existing research underscores the importance of bureaucratic quality in achieving the Sustainable Development Goals (SDGs) (Mundy, 2023). Countries with professional, meritocratic bureaucracies tend to perform better in implementing sustainability policies, while weak or politicized bureaucracies struggle with corruption, inefficiency, and lack of enforcement capacity (Heinrichs & Laws, 2014; Ukeje et al., 2020; Véron et al., 2024).

Moreover, comparative studies highlight that institutional reforms aimed at improving governance such as anti-corruption initiatives, digital transformation, and intergovernmental coordination can enhance the state's capacity to promote sustainable outcomes. However, the literature also emphasizes the complexity of this relationship, suggesting that bureaucracies can simultaneously facilitate and constrain sustainable development depending on context, capacity, and political will.

3 | METHODS

This study employs a bibliometric approach to systematically analyze the scholarly literature on bureaucracy and sustainable development. Bibliometric analysis is a well-established method for mapping the intellectual structure of research domains, identifying influential works, and exploring the conceptual and thematic development of a field (Amaliah et al., 2025; Y. Zhu & Yan, 2016).

3.1 | Data Source and Search Strategy

Data was retrieved from the Scopus database, one of the largest repositories of peer-reviewed literature. The search string was designed to be both precise and comprehensive, focusing on the keyword's "bureaucracy" AND "sustainable development" in the title and abstract fields. To ensure relevance, the dataset was restricted to journal articles written in English and published between 1985 and 2025.

The search returned an initial set of 265 articles. After applying inclusion and exclusion criteria—removing duplicates, conference papers, and unrelated articles—the final dataset comprised 168 valid articles. This dataset represents the global academic discourse on the relationship between bureaucracy and sustainable development over the past three decades.

3.2 | Analytical Tools

The data analysis process in this study was entirely conducted using the *Bibliometrix* package operated within the R programming environment (Y. Zhu & Yan, 2016). The selection of *Bibliometrix* was driven by its robust and flexible capability to precisely process large-scale bibliometric data. This open-source software enables the systematic integration and extraction of information from various reputable research databases, thereby minimizing bias and enhancing accuracy in literature mapping.

Functionally, the analysis encompasses two main approaches: performance analysis and science mapping. Performance analysis focuses on evaluating the quantitative contributions and impact of various scientific entities, such as annual publication trends, highly cited articles, and the reach of contributions from authors, institutions, and countries of origin. This approach provides a strong descriptive overview of the dynamics, growth, and distribution of research productivity over time.

3.3 | Research Framework

The research framework in this study was structured systematically to ensure transparency, reproducibility, and methodological rigor. It consisted of three main stages: data identification, screening and eligibility assessment, and bibliometric analysis (Fig. 1). This approach integrates quantitative bibliometric mapping with qualitative interpretation to understand how bureaucracy has been examined within the broader discourse of sustainable development.

The data collection process began with a targeted search in the Scopus database, using a combination of keywords that captured the intersection of governance, bureaucracy, and sustainability. The query used was:

TITLE-ABS-KEY("bureaucracy" AND "sustainable development") AND (LIMIT-TO(DOCTYPE, "ar") AND LIMIT-TO(SRCTYPE, "j") AND LIMIT-TO(LANGUAGE, "English"))

This search initially identified 312 documents published between 1990 and 2024. A series of screening procedures were then conducted to ensure relevance and quality (Fig. 1). Articles that were not directly related to bureaucracy, sustainability, or public administrations such as those focusing solely on environmental engineering or unrelated economic models were excluded. After removing 91 records based on the exclusion criteria, 221 publications remained for detailed eligibility assessment.

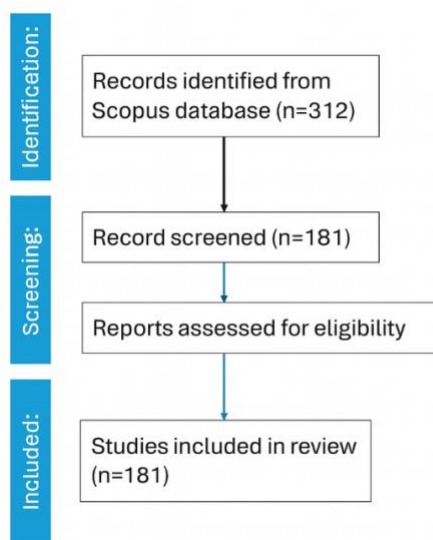


Fig. 1. PRISMA flow diagram illustrating the study selection process for the bibliometric analysis. Records were identified from the Scopus database (n = 312), screened for relevance (n = 221), and assessed for eligibility. After applying inclusion and exclusion criteria, 181 studies were included in the final analysis.

A further review of abstracts and keywords was performed to confirm topical relevance and avoid duplication. Following this step, 181 articles were retained as the final dataset for bibliometric analysis. These articles represent the most comprehensive body of scholarly work connecting bureaucratic institutions, governance mechanisms, and sustainable development processes. To enhance methodological clarity, this study employed the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) model to visualize the flow of data selection. The PRISMA framework outlines the transition from the initial search to final inclusion, ensuring that each article met the established inclusion criteria regarding relevance, quality, and publication type.

4 | RESULTS AND DISCUSSION

The bibliometric analysis provides an overview of the intellectual landscape of research on bureaucracy and sustainable development. By examining publication output, contributing countries and institutions, sources, authorship patterns, citations, and thematic structures, the results highlight both the growth of the field and the fragmentation that still characterizes it. The findings are organized into several dimensions: the evolution of publication trends, the geographical and institutional distribution of contributions, the role of journals and disciplines, author productivity and citation impact, keyword dynamics, and thematic as well as network structures. Together, these results offer a comprehensive picture of how study on bureaucracy and sustainable development has developed over time and where opportunities for further integration remain.

4.1 | Publication Trends

The evolution of scholarly output on bureaucracy and sustainable development demonstrates a gradual but steady increase over the past four decades (Fig. 2). During the early period (1985–2005), annual publications were minimal typically ranging between one and three articles per year—indicating that the intersection of bureaucracy and sustainability was still a marginal concern in the academic literature. Interest began to rise slightly between 2010 and 2015, although the scale of publications remained relatively modest.

A sharp increase occurred after 2016, corresponding to major global sustainability milestones such as the United Nations' 2030 Agenda for Sustainable Development and the implementation of the Paris Agreement (2015). This surge reflects the growing recognition that bureaucratic structures are integral to achieving sustainability goals. The peak in publications was recorded in 2022 with over 20 articles, after which a slight decline was observed in 2023 and 2024. The apparent drop in 2025, as shown in the data, is likely due to incomplete indexing for the current year rather than an actual decrease in scholarly interest.

Beyond numerical growth, the trend reflects a substantive shift in the way bureaucracy is framed in the sustainability discourse. Early contributions largely examined bureaucracy as an administrative tool for policy implementation, with limited engagement in long-term environmental or social outcomes. In contrast, more recent studies position bureaucracy as a central actor in governance systems that mediate economic, ecological, and social dimensions of development. This reconceptualization signals a move away from viewing bureaucracy as rigid and hierarchical, toward recognizing its potential as an adaptive institution capable of driving innovation and sustainability transitions (Baum et al., 2021; Palm & Lilja, 2021).

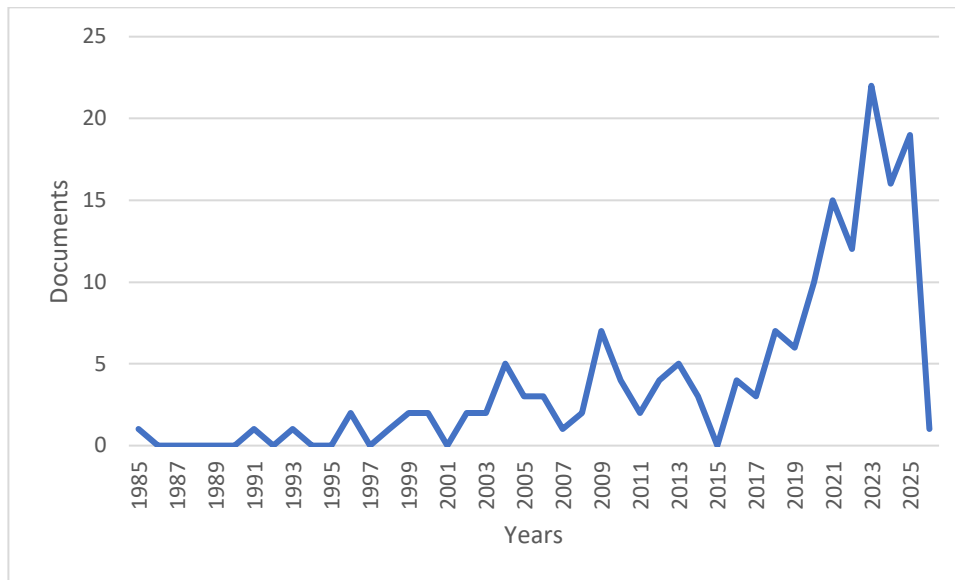


Fig. 2. Annual scientific production (1985–2025).

Another critical observation is the role of global events in shaping publication dynamics. The surge of academic output after Rio+20 (2012) and especially post-Paris Agreement (2015) indicates the responsiveness of the research community to international policy frameworks. Scholars increasingly engage with questions of how bureaucracies can be reformed, digitalized, or restructured to meet the challenges of a volatile, uncertain, complex, and ambiguous (VUCA) world. The data suggests that research interest aligns closely with global sustainability debates, confirming the relevance of bureaucracy not only as a policy instrument but also as a locus of innovation in sustainable governance (Mora, 2023; Spyromitros, 2023).

4.2 | Country and Institutional Contributions

The analysis of country-level contributions reveals significant disparities in the global production of research on bureaucracy and sustainable development (Fig. 3). The United States ranks first with 332 citations, followed by New Zealand (261), the United Kingdom (197), and Australia (194). This dominance reflects the strong traditions of public administration and sustainability studies in Anglo-Saxon countries, where governance reform and sustainability have long been embedded in academic and policy debates (Wang, 2013). European countries such as France, Italy, and the Netherlands also show considerable influence, underscoring the importance of European research networks in shaping scholarly discourse on bureaucratic capacity and sustainable governance (Dogmus & Nielsen, 2019; Palm & Lilja, 2021; Ryan & Mazzilli, 2023). At the same time, the presence of South Africa in the top ten suggests that Global South countries are increasingly contributing to the field, even if their citation impact remains comparatively lower.

At the institutional level, the landscape appears more fragmented (Fig. 4). The Bucharest University of Economic Studies (Romania) and Universidade Federal de Pernambuco (Brazil) lead with four publications each, followed by a group of institutions with three publications, including Al-Mustaqbal University, Cardiff University, IPB University (Indonesia), and the Queensland University of Technology. This pattern demonstrates that no single institution dominates the field; instead, research is being advanced by a wide range of academic centers across regions. The presence of universities from both developed and developing countries highlights the global relevance of the topic and points to emerging opportunities for cross-regional collaboration.

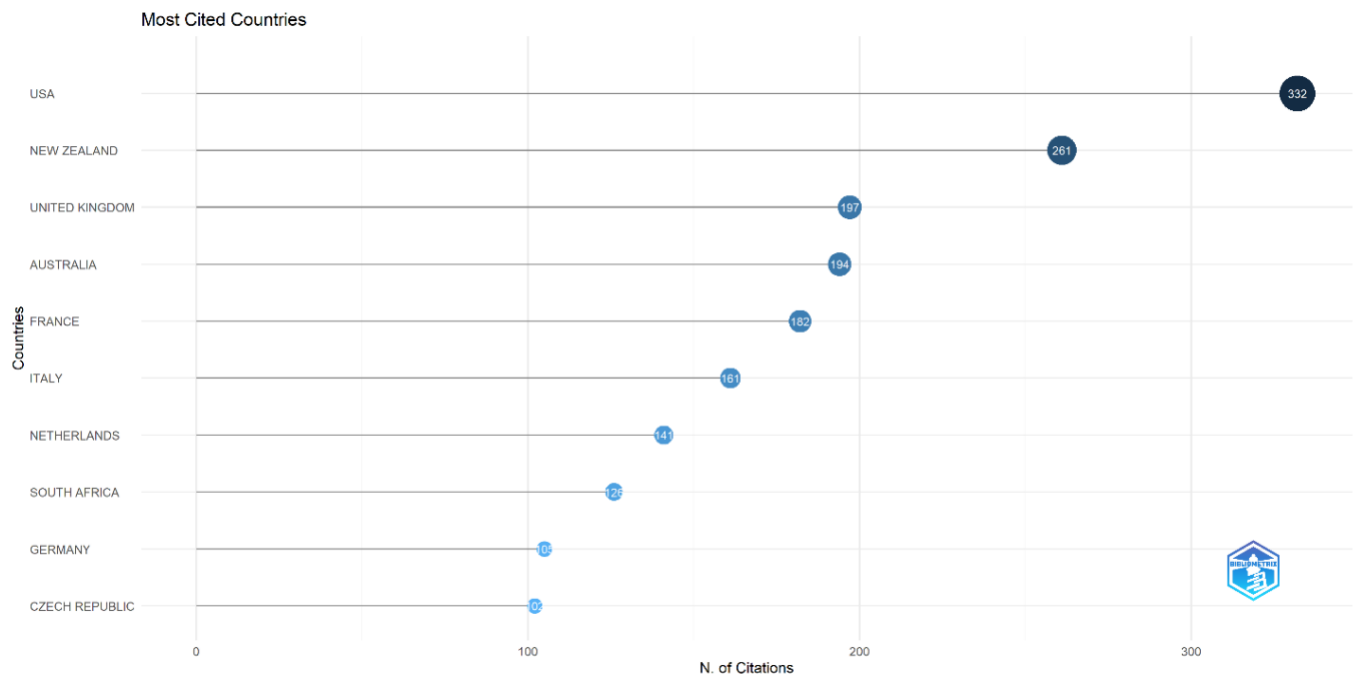


Fig. 3. Most cited countries in bureaucracy and sustainable development research.

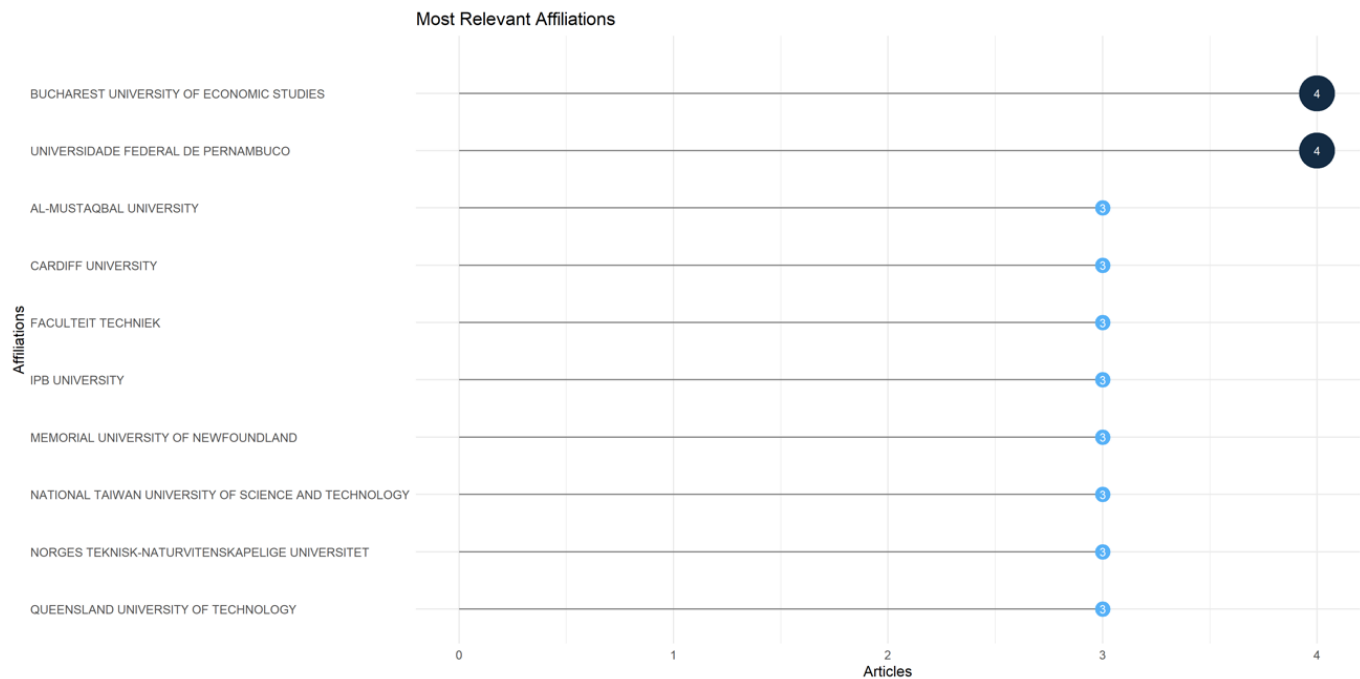


Fig. 4. Most relevant affiliations in bureaucracy and sustainable development research.

These findings suggest that while high-impact research is still dominated by Western countries, emerging contributions from institutions in Latin America, Asia, and Africa provide new perspectives on how bureaucracies engage with sustainability challenges in different governance contexts. Moreover, institutional diversity indicates that bureaucracy and sustainability are not confined to elite universities or Western-centric study. Instead, the field benefits from a polycentric research structure where multiple institutions, even those outside the global top-tier rankings, contribute meaningful insights. This diffusion of knowledge production not only strengthens the interdisciplinarity of the field but also enhances the chances of policy-relevant findings being embedded in local

governance reforms (Cheema et al., 2024; Fallah et al., 2024; Rodríguez et al., 2023; Véron et al., 2024; Yin & Rui, 2023).

In summary, the distribution of countries and institutions reflects a dual dynamic: on one hand, the consolidation of influence in the Global North, and on the other, the growing presence of Global South perspectives. This balance suggests that the study of bureaucracy and sustainable development is becoming a truly global endeavor, with increasing potential for comparative and collaborative research that bridges different governance realities.

4.3 | Distribution of Journals and Disciplines

The analysis of publication outlets reveals that research on bureaucracy and sustainable development is distributed across a diverse range of journals, reflecting the interdisciplinary character of the field (Fig. 5). Sustainability (Switzerland) emerges as the most prominent journal, publishing 13 articles, which highlights its role as a leading platform for sustainability-related research that bridges governance, environmental, and social perspectives. Other key outlets include the Journal of Cleaner Production (4 articles), Journal of Environmental Management (3 articles), and Water SA (3 articles). These journals predominantly focus on environmental governance, resource management, and sustainable policy, suggesting that the discourse on bureaucracy and sustainability is closely linked to environmental concerns.

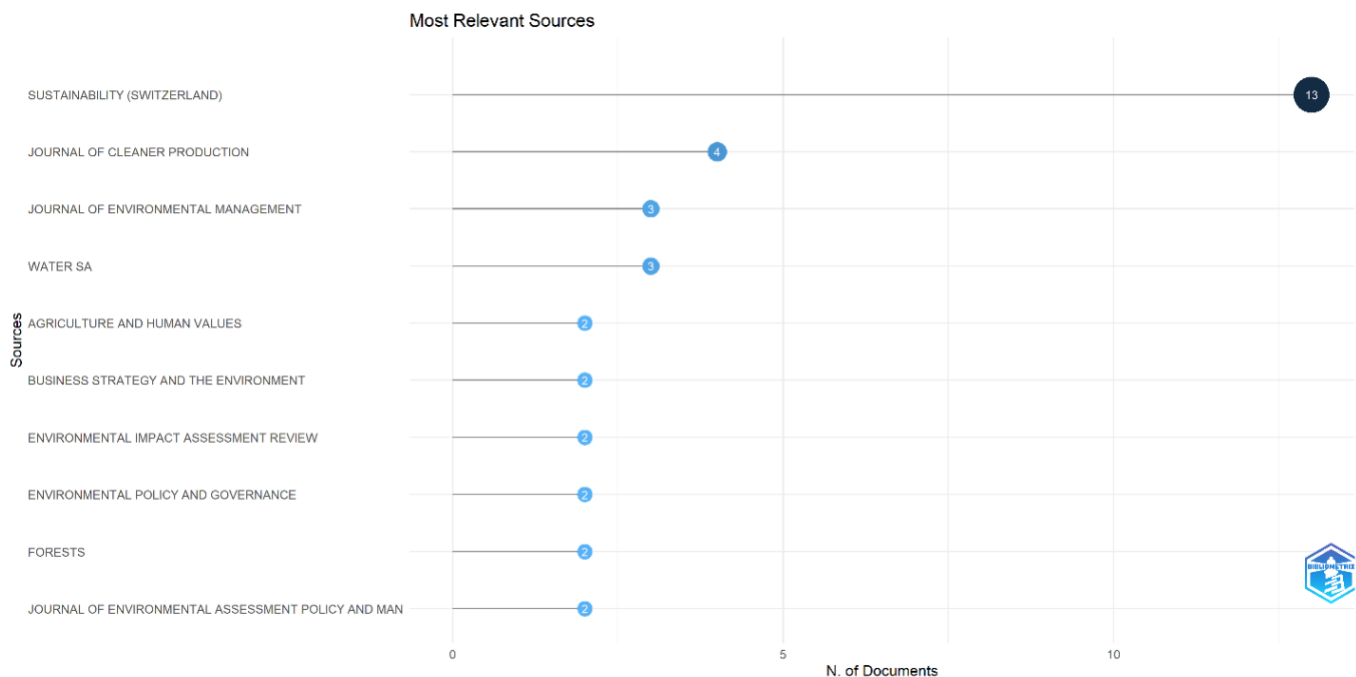


Fig. 5. Most relevant sources in bureaucracy and sustainable development research.

The presence of journals such as Agriculture and Human Values, Business Strategy and the Environment, and Environmental Impact Assessment Review further underscores the multidimensional nature of this research domain. These outlets bridge public administration with broader sustainability and social science debates, emphasizing the role of bureaucratic structures in addressing complex issues such as agricultural governance, corporate responsibility, and environmental assessments. This indicates that the topic is not confined to the traditional boundaries of political science or public administration but is enriched by contributions from environmental studies, management, and development disciplines (Alola et al., 2022; Bravi et al., 2020; Esposito et al., 2021; Svrydenko & Revin, 2023).

A closer examination of the distribution also reveals that sustainability journals dominate the field compared to mainstream public administration outlets. This trend suggests that scholars tend to approach the topic primarily from a sustainability or environmental governance perspective, integrating bureaucracy as one of the enabling or constraining factors in achieving long-term goals. While this has expanded the visibility of the subject within interdisciplinary research, it also points to a relative underrepresentation of bureaucracy-focused journals, which could play a stronger role in advancing administrative theory within the sustainability discourse.

The spread of journals reflects the hybrid and evolving nature of the field. The growing prominence of sustainability-oriented outlets signals an increasing recognition that bureaucratic structures are not merely administrative mechanisms but critical components of governance systems that mediate sustainable development pathways. This diffusion across multiple disciplines reinforces the importance of cross-cutting perspectives, while also highlighting the need for greater integration between administrative science and sustainability studies.

4.4 | Authors and Citation Impact

Understanding author contributions and citation impact provides valuable insights into the intellectual structure of the field. While publication trends reveal the growth of research output over time, examining who publishes and which works are most cited sheds light on the key scholars, influential ideas, and evolving networks that shape the discourse on bureaucracy and sustainable development. This dimension of analysis highlights both the diversity of academic voices and the central works that form the foundation of current debates.

Authors with the Highest Number of Publications

The author-level analysis reveals a relatively dispersed pattern of scholarly contributions in the field of bureaucracy and sustainable development (Fig. 6). Martinais E emerges as the most productive author with three publications, followed by a group of scholars—such as Alola AA, Boehmer-Christiansen SA, Clinton AO, Hermans LM, Le Bourhis JP, Li Y, Nemec J, and Nurrochmat DR—each contributing two articles. Meanwhile, other authors such as Abbas HSM have contributed a single work but still add to the diversity of perspectives within the field.

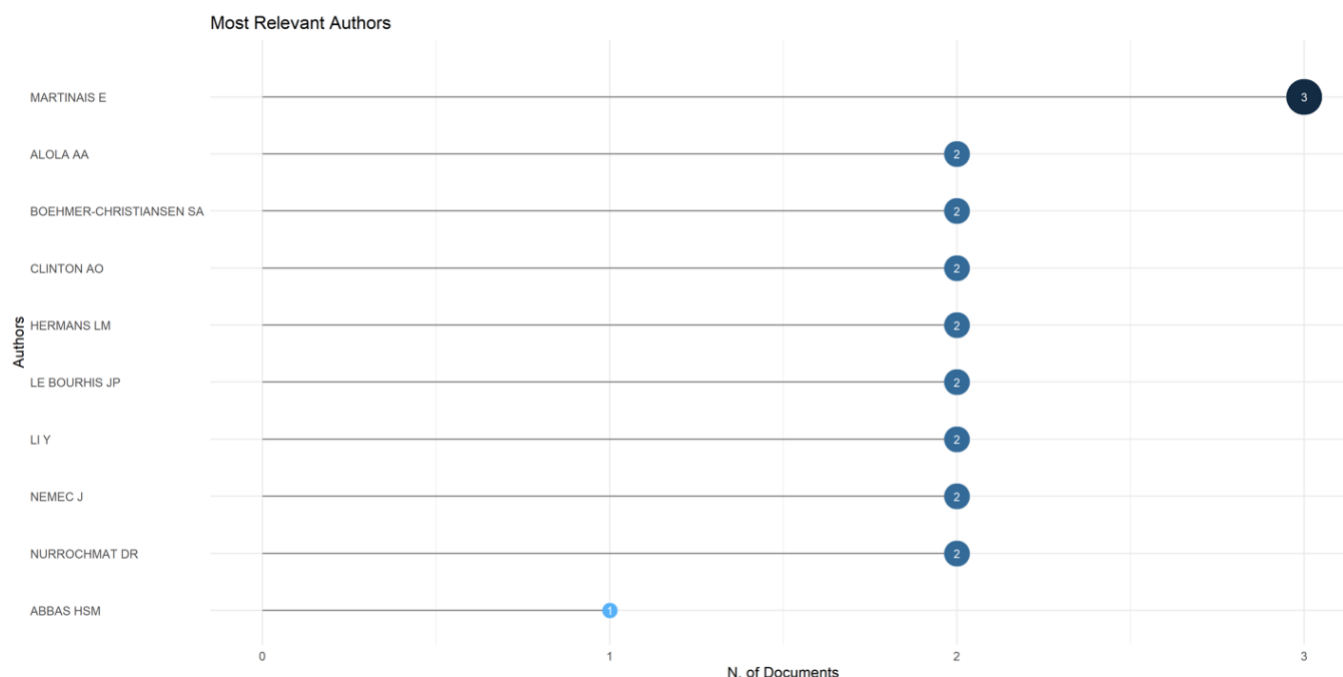


Fig. 6. Leading authors in bureaucracy and sustainable development research.

This distribution suggests that research on bureaucracy and sustainable development is not concentrated in the hands of a few highly prolific authors but rather spread across multiple contributors from different backgrounds and regions. Such diversity may indicate that the field is still in a stage of conceptual exploration, with researchers from various disciplines (public administration, environmental studies, and policy analysis) engaging with the topic in different ways (Han et al., 2024; Sadeghi et al., 2025; Torkington et al., 2025). The relatively balanced contributions also highlight the collaborative and interdisciplinary nature of the research domain. Instead of a single dominant “thought leader,” the field appears to be shaped by multiple voices, each bringing unique insights into how bureaucratic institutions can facilitate or hinder sustainability transitions (Francksen et al., 2023; Mora, 2023).

Most Cited Articles

The citation analysis reveals that among the listed authors, Nurrochmat, D.R. has received the highest number of citations, with 157 total citations (TC) from 2 publications (NP) since 2017. This indicates that despite a relatively recent entry compared to earlier authors, his work has had a significant scholarly impact, reflected also in his m-index (0.222) which is comparatively higher than some senior authors. In contrast, Boehmer-Christiansen, S.A., who began publishing in this dataset as early as 2002, has accumulated 37 citations across 2 publications, resulting in a lower m-index (0.083) due to the longer time span. Similarly, Martinais, E. has 28 citations from 3 publications since 2003, with a modest g-index of 3, suggesting consistent but moderate citation influence (Table 1).

The other authors, including Abbas H.S.M., Abbas S., and Aboelazm K.S., each recorded 6–10 citations, all from single publications, which indicates initial scholarly attention but not yet sustained influence. A number of authors, such as Ahmad, I. (2024), are very recent contributors with minimal citation records, which is expected given the short timeframe for citation accumulation.

Table 1. Top 10 authors based on citation and index impact.

No	Author	h_index	g_index	m_index	TC	NP	PY_start
1	Boehmer-Christiansen SA	2	2	0.083	37	2	2002
2	Martinais E	2	3	0.087	28	3	2003
3	Nurrochmat DR	2	2	0.222	157	2	2017
4	Abbas HSM	1	1	0.333	6	1	2023
5	Abbas S	1	1	0.333	6	1	2023
6	Aboelazm KS	1	1	0.333	10	1	2023
7	Agdas D	1	1	0.25	25	1	2022
8	Aguila-Obra ARD	1	1	0.167	18	1	2020
9	Agyepong IA	1	1	0.2	21	1	2021
10	Ahmad I	1	1	0.5	1	1	2024

The findings reveal a dual pattern of impact: (1) foundational contributors such as Boehmer-Christiansen and Martinais, whose works remain relevant over decades, and (2) new-generation scholars like Nurrochmat, whose research rapidly gained traction and shaped ongoing discourse. This suggests that the field benefits from both historical continuity and fresh perspectives, ensuring a dynamic and evolving body of knowledge.

Authors' Productivity Trends

The temporal distribution of authors' publications shows heterogeneous productivity patterns over time. Martinais, E. appears as the most consistent contributor, maintaining research output from the early 2000s up to 2023. This long span of productivity highlights his sustained involvement and continuity in the field. In contrast, Boehmer-Christiansen, S.A. made an early contribution in 2002, but subsequent publications are less visible,

suggesting that his role is more foundational rather than continuous. Similarly, other senior authors such as Le Bourhis, J.P. and Nemec, J. published in the mid-2010s, with activity that extended for only a limited period.

On the other hand, a new generation of scholars has emerged more recently. Nurrochmat, D.R. began publishing in 2017 and has continued to contribute, with his works showing strong citation performance despite a shorter career span. Authors like Alola, A.A., Clinton, A.O., Hermans, L.M., and Li, Y. also entered the field after 2015, indicating a diversification of contributors and a growing global engagement in this research domain. Most recently, Abbas H.S.M. (2023) represents the newest wave of contributors, whose long-term influence is yet to be determined given the short time window since publication.

The productivity trends reveal two key dynamics (Fig. 7): (1) a group of long-standing contributors who provide historical continuity and (2) an influx of emerging authors whose works are shaping the present and future scholarly landscape. Together, these patterns suggest a research field that is both stable and dynamic, evolving through intergenerational contributions.

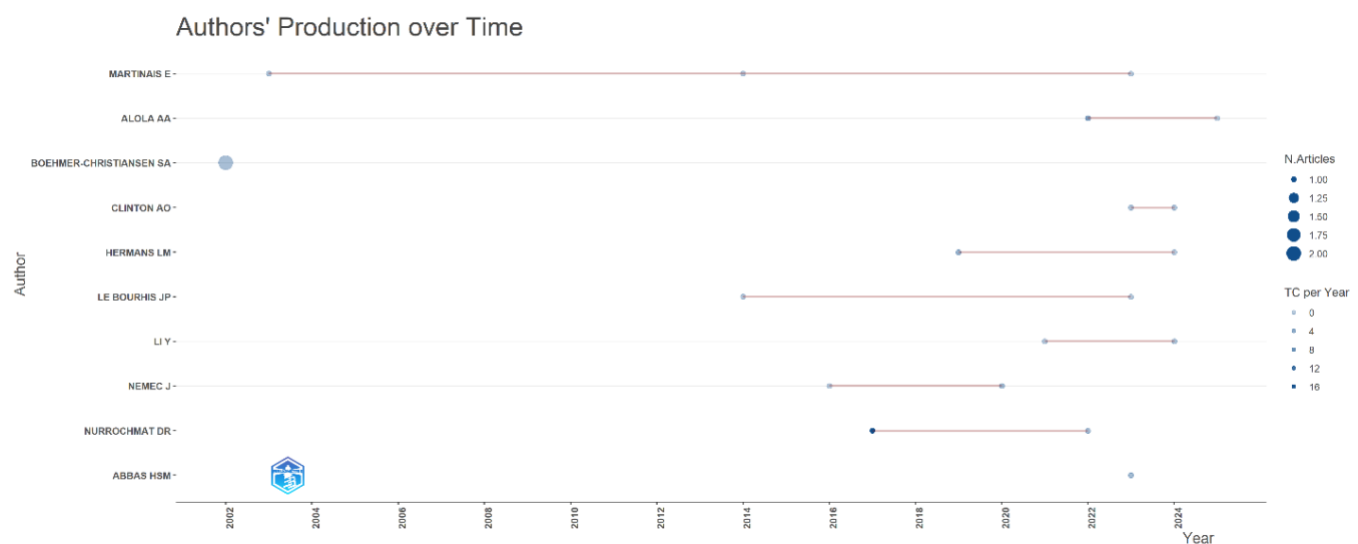


Fig. 7. Authors' production over time.

4.5 | Keyword Analysis

The keyword analysis provides a deeper understanding of the intellectual structure and thematic evolution of research on bureaucracy and sustainable development. By examining both the frequency and co-occurrence of terms, it becomes possible to identify the central concepts, emerging themes, and temporal dynamics that define this field.

Core Research Themes (Keyword Frequency Analysis)

The frequency analysis of keywords highlights the dominant research themes within the field of bureaucracy and sustainable development (Fig. 8). The terms sustainable development (100 occurrences) and bureaucracy (53 occurrences) are by far the most prominent, confirming that the intersection of these two concepts forms the core of the scholarly debate. The presence of sustainability (25 occurrences) further reinforces this emphasis, suggesting that the discourse is firmly situated within the broader sustainability literature.

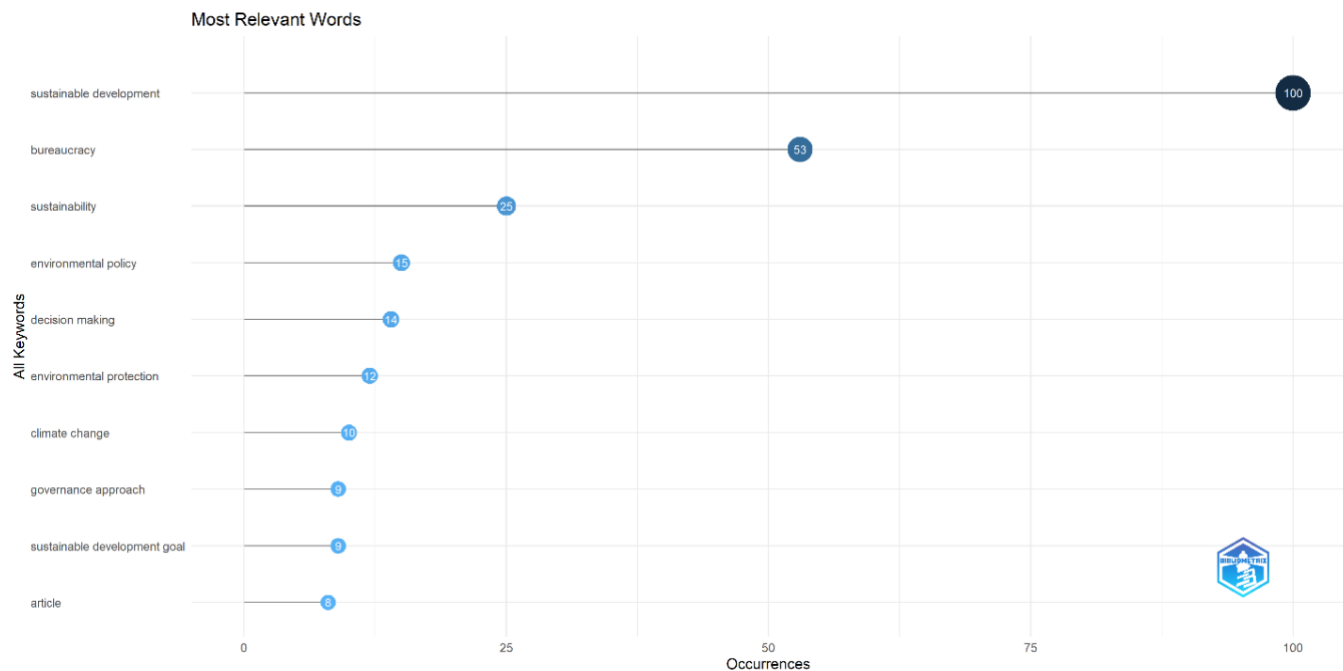


Fig. 8. Time core research themes: frequency of keywords in bureaucracy and sustainable development research.

Other frequently occurring keywords—such as environmental policy (15 occurrences), decision making (14), environmental protection (12), and climate change (10)—indicate that environmental governance constitutes a major dimension of the discussion. These terms reflect scholarly concern with how bureaucratic institutions design, implement, and enforce policies that address ecological challenges and align with global sustainability commitments. Additional terms, including governance approach (9 occurrences) and sustainable development goal (9), point to a normative orientation in literature. Scholars are not only interested in the mechanics of administration but also in how bureaucratic processes contribute or hinder—the achievement of internationally recognized goals, such as the UN Sustainable Development Goals (SDGs). The inclusion of decision making as a recurrent term also underscores the focus on institutional processes, highlighting that bureaucracies are seen as key decision-making arenas in the governance of sustainability transitions.

The keyword frequency analysis suggests that literature is structured around two interrelated pillars: (1) the conceptual nexus between bureaucracy and sustainable development, and (2) the operationalization of this nexus through environmental policy, governance approaches, and decision-making mechanisms. This confirms that while the field is inherently interdisciplinary, it is anchored in questions of administrative capacity and institutional reform as crucial enablers of sustainability.

Conceptual Linkages (Keyword Co-occurrence Network)

The co-occurrence analysis highlights how research themes on bureaucracy and sustainable development are structured around two dominant clusters. Cluster 1, represented by terms such as human, humans, covid-19, and management, reflects the socio-contextual and crisis-driven dimension of sustainability studies. The inclusion of COVID-19 indicates the growing attention to how global crises disrupt governance systems and highlight bureaucratic adaptability in emergency response. Cluster 2, in contrast, is centered on sustainable development and bureaucracy, with strong connections to related concepts such as sustainability, governance approach, sustainable development goals (SDGs), and developing countries. This cluster represents the institutional and policy-oriented strand of literature, focusing on how bureaucratic reform, governance frameworks, and institutional capacities contribute to achieving sustainability objectives. The high betweenness centrality of sustainable development (709.327) and bureaucracy (267.286) indicates their role as key bridging concepts linking diverse research discussions.

The network visualization (Fig. 9) further confirms that sustainable development serves as the intellectual hub of this field, integrating perspectives from environmental governance, public administration, and development studies. Keywords such as climate change, decision making, environmental protection, and economic growth cluster around these core terms, suggesting a strong interdisciplinary orientation. This finding underscores that sustainable development is not studied in isolation but as an interdependent process where bureaucratic institutions, governance strategies, and policy mechanisms play a decisive role in shaping outcomes.



Fig. 9. Conceptual linkages: co-occurrence network of keywords in bureaucracy and sustainable development.

Visual Representation of Research Focus (Word Cloud)

The word cloud provides a visual overview of the most dominant research themes in the literature. The word cloud highlights “sustainable development” and “bureaucracy” as the most salient concepts, visually demonstrating their centrality in the field. These terms dominate the discourse, overshadowing related but less frequent terms such as “sustainability,” “environmental policy,” and “decision making.” Equally important, bureaucracy emerges as the second most frequent keyword, signifying its growing relevance in discussions on how states and institutions translate sustainability principles into practice. Its prominence indicates that scholars do not only focus on the normative goals of sustainability but also pay increasing attention to the administrative machinery needed to deliver those goals effectively (Fig. 10).

Other recurring terms such as sustainability, environmental policy, decision making, and climate change appear in smaller font sizes, showing that while these issues are central to the debate, they function as supporting concepts rather than the primary research anchors. Their presence illustrates the multidimensional nature of sustainability studies, where environmental, political, and institutional concerns intersect. The word cloud complements this by emphasizing the relative weight of each keyword in the research corpus. The prominence of “bureaucracy” alongside “sustainable development” suggests that administrative capacity, institutional reform, and governance approaches are perceived as crucial in aligning public administration with sustainability goals. Meanwhile, the appearance of terms such as “climate change” and “environmental protection” indicates the thematic expansion of the field into environmental governance and global challenges.



Fig. 10. Visual representation of research focus: word cloud of keywords in bureaucracy and sustainable development literature.

Evolution of Research Priorities (Temporal Keyword Trends)

The temporal distribution of keywords shows how research themes have evolved over the last two decades. Early studies (2004–2010) were dominated by broad governance and policy-related terms such as planning, policy making, and participatory approach. These reflect an initial emphasis on institutional frameworks and the design of governance mechanisms to support development initiatives.

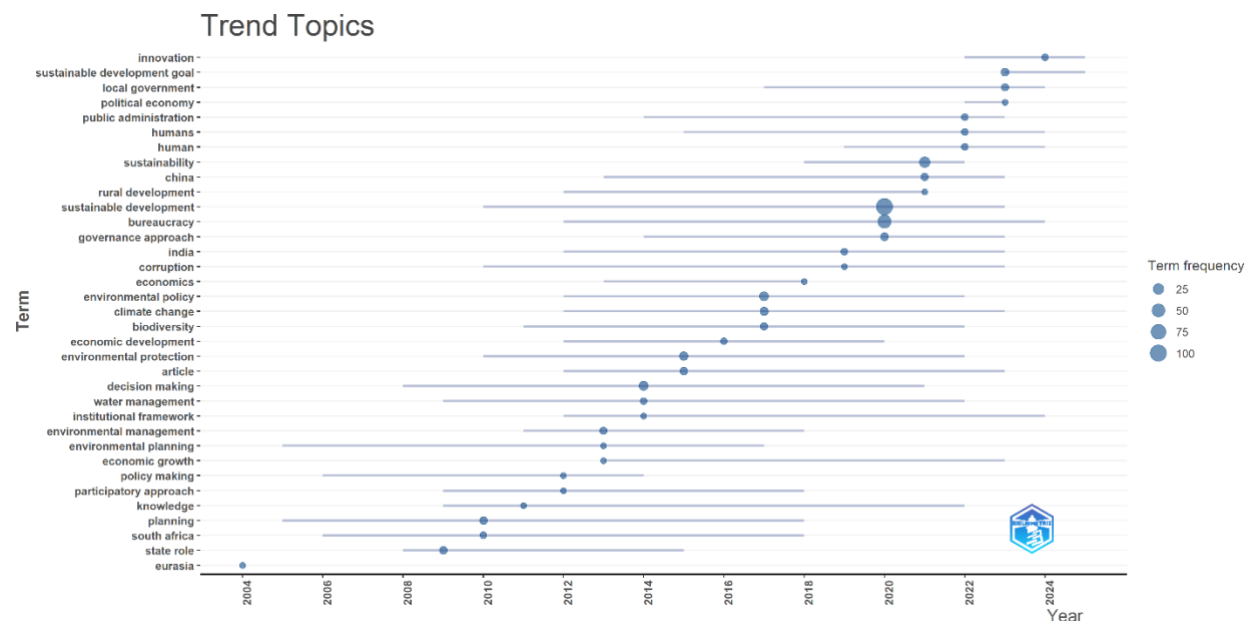


Fig. 11. Evolution of research priorities: temporal trends of keywords in bureaucracy and sustainable development research.

From 2010 to 2016, the focus expanded toward environmental dimensions, with terms such as climate change, environmental policy, environmental management, and biodiversity gaining prominence (Fig. 11). This shift indicates that the sustainability discourse became more closely tied to ecological and environmental governance, linking bureaucratic processes with pressing global challenges. Since 2017, keywords such as bureaucracy, governance approach, and decision making appear more frequently, reflecting a turn toward administrative capacity and institutional reform as critical factors in sustainable development. At the same time, sustainable development goals (SDGs) and local government emerged strongly after the adoption of the UN 2030 Agenda, showing the increasing role of subnational governance in operationalizing sustainability policies.

Most recently (2020–2024), terms like innovation and public administration have entered the discourse, suggesting a forward-looking trend toward digital transformation, adaptive governance, and dynamic bureaucratic models. This development highlights a transition from conceptual discussions of sustainability toward applied governance solutions capable of addressing complex and volatile contexts.

4.6 | Thematic Analysis & network

Thematic and network analysis provides a deeper understanding of the intellectual and collaborative structure of research on bureaucracy and sustainable development. While bibliometric indicators such as publication trends and keyword frequencies reveal quantitative growth, thematic mapping and network visualization uncover the conceptual foundations, topic evolution, and collaborative dynamics that shape the field. This section explores how bureaucratic studies intersect with governance, development policy, and institutional reform, while also tracing the evolution of themes across time. Furthermore, collaboration networks among authors and countries are analyzed to highlight the global academic interactions driving this area of research.

Positioning Bureaucracy within the Thematic Landscape of Sustainable Development Research

The thematic map provides a strategic visualization of research themes based on two dimensions: centrality (relevance to the field) and density (level of development) (Fig. 12). Four quadrants are identified—motor themes, niche themes, basic themes, and emerging or declining themes—each representing different positions within the intellectual structure of the field.

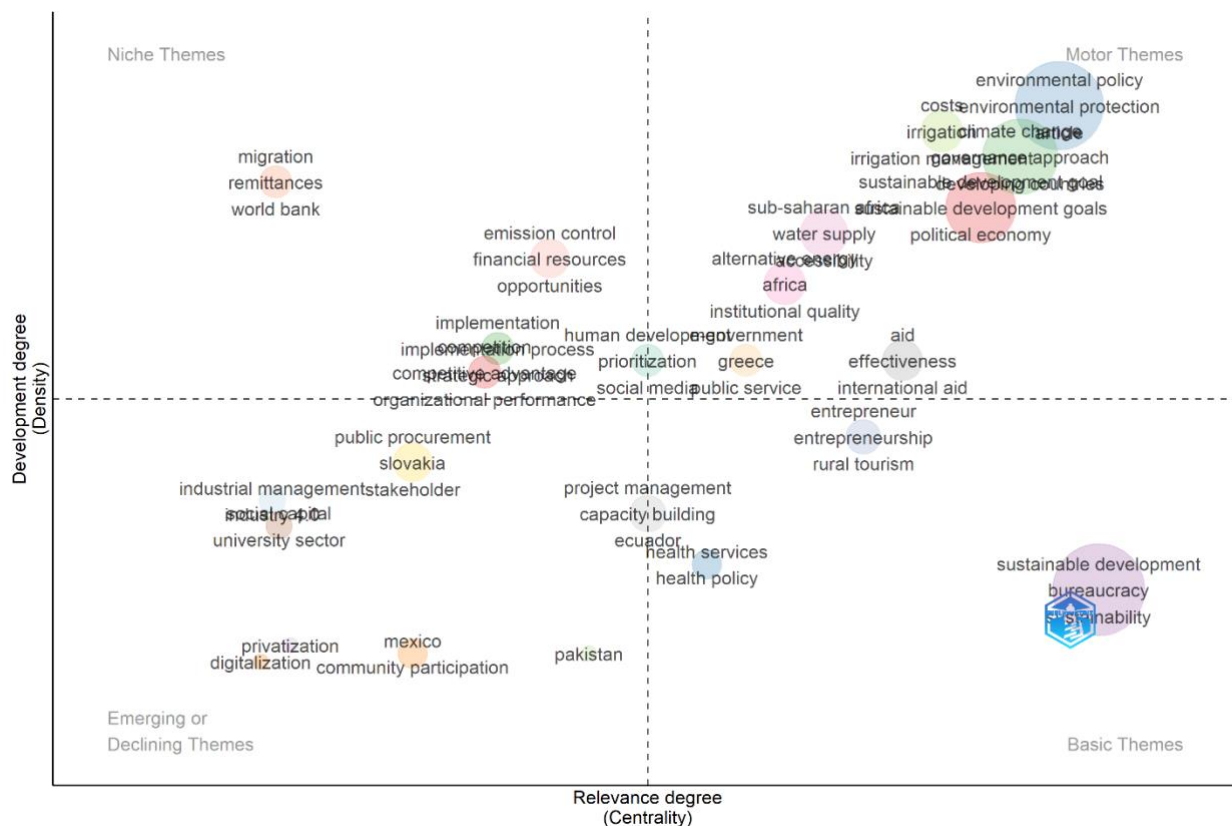


Fig. 12. Thematic map of bureaucracy and sustainable development research.

In the motor themes quadrant, topics such as environmental policy, environmental protection, climate change, management, and sustainable development goals appear as well-developed and highly connected clusters. Their position reflects the strong link between sustainability research and ecological governance, where bureaucratic institutions play an enabling role in implementing and coordinating environmental strategies. These

themes indicate the maturity of sustainability discourse in relation to governance and policy integration. The basic themes quadrant is notable for the presence of sustainable development, bureaucracy, and sustainability. While these terms exhibit high centrality, their density remains relatively low, suggesting that they form the conceptual foundation of the field but still require deeper theoretical and empirical elaboration. This positioning reinforces the notion that bureaucracy is a crucial entry point for sustainability debates, yet its mechanisms, reform pathways, and institutional roles are still underexplored.

In the quadrant niche themes, terms such as migration, remittances, and World Bank represent specialized but less interconnected lines of inquiry. These topics may offer valuable insights into specific development contexts but remain peripheral to the core debates on bureaucracy and sustainable development. Similarly, themes like financial resources and emission control highlight sector-specific discussions that have not yet integrated strongly with broader governance studies. Finally, the emerging or declining themes quadrant contains topics such as privatization, digitalization, and community participation. Their position suggests either emerging relevance—particularly digitalization, which may gain prominence in the coming years—or a gradual decline in academic attention, as in the case of privatization. This quadrant signals potential directions for future research, especially where digital transformation intersects with bureaucratic reform and sustainability governance.

The thematic map reveals that while environmental governance has developed into a mature research cluster, the integration of bureaucracy and sustainable development remains foundational yet underdeveloped. This provides a clear opportunity for future studies to strengthen the theoretical and practical linkages between bureaucratic institutions, governance innovation, and long-term sustainability outcomes.

Network analysis: Collaboration Pattern among Authors and Countries

Network analysis sheds light on how scholarly interactions shape the development of bureaucracy and sustainable development research (Fig. 13). Collaboration can be examined at two levels: micro-level co-authorship networks among individual scholars and macro-level partnerships across countries. Together, these perspectives provide insights into how knowledge production is organized and diffused globally.

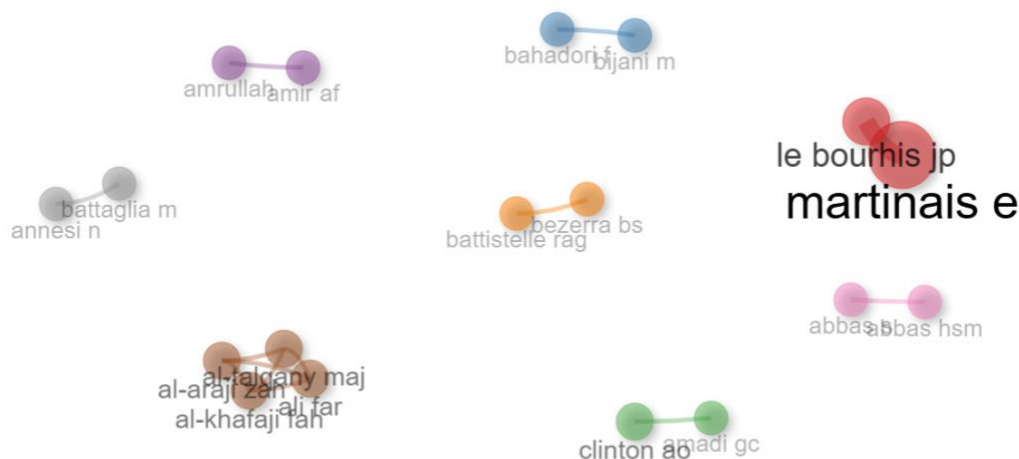


Fig. 13. Author collaboration network in bureaucracy and sustainable development research.

The co-authorship map reveals that collaboration among scholars in this field is still fragmented. Most research is conducted by small teams or bilateral partnerships rather than large, interconnected networks. For

instance, Martinais E and Le Bourhis JP form one of the most visible collaborative pairs, while smaller clusters are observed among Clinton AO and Amadi GC, or Al-Araji Zeni and Al-Khafaji Ian. These localized partnerships suggest that study on bureaucracy and sustainability is often shaped by regional or institutional contexts rather than global academic networks. While this fragmentation highlights the field's developmental stage, it also indicates opportunities for future expansion. Stronger interdisciplinary and international collaborations could help consolidate the field, enrich comparative studies, and provide more diverse insights into the role of bureaucracy in achieving sustainability.

At the macro level, the country collaboration map shows a more consolidated pattern (Fig. 14). The United States, the United Kingdom, and Australia emerge as central hubs with extensive international partnerships, often serving as anchors for global research networks. Meanwhile, countries such as China, India, and South Africa demonstrate growing participation, frequently connected through collaborations with institutions in advanced economies. This contrast between micro-level fragmentation and macro-level concentration suggests that while national research systems are interconnected, individual collaborations remain limited in scale. The dominance of advanced economies reflects structural asymmetries in global knowledge production, leaving many developing countries at the periphery with weaker collaborative ties. Expanding South-South collaborations could help bridge this gap and bring more context-specific perspectives into the global sustainability discourse.

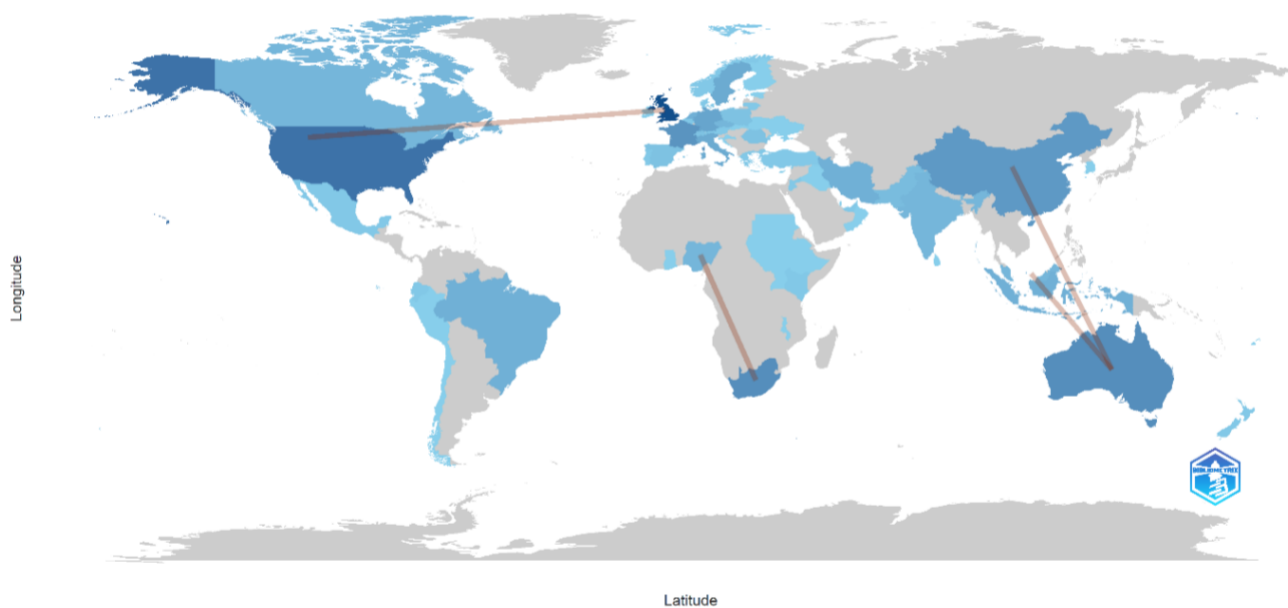


Fig. 14. Country collaboration map in bureaucracy and sustainable development research.

The author and country collaboration networks reveal complementary dynamics. At the micro level, fragmented author clusters reflect localized academic interactions, while at the macro level, national systems are increasingly integrated into global networks. The overlap between these two patterns indicates that international collaborations are often concentrated around a few powerful hubs, which in turn shape the smaller clusters of individual scholars. Strengthening cross-regional and interdisciplinary linkages at both levels is therefore essential to build a more cohesive and inclusive research community in bureaucracy and sustainable development.

5 | DISCUSSION

The results of the bibliometric analysis provide valuable insights into how bureaucracy and sustainable development have been studied over time. Beyond descriptive trends, the findings also raise deeper theoretical and practical questions about the role of bureaucracy in advancing sustainability, the evolution of research

priorities, and the structure of global scholarly collaboration. This section discusses these themes, linking empirical patterns with the broader academic literature and highlighting implications for future research.

5.1. Bureaucracy as an Enabler and Barrier to Sustainability

The bibliometric analysis confirms that bureaucracy remains a central but underdeveloped theme in sustainability research. As indicated in the thematic map, bureaucracy is categorized as a basic theme conceptually central but with relatively low density. This aligns with the literature review, where bureaucracy has been described as both a stabilizing mechanism and a source of rigidity in governance systems (Li et al., 2024; Selseng & Gjertsen, 2024; Wendling et al., 2018; S. Zhu & Feng, 2025). The steady growth in publications, particularly after the adoption of the UN 2030 Agenda, suggests a rising scholarly interest in understanding how bureaucratic processes mediate the implementation of sustainable development policies (Meuleman, 2021). Yet, the relative lack of dense theoretical development points to the need for more integrative frameworks that directly link bureaucratic reform with sustainability transitions.

This duality is particularly important because bureaucratic institutions possess both enabling and constraining capacities in sustainability governance. On the one hand, formal rules, administrative procedures, organizational routines, and clearly defined responsibilities can provide continuity, accountability, and policy consistency, particularly when sustainability objectives require long-term coordination across sectors and levels of government. Bureaucratic structures can therefore function as institutional infrastructure through which broad sustainability commitments are translated into programs, regulations, and administrative practices. On the other hand, when these structures become excessively hierarchical, procedural, or fragmented, they may inhibit experimentation and delay responses to rapidly changing environmental and social challenges. The tension between administrative stability and adaptive capacity therefore represents a critical issue in understanding the contribution of bureaucracy to sustainable development.

From a theoretical perspective, these findings suggest that bureaucracy should not be conceptualized simply as an administrative obstacle to sustainability, but rather as an institutional arena in which sustainability objectives are negotiated and operationalized. The effectiveness of bureaucratic institutions depends on their ability to combine procedural legitimacy with organizational learning, inter-agency coordination, and adaptive decision-making. This perspective extends conventional debates on bureaucratic efficiency by emphasizing the importance of institutional adaptability in sustainability transitions. Future research could therefore examine how specific bureaucratic arrangements—such as decentralization, cross-sectoral coordination, digitalization, and participatory mechanisms—shape the capacity of public organizations to translate sustainability goals into effective and context-sensitive outcomes.

5.2. Shifts in Research Priorities and Emerging Themes

The temporal analysis of keywords reveals a clear shift in priorities. Early studies were dominated by governance and policymaking, consistent with Nerland et al., (2024) argument that sustainability initially emerged as a policy integration problem. Over time, the focus shifted toward environmental management and climate change, highlighting the ecological dimension of sustainability. More recently, themes such as digital governance, innovation, and institutional reform have emerged, reflecting both global policy pressures and local reform dynamics (Syamsir et al., 2025). This evolution demonstrates a gradual broadening of the research agenda from normative frameworks to applied governance practices. It also underscores the increasing recognition that bureaucracies must adapt to volatile, uncertain, complex, and ambiguous (VUCA) contexts through innovation and flexibility (Lawande, 2023; Song & Bae, 2016).

The observed thematic transition also indicates that sustainability research has become increasingly concerned with the capacity of institutions to respond to interconnected and rapidly evolving challenges. The emergence of digital governance and innovation-related themes suggests that technological transformation is no longer treated merely as a technical issue but increasingly as an institutional and governance concern. Digital

technologies can improve information sharing, monitoring, transparency, and service delivery, but their effectiveness depends on organizational capabilities, regulatory arrangements, and the willingness of bureaucratic actors to adopt new modes of working. Consequently, the growing intersection between digitalization, innovation, and sustainability reflects a broader movement toward understanding governance as a dynamic process rather than a static administrative function.

Nevertheless, the thematic evolution also indicates that important conceptual gaps remain. The increasing prominence of climate change, digital transformation, and institutional reform has created a more complex research landscape in which environmental, technological, organizational, and social dimensions of sustainability increasingly intersect. Future studies should therefore move beyond examining these themes independently and investigate their interactions within specific institutional contexts. For example, research could explore whether digital innovation enhances bureaucratic responsiveness to climate-related risks, or whether institutional reforms enable public organizations to integrate technological innovation with inclusive and environmentally sustainable development. Such approaches would contribute to a more integrated understanding of how bureaucracies can evolve from rule-oriented administrative structures toward adaptive institutions capable of addressing complex sustainability challenges.

5.3. Collaboration Patterns and Global Asymmetries

The collaboration networks offer important insights into the organization of knowledge production. At the micro level, author collaborations remain fragmented, with small, localized clusters dominating the field. At the macro level, however, countries such as the United States, the United Kingdom, and Australia act as major hubs in international collaboration, often partnering with institutions in Asia and Africa. This imbalance reflects broader global asymmetries in research capacity and agenda-setting power, as documented in comparative governance studies (W. Chen et al., 2021; Véron et al., 2024). While the increasing participation of countries in the Global South is a promising trend, the relatively limited cross-regional collaboration suggests that much of the sustainability discourse is still shaped by perspectives from advanced economies. Expanding South-South collaborations could diversify the knowledge base and strengthen the contextual relevance of sustainability research.

These collaboration patterns have significant implications for the production and circulation of knowledge on bureaucracy and sustainable development. The concentration of research networks around a relatively small number of countries and institutions may influence which theoretical perspectives, methodological approaches, and policy problems become most visible within the international literature. Research agendas developed in advanced economies may be highly influential because of greater research funding, institutional capacity, publication infrastructure, and international connectivity. However, sustainability challenges are strongly shaped by local institutional conditions, socioeconomic inequalities, political arrangements, and ecological contexts. Consequently, a research agenda dominated by a limited set of geographical perspectives may not adequately capture the diversity of bureaucratic experiences across different regions.

Strengthening international collaboration should therefore involve more than increasing the number of co-authored publications. Greater emphasis should be placed on equitable knowledge partnerships that recognize researchers and institutions in the Global South as active contributors to theory development, methodological innovation, and agenda setting. South-South and South-North collaborations could facilitate comparative research capable of identifying both common institutional mechanisms and context-specific pathways toward sustainability. Such collaborations may also help reduce epistemic asymmetries by incorporating locally grounded knowledge into global sustainability debates. Future bibliometric and systematic reviews could consequently examine not only the volume of international collaboration but also patterns of institutional leadership, citation influence,

thematic specialization, and knowledge flows between regions to provide a more nuanced understanding of global research inequalities.

6 | CONCLUSION

This study conducted a systematic bibliometric analysis of the intersection between bureaucracy and sustainable development, drawing on publications indexed in Scopus between 1985 and 2025. The results reveal steady growth in scholarly output, particularly after the institutionalization of the UN 2030 Agenda, underscoring the rising academic relevance of this field. However, the thematic map shows that bureaucracy, while conceptually central, remains underdeveloped compared to mature clusters such as environmental policy and climate change. The temporal evolution of keywords highlights a shift from normative discussions of governance and policy integration toward applied themes such as digital transformation, bureaucratic reform, and innovation. This reflects growing recognition that sustainability requires not only visionary frameworks but also adaptive, capable, and responsive bureaucracies. At the same time, collaboration patterns reveal asymmetries: author-level networks remain fragmented, while country-level collaborations are dominated by advanced economies, leaving developing countries at the margins of global scholarly debates.

The findings suggest three key implications. First, deeper theorization is needed to move beyond descriptive accounts toward conceptual frameworks linking bureaucratic reform with sustainability outcomes. Second, greater emphasis should be placed on local governance and context-specific bureaucratic practices, as these are critical for translating global agendas into practical results. Third, more inclusive collaboration networks, particularly South-South partnerships, are essential to diversify perspectives and enrich the global knowledge base. In conclusion, this study demonstrates the value of bibliometric mapping in clarifying fragmented scholarship and pointing to future research directions. By strengthening conceptual development, fostering inclusive collaboration, and bridging normative ideals with institutional realities, scholars and practitioners can better position bureaucracy as a vital enabler of sustainable development.

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Disclosure Statement

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Data Availability Statement

The data will be available upon request to the corresponding author.

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