Policy advisory systems and public policy making: bibliometric analysis, knowledge mapping, operationalization, and future research agenda

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Policy advisory systems and public policy making: Bibliometric analysis, knowledge mapping, operationalization, and future research agenda

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Abstract

This study offers a comprehensive overview of the literature on policy advisory systems (PAS), motivated by its significance, growing interest in the field among policy scholars, and the substantial body of recent research published recently. The study conducted a quantitative bibliometric analysis of 62 articles on PAS published between 1993 and 2022, using data extracted from the Web of Science and Scopus databases. The analysis included performance analysis, collaboration analysis, and science mapping (co-citation and co-word analysis). The dataset comprises articles published in 29 different journals, with 17.2% of these journals publishing three or more articles on PAS. Of the 80 authors in the dataset, 78.8% had only one publication. Over the past 5 years, there has been a 69% increase in the production of research on PAS, with the majority of output coming from Canada, Australia, Germany, and the Netherlands. The intellectual structure of the field was examined through co-citation analysis, revealing two main clusters named dynamics of PAS and Policy Advice & Policy Analysts' Role. The former focuses on the variations and dynamics of PAS, while the latter is more concerned with the

nature of policy advice and the role of policy analysts. The co-word analysis identified the most relevant issues linked with PAS, including policy advice, externalization, politicization, and policy capacity. The study has also provided operationalization of the concept with the support of empirical evidence and categorized it into internal and external PAS. Externalization is the dominant trend in Anglophone countries, while public service in Europe and Canada has been the focus of internal PAS research. The study identifies gaps in the literature and calls for further research on the application of PAS in the Global South, the demand for policy advice, and comparative analysis of PAS across different contexts and dimensions.

KEYWORDS

bibliometric analysis, co-citation analysis, co-word analysis, operationalization of PAS, policy advisory systems, science mapping

INTRODUCTION

Policy advice has recently attracted increasing scholarly attention (Pattyn et al., 2022). There is a broad range of activities that fall under the policy advice function, such as "research, data analysis, proposal development, consultation with stakeholders, formulation of advice for decision makers, guiding policy through governmental and parliamentary processes, and the subsequent evaluation of the outcomes of the policy" (Gregory & Lonti, 2008, p. 838; Veselý, 2017). The complex system of advice that circulates the government and adapts to the context it governs has long been recognized in the literature (Dror, 1984; Peters & Barker, 1993; Plowden, 1987). The notion of a system has more meaning than structure to those working within it (Craft & Halligan, 2020a). The public policy system is seen as "a vast repository of knowledge for policy" that "covers the relationships and flows of policy-relevant knowledge and information among people, organizations and institutions that have policymaking roles and responsibilities. Public policy is the outcome of a complex set of interactions among actors in the system" (Howard, 2012, p. 20). policy making is viewed as a system rather than a structure, with policy makers acting as stewards instead of top-down controllers of sharply defined processes. Actors in this system include ministers, government departments, businesses, charities, universities, research institutes, NGOs, consultants, and individual citizens (Howard, 2012, p. vi).

Initially focusing on individual public service analysts, policy advice has evolved into examining "policy advisory systems" (Craft & Wilder, 2017). The concept of a policy advisory system (PAS) was introduced by Seymour-Ure (1987) as a way to describe the different sources and channels of policy advice available to governments. A distinction was made between internal and external sources of advice and between formal and informal communication channels. Additionally, four main types of policy advisers were identified: professional civil servants, political advisers,

consultants, and interest groups. The concept was later expanded by Halligan (1995) as a way to characterize and analyze the multiple sources of policy advice utilized by governments in policy-making processes. PAS was defined by Halligan (1995) as "the organizational configuration of advisory actors in a jurisdiction or a policy sector" and was conceived as an "interlocking set of actors and organizations that provide recommendations for action to policymakers" (Halligan, 1995, p. 3). A typology of PAS based on two dimensions was proposed by Halligan, with core and peripheral actors and high and low levels of government control over advice being distinguished. Two dimensions were used in the typology of PAS: the location of advice (internal or external to the government) and the exposure to government control (high or low). The concept was further developed by Craft and Howlett (2013) as a way to understand the dynamics and variations of PAS across countries, sectors, and time periods. They argued that PAS are influenced by three main factors: the complexity of policy challenges, the preferences and capacities of policy makers, and the availability and quality of policy advice. They also identified four main types of PAS based on two dimensions: the degree of externalization (the use of external sources of advice) and the degree of politicization (the use of partisan-political sources of advice).

Generally, the literature on PAS can be divided into two distinct waves. There has been a significant amount of scholarly work on policy advice since the seminal work of Halligan (1995), which laid the foundation for a framework for policy advice within a PAS with a focus on government control and location (Albert & Manwaring, 2019). For this reason, the initial research on PAS has centered around questions of location, where advisory supply is generated (inside or outside the government), and the degree to which the government controls it (Marando & Craft, 2017). In this view, the government occupies a core position within PAS, while the public service is its core advisory actor (Hustedt, 2019). Subsequently, Craft and Wilder (2017) emphasized having a "second wave" of policy advisory research and argued to go beyond this inside-outside dichotomy and degrees of government "control" of policy advice. The "second wave" of scholarship on policy advice calls for more attention to factors such as policy content, context, ideational compatibility, and network governance that shape the supply and demand of policy advice (Craft & Wilder, 2017; Halligan, 2015; Howlett, McConnell, et al., 2017). It also seeks to explore the diversity and dynamics of policy-advisory systems across different countries, regions, and sectors (Albert & Manwaring, 2019; Pattyn et al., 2022).

It is acknowledged that multiple actors share expertise and that externalization and politicization are important developments (Craft, 2015; Craft & Howlett, 2013; Howlett & Migone, 2013a). The shift to the growing externalization of policy advice reflects a more pluralized, polycentric advice-giving universe (Craft & Howlett, 2013; Veselý, 2013). In the current polycentric advisory systems (Craft & Howlett, 2013), the bureaucracy's privileged position as a provider of policy advice has been challenged by external actors such as private consultants (Howlett & Migone, 2013a), think tanks (Fraussen & Halpin, 2017), political advisors (Eichbaum & Shaw, 2010), policy labs (Lewis, 2021).

To analyze policy dynamics, an understanding of PAS is crucial (Campbell & Pedersen, 2014; Roy Chowdhury, 2019). It combines the power of politics with the knowledge of policy analysis and has become one of the central concepts in recent advisory scholarship (Hustedt, 2019). The policy advisory systems are essential for good governance and sound public decision-making, as they provide information, knowledge, and recommendations for actions to policy-makers (Craft & Halligan, 2020a). The concept is crucial because it helps to understand the country-specific organization and institutionalization of policy advice, as well as the interactive effects of different actors and sources of advice on policy outcomes (Craft & Halligan, 2020a; Craft & Howlett, 2017). The intellectual value it adds to the policy analysis scholarship is that it enables researchers to

integrate the analysis of dimensions of power and knowledge in policy making instead of separating them into different analytical perspectives (Craft & Halligan, 2020a). It also allows for comparative analysis of advisory systems across countries and sectors and for identifying the drivers and consequences of change in advisory systems (Craft & Halligan, 2020a; Hustedt & Veit, 2017). However, PAS are also subject to change and variation across countries, sectors, and time periods, depending on the complexity of policy challenges, the preferences and capacities of policy makers, and the availability and quality of policy advice (Craft & Halligan, 2020a; Hustedt & Veit, 2017). Therefore, it is important to understand the gaps in the literature on PAS and how they can be addressed.

In the recent past, policy advisory literature has seen enormous growth as few journals and specialized publications have been devoted to this subject; for instance, the articles have been published in the special issues of *Policy Studies (2019)*, 40(3–4) "Advancing the Second Wave of Policy Advisory System Studies: Multi-Level, Non-OECD and Demand Side Dynamic," *Policy Sciences*, (2017), 50(1) "Policy advisory systems: Change dynamics and sources of variation," *Policy and Society (2013)*, 32(3) "Externalization and Politicization of Policy Advice Systems," and books such as Howlett, Wellstead, and Craft (2017). *Policy work in Canada: Professional practices and analytical capacities*. University of Toronto Press and, more recently, by Craft and Halligan (2020a). *Advising Governments in the Westminster Tradition: Policy Advisory Systems in Australia, Britain, Canada and New Zealand* (Cambridge Studies in Comparative Public Policy). Cambridge: Cambridge University Press. These publications prove the importance of the subject and invite further contributions to it.

The intellectual significance, growing interest of policy scholars in the field, and a significant number of publications on the subject have enticed us to conduct a quantitative bibliometric analysis of PAS. The analysis presents a comprehensive picture of PAS's structure and development. Although minimal qualitative reviews of this field are available in the literature (for example, Craft & Halligan, 2017; Galanti, 2017), this is the first study to use a quantitative approach and map this scientific field comprehensively and systematically. The quantitative review enhances the understanding of this research field and contributes to a deeper scientific debate. The study will utilize performance analysis, collaboration analysis, and science mapping to describe the primary outputs and evolution of the research field, examine collaboration practices, map the social structure of the field, and define the intellectual structure. Furthermore, the study will provide an operationalization of PAS based on empirical evidence. Additionally, the study will identify gaps in the current literature and propose future research directions.

METHODS

The bibliometric method of literature reviews is widely used across a wide range of disciplines, for example, in the social sciences (Cuccurullo et al., 2016; Singh & Verma, 2022), public health (Yang & Qi, 2022), business research (Kumar et al., 2021), management (Fusco et al., 2020; Verma & Gustafsson, 2020), and medical sciences (Kumar et al., 2022). This method is based on the statistical measurement of science, scientists, or scientific activity. Consequently, this is considered more systematic, objective, and reproducible (Feng et al., 2017; Klarin, 2019). As the name suggests, bibliometric techniques are designed to gain insight into a scientific field's structure, social networks, and relevant themes by analyzing the bibliographic attributes of a document (also called "metadata"). These attributes include the author, citations, collaboration, and the keyword (Aria & Cuccurullo, 2017).

Data collection

The bibliometric analysis of scientific papers is generally performed using either Clarivate Analytics' Web of Science™ or Elsevier's Scopus® database (Pranckutė, 2021). However, we collected data from both of these internet databases since these bibliographic databases are widely acknowledged as the most comprehensive sources of data (Zhu & Liu, 2020). The search criteria were "policy advisory system" OR "policy advice system" in the string "topic" (that is, title, abstract, and keywords). We also tried other variations of the keyword. The query was launched in August 2022 and resulted in the retrieval of 121 documents. All documents were in the English language. The search was then refined by document type (articles and reviews) to obtain peer-reviewed records. We set no time limit for gathering records that have evolved since their first appearance in literature. The filtering stage produced a sample of 113 articles from both databases for further analysis.

The preliminary source analysis regarding the abstract represents a useful quality criteria assessment to the extent that it allows us to remove all the irrelevant articles from the sample. Two other authors verified the evaluation after the first author carried it out, and any discrepancies were discussed. Consequently, due to this screening, there was less chance of including unrelated articles or excluding pertinent ones. As the data were retrieved from two different databases, there were chances of duplicate entries, and for that matter, R-Studio, Zotero, and MS Excel software[1] were employed to delete duplicate entries in the dataset. Overall, 51 duplicate entries were found and removed after thorough screening, resulting in a sample of 62 articles for further processing. All the retrieved articles, 62, were included for bibliometric analysis as they all were relevant to the research field. This research process is summarized in Figure 1.

Data analysis

The bibliometric analysis was done primarily using RStudio biblioshiny package. The Bibliometrix package of RStudio is an excellent scientific mapping tool for non-coders (Aria & Cuccurullo, 2017).
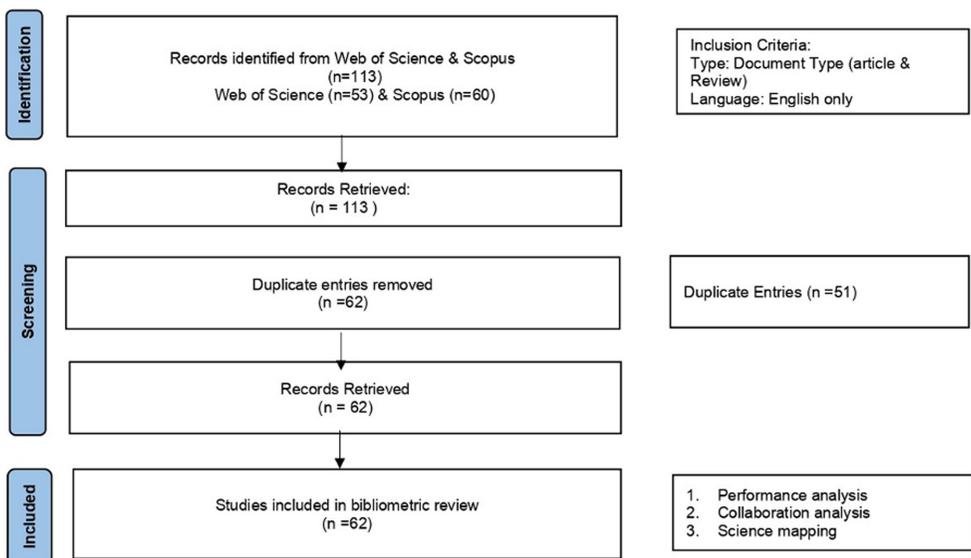

FIGURE 1 Flow chart of data collection & screening.

The analysis includes eight levels: dataset, authors, sources, documents, clustering, conceptual, intellectual, and social. Each level has different indicators, statistical measures, and visual representations. Using this software, we carried out all the analysis (performance analysis, collaboration analysis, and science mapping); our only use of Zotero and MS Excel was to check for duplicate entries.

Performance analysis

In performance analysis, research constituents are examined concerning their contributions to a given field (Cobo et al., 2011). Descriptive analysis is significant in bibliometric studies (Donthu, Kumar, et al., 2021). The sample characteristics are highlighted during the analysis. To determine the performance metrics, the research field is quantified (number of publications and citations), the most important actors are identified (most cited, most productive, etc.), and groups of scientific actors (countries, universities, researchers) and their impact is evaluated (Cobo et al., 2015; Donthu, Reinartz, et al., 2021). Citation analysis was also performed at this stage. It is hypothesized that authors cite the most important documents in their research. Citation frequency determines how much impact a study has on the field (Fusco et al., 2020; Podsakoff et al., 2005). Citations, therefore, can be used to understand the intellectual dynamics of a research area by analyzing the most influential publications (Donthu, Kumar, et al., 2021).

Collaboration analysis

Our next step was to conduct a scientific collaboration analysis to highlight the most relevant links between the actors and the countries concerned. Scientific collaboration analysis has been extensively used in a wide range of research fields to identify the social structure of a field of research. With social network analysis, the nodes of the network are the authors or countries where the institutions are located, and the edges (links) are established according to the co-authors of the articles (Yan & Ding, 2012).

Science mapping

In order to perform the science mapping, a co-citation analysis and co-word analysis tools are used. Science mapping "is a spatial representation of how disciplines, fields, specialties, and individual papers or authors are related to one another" (Cobo et al., 2011, p. 147). It provides insight into the intellectual structure of a field of research (Rossetto et al., 2018), such as the underlying themes (Liu et al., 2015). A co-citation occurs when two documents are cited together in the literature; it assumes that two documents are co-cited if they have conceptually similar content (Hjørland, 2013; Trujillo & Long, 2018). A higher co-citation frequency indicates an article's relevance within a given field of research (Small, 1973). Co-citation analysis allows researchers to discover thematic clusters and the most influential publications. This analysis produces a network clustering representing cited documents, whose size varies depending on how many citations they receive. A co-citation edge is weighted by the number of times it has been cited together with another document (Trujillo & Long, 2018). In this bibliometric analysis, we consider network nodes with a co-citation score of at least two and a threshold of 50.

According to Callon et al. (1991), the co-occurrence of key terms (i.e., abstract, title, or keywords) provides insight into the content of a document. Various topics treated in the research field are clustered and visualized using this technique. In a "strategic diagram" or map, thematic clusters are visualized using the approach developed by Cobo et al. (2011, 2015). In addition, the authors read abstracts or full texts of papers to enrich the quantitative bibliometric analysis with relevant information.

RESULTS AND DISCUSSION

Performance analysis: Sample characteristics

A sample of articles from 1993 to 2022 was selected. Table 1 presents the sample statistics.

A mere 9.36% growth rate is recorded in this relatively new field. The concept of the policy advisory system was introduced by Seymour-Ure (1987), and his work appeared in an edited book, "Advising the Rulers" based on conference papers. Subsequently, Johnston (1993) and Conrad (1993) examined PAS in the context of advising the German and Australian governments on science and technology policy. It was, however, Halligan (1995) who expanded the concept. During the last five years, this research field has experienced a 69% increase in production, with the most significant increase occurring in 2017 and 2019 when two journals (*Policy Sciences* and *Policy Studies*) published special issues on policy advisory systems (Figure 2).

In total, 80 authors contributed to the work, and a collaboration index of 1.73 was calculated using only multi-authored articles. There is an average of 1.29 authors per document, and 47% are single-authored.

The publication concentration is further illustrated in Figure 3 using Lotka's Law of scientific productivity. Lotka's Law helps to determine productivity patterns in each field of study over a specified period of time (Adigwe, 2016). The method can be used to determine whether a large number of authors dominate the analyzed research area (López-Fernández et al., 2016). The output is dominated by authors with only one publication, 63 out of 80 authors, which makes up 78.8% of the total authors. The remaining 17 authors have written two or more two articles. The average number of documents per author is 0.78. Michael Howlett and Jonathan Craft are the most productive authors, with 11 and 7 publications, respectively (Table 2).

TABLE 1 Sample description.

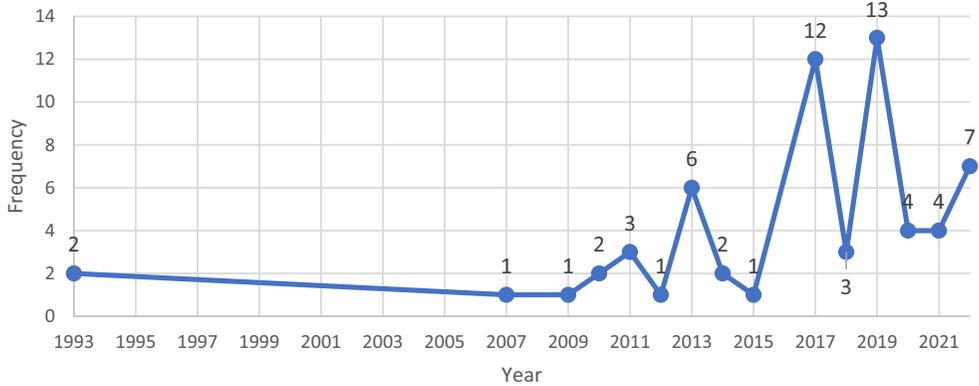| Description	Results
Timespan	1993:2022 (August)
Sources (Journals)	29
Documents (Articles)	62
Authors	80
Author appearances	121
Single-authored documents	29
Authors per document	1.29
Collaboration index	1.73

FIGURE 2   Annual scientific production.
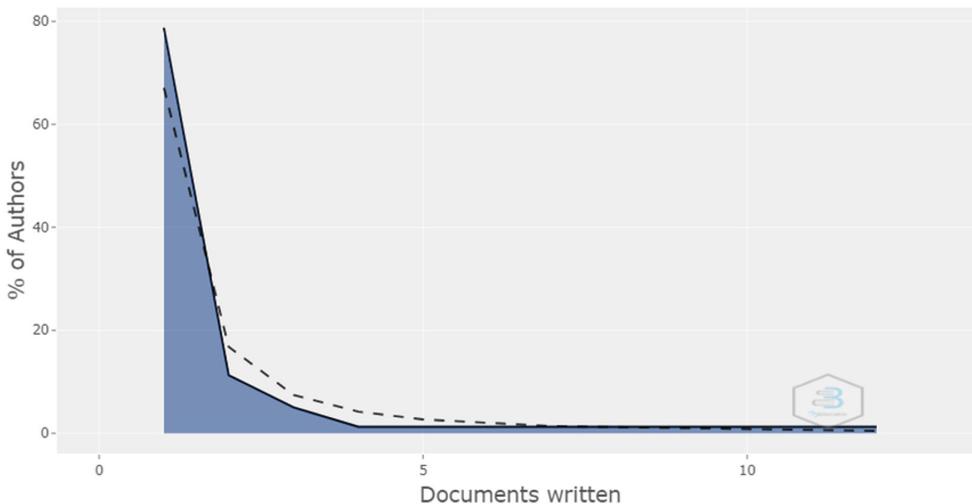
FIGURE 3   Lotka law of scientific productivity.

The dataset comprises 29 sources (journals), of which 5 published three or more articles (17.2%). Regarding publications, *Policy Sciences*, and *Policy Studies* are the most productive journals, with nine and eight publications, respectively. Rankings differ when we consider citation counts. *Despite having just four publications, Policy & Society has the most citations (TC = 255).* Similarly, *Journal of Public Policy* only has one publication, the seminal work of Craft and Howlett (2012), with 157 citations. According to the WOS categories, the top 10 journals predominantly relate to political science and public administration.

Based on the authors' affiliations, the geographical distribution of papers appears to be dominated by four countries (Canada, Australia, Germany, and the Netherlands). Canada is the leading country with 31 affiliations (Figure 4).

The top 10 manuscripts per total citations are shown in Table 3. These articles are all focused on various aspects of PAS, which are structures that provide advice to policy makers on policy development, implementation, and evaluation. These articles include both conceptual and empirical papers. Four of those five empirical papers use quantitative methods (e.g., Howlett, 2009, 2011; Howlett & Migone, 2013b; Howlett & Newman, 2010). The survey data in all four

TABLE 2 Most productive authors and journals.

Author	NP	TC	Source	WoS/Scopus category	NP	TC
Michael Howlett	11	579	Policy Sciences	Public Administration; Social sciences	9	202
Jonathan Craft	7	379	Policy Studies	Public Administration	8	42
Andrea Migone	4	116	Policy and Society	Public Administration; Political Science	4	255
Thurid Hustedt	4	66	Central European Journal of Public Policy	Social Sciences[a]	3	75
Bryan Evans	3	48	Administration & Society	Social Sciences; Business Management & Accounting[a]	2	17
Adam M. Wellstead	3	48	Canadian Public Administration	Public Administration	2	16
John Halligan	2	58	International Journal of Public Administration	Public Administration	2	22
Sylvia Veit	2	43	Policy Studies Journal	Public Administration; Political Science	2	60
Bert Fraussen	2	41	Journal of Public Policy	Public Administration; Political Science	1	157
Darren Halpin	2	41	International Review of Public Administration	Social Sciences[a]	1	41

Abbreviations: NP, number of publications; TC, total citations.

[a]Scopus category.

Rank	Region	Freq	Rank	Region	Freq
1	Canada	31	6	Singapore	7
2	Australia	15	7	Belgium	5
3	Germany	10	8	Italy	5
4	Netherlands	10	9	USA	4
5	Russia	7	10	Czech Republic/Denmark/Norway/Switzerland/UK	2
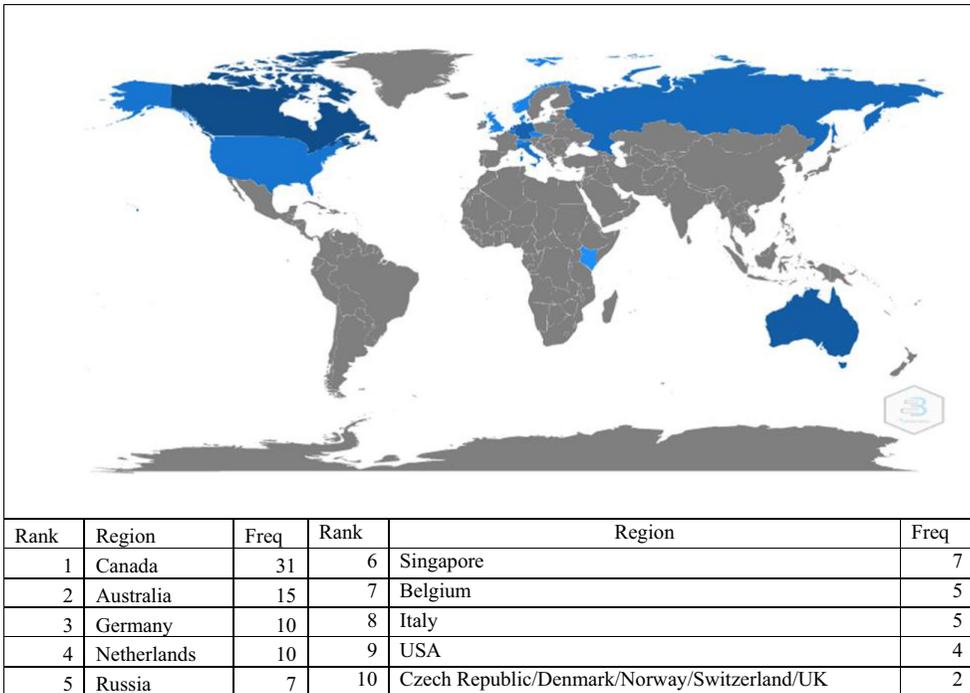
FIGURE 4 Scientific production by country. Dark blue indicates high productivity, while gray indicates no articles. *Source*: Biblioshiny.

papers were collected from Canadian respondents. Fraussen and Halpin (2017) used a qualitative method based on interviews.

Craft and Howlett (2012, 2013) explore the location, content, and impact of externalization and politicization on policy advisory systems, while Howlett and Newman (2010) investigate the contribution of policy advice to evidence-based policy making in multi-level governance systems. Craft and Halligan (2017) assess the experience of the Westminster PAS over the past 30 years. Howlett and Migone (2013) investigate the work of Canadian policy consultants, while Craft and Wilder (2017) explore the context and compatibility in advisory system dynamics. Howlett (2009) focuses on the role of sub-national policy analysts and analysis in multi-level governance systems. Howlett (2011) investigates the missing variable in policy studies: public managers' role. Finally, Fraussen and Halpin (2017) examine the contribution of think tanks to PAS. These articles provide valuable insights into PAS's evolving nature and challenges and the complex interplay between expertise, politics, and governance in shaping policy advice and decision-making. They offer a range of theoretical frameworks, empirical evidence, and policy recommendations that can inform and enrich this field's academic and policy debates.

Policy advisory systems are the main topic of the top 10 most cited references (Table 4). Despite some criticisms and challenges, PAS remains an essential aspect of contemporary governance, potentially enhancing policy-making effectiveness and accountability (Craft & Halligan, 2017; Meltsner, 1976). The concept has undergone significant changes over the past few decades. Researchers have identified externalization and politicization as key dynamics affecting policy advice (Craft & Howlett, 2013; Veselý, 2013). Craft and Howlett (2012) have looked at the location and content of policy advisory systems and how governance shifts

TABLE 3   Top 10 manuscripts by citations.

Full reference	Total citations (TC)	TC per year	Type of article
Craft, J., & Howlett, M. (2012). Policy formulation, governance shifts and policy influence: Location and content in policy advisory systems. *Journal of Public Policy*, **32**(2), 79–98. doi: 10.1017/S0143814X12000049	157	14.2727	Conceptual
Craft, J., & Howlett, M. (2013) The dual dynamics of policy advisory systems: The impact of externalization and politicization on policy advice. *Policy and Society*, 32 (3), 187–197. doi: 10.1016/j.polsoc.2013.07.001	99	9.9	Conceptual
Howlett, M., & Newman, J. (2010) Policy analysis and policy work in federal systems: Policy advice and its contribution to evidence-based policymaking in multi-level governance systems. *Policy and Society*, **29**(2), 123–136. doi: 10.1016/j.polsoc.2010.03.004	92	7.0769	Empirical
Craft, J., & Halligan, J. (2017). Assessing 30 years of Westminster policy advisory system experience. *Policy Sciences*, **50**, 47–62. doi: 10.1007/s11077-016-9256-y	45	7.5	Conceptual
Howlett, M., & Migone, A. (2013) Policy advice through the market: The role of external consultants in contemporary policy advisory systems. *Policy and Society*, **32**(3), 241–254. doi: 10.1016/j.polsoc.2013.07.005	43	4.3	Conceptual
Craft, J., & Wilder, M. (2017), Catching a second wave: Context and compatibility in advisory system dynamics. *Policy Studies Journal*, **45**, 215–239. doi: 10.1111/psj.12133	41	6.8333	Conceptual
Howlett, M. (2009) Policy advice in multi-level governance systems: Sub-national policy analysts and analysis. *International Review of Public Administration*, 13(3), 1–16. doi: 10.1080/12294659.2009.10805127	41	2.9286	Empirical
Howlett, M. (2011), Public managers as the missing variable in policy studies: An empirical investigation using Canadian data. *Review of Policy Research*, **28**, 247–263. doi: 10.1111/j.1541-1338.2011.00494.x	38	3.1667	Empirical
Howlett, M., & Migone, A. (2013). Searching for substance: Externalization, politicization and the work of Canadian policy consultants 2006–2013. *Central European Journal of Public Policy*, **7**(1), 112–133.	35	3.5	Empirical
Fraussen, B., & Halpin, D. (2017). Think tanks and strategic policymaking: The contribution of think tanks to policy advisory systems. *Policy Sciences*, **50**, 105–124. doi: 10.1007/s11077-016-9246-0	31	5.1667	Empirical

have influenced policy influence, while Craft and Wilder (2017) highlight the importance of context and compatibility in advisory system dynamics. Hustedt and Veit (2017) explore the change dynamics and sources of variation in PAS, while Craft and Halligan (2017) assess

TABLE 4 Top 10 most cited references.

Cited references	Citations	Type of publication	Approach (if applicable)
Craft, J., & Howlett, M. (2012). Policy formulation, governance shifts and policy influence: Location and content in policy advisory systems. *Journal of Public Policy*, 32(2), 79–98. doi: 10.1017/S0143814X12000049	36	Academic Paper	Conceptual
Halligan, J. (1995). Policy advice and the public sector. In B. Guy Peters & D. T. Savoie (Eds.), Governance in a changing environment (pp. 138–172). McGill-Queen's University Press.	35	Book	n.a
Craft, J., & Howlett, M. (2013). The dual dynamics of policy advisory systems: The impact of externalization and politicization on policy advice. *Policy and Society*, 32(3), 187–197. doi: 10.1016/j.polsoc.2013.07.001	31	Academic Paper	Conceptual
Veselý, A. (2013). Externalization of policy advice: Theory, methodology and evidence, *Policy and Society*, 32(3), 199–209. doi: 10.1016/j.polsoc.2013.07.002	20	Academic paper	Conceptual
Craft, J., & Wilder, M. (2017). Catching a second wave: Context and compatibility in advisory system dynamics. *Policy Studies Journal*, 45, 215–239. doi: 10.1111/psj.12133	17	Academic Paper	Conceptual
Hustedt, T., & Veit, S. (2017). Policy advisory systems: Change dynamics and sources of variation. *Policy Sciences*, 50, 41–46. doi: 10.1007/s11077-016-9272-y	15	Editorial Introduction	Conceptual
Craft, J., & Halligan, J. (2017). Assessing 30 years of Westminster policy advisory system experience. *Policy Sciences*, 50(1), 47-62. doi: 10.1007/S11077-016-9256-Y	14	Academic Paper	Conceptual
Eichbaum, C. and Shaw, R. (2007), Ministerial advisers and the politics of policymaking: Bureaucratic permanence and popular control. *Australian Journal of Public Administration*, 66, 453–467. doi: 10.1111/j.1467-8500.2007.00556.x	13	Academic Paper	Conceptual
Meltsner, A. J. (1976). *Policy analysts in the bureaucracy*. University of California Press.	12	Book	n.a
Maley, M. (2000). Conceptualizing advisers' policy work: The distinctive policy roles of ministerial advisers in the keating government, 1991–96. *Australian Journal of Political Science*, 35(3), 449–470. doi: 10.1080/713649346	11	Academic Paper	Conceptual

30 years of Westminster PAS experience. Eichbaum and Shaw (2007) discuss the role of ministerial advisers in policy making and the balance between bureaucratic permanence and popular control. Meltsner (1976) examines the role of policy analysts in the bureaucracy,

while Maley (2000) conceptualizes the policy roles of ministerial advisers in the Keating Government. Halligan (1995) provides a broader overview of policy advice and the public sector. Overall, these articles critically evaluate the complexities involved in PAS and provide insights into how they have evolved over time.

Collaboration analysis

Collaboration analysis has been carried out to analyze collaboration practices and map the social structure where countries and authors are considered as units of analysis. This analysis provides an overview of the scientific collaboration and research communities regarding different aggregation levels (Yan & Ding, 2012). Collaboration networks show how authors and countries relate to others in a specific field of research.

Figure 5 presents cross-country collaboration and collaboration among authors. In the first analysis (A), only two clusters are distinguished by their colors. The network has its central and most important node in Canada (betweenness centrality = 5); the other top node is Australia (between centrality = 3).

As shown in Table 5, the results are not unexpected. Canada has the most publications and cross-country collaborations (7 multi-country collaborations). Further comments can be made regarding the multi-country collaboration ratio of the top 10 countries per publication, that is, the ratio between the number of multi-country collaborations and the total number of papers attributed based on the corresponding author's affiliation. Despite only having two publications, Singapore has a better MCP ratio (0.5).

In the second analysis, five clusters are distinguished by their colors (Figure 5b). To understand long-term collaborations, we excluded one-shot collaborations from the co-authorship network (min.edge = 2). Only 11 out of 80 authors appear to have collaborated with the same research group more than once. The network has its central and most important node in Michael Howlett (betweenness centrality = 4), followed by Jonathan Craft (betweenness centrality = 3).

The first group comprises three authors: Michael Howlett, Seck L Tan, and Andrea Migone. It exhibits an academic cross-national network between Canadian and Singaporean authors with a research focus on policy formulation and appraisal. The second group consists of Jonathan Craft
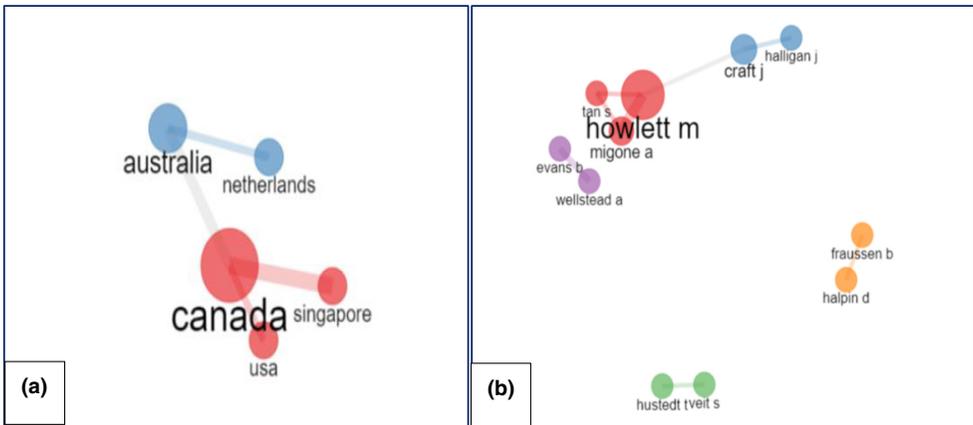

FIGURE 5 (a) Cross-Country Collaborations (b) Collaboration among authors.

TABLE 5   Production and collaborations of countries.

Country	Articles	Freq	SCP	MCP	MCP_Ratio
Canada	21	0.3443	14	7	0.333
Australia	10	0.1639	8	2	0.2
Germany	6	0.0984	4	2	0.333
Russia	5	0.082	5	0	0
Italy	3	0.0492	3	0	0
Netherlands	3	0.0492	2	1	0.333
Belgium	2	0.0328	2	0	0
Denmark	2	0.0328	2	0	0
Singapore	2	0.0328	1	1	0.5
United Kingdom	2	0.0328	2	0	0

and John Halligan. The network is composed of Canadian and Australian academics interested in PAS. The third group comprises Thurid Hustedt and Sylvia Veit from Germany, who are researching change dynamics and sources of variation in PAS. The fourth group consists of Bryan Evans and Adam Wellstead. There is a network of academics from Canada and the USA who are interested in policy dialogue and engagement. The fifth group is made up of Darren R. Halpin and Bert Fraussen. It is a cross-national network of Australian and Dutch academic authors focused on collaborative governance.

Science mapping

Science mapping was conducted using co-citation and co-word analyses. This technique is helpful in measuring the intellectual structure and major themes of the research field.

Co-citation analysis

Co-citation analysis is used to analyze the intellectual structure of a dataset by verifying the presence and frequency of co-citations and identifying which clusters of citations are conceptually related (Liu et al., 2015; Rossetto et al., 2018). The analysis offers the benefit of allowing researchers to find the most influential publications and discover thematic clusters. Using the cited publications, thematic clusters are derived (Donthu, Kumar, et al., 2021). Figure 6 shows the co-citation analysis with a minimum degree of co-citation equal to 2 and a threshold of 50 network nodes.

The results show that a critical node in the network is "halligan j. 1995" (betweenness centrality = 235.33), followed by "craft j. 2012" (betweenness centrality = 226.09). The results are not surprising, as they are correlated with citation analysis (Table 3) and the most cited references (Table 4). Co-citation analysis revealed two main clusters distinguished by their colors.

Cluster 1 (Red): Dynamics of PAS
In recent years, scholars have conducted extensive research on PAS, examining the factors influencing policy formulation, governance shifts, and policy influence (Craft & Howlett, 2012;

FIGURE 6 Co-citation analysis of papers.

Veselý, 2013). The dual dynamics of PAS have also been explored, with particular attention paid to the impact of externalization and politicization on policy advice (Craft & Howlett, 2013). Studies have compared PAS beyond the OECD, analyzing models, dynamics, and the second-generation research agenda (Howlett, 2019). Scholars have also examined the contribution of think tanks to policy advisory systems, highlighting their role in strategic policy making (Fraussen & Halpin, 2017). Additionally, researchers have investigated expert-based information and policy sub-systems, synthesizing findings from previous studies (Weible, 2008). Other studies have focused on institutionalized advisory systems, analyzing member satisfaction with advice production and use across different councils (Fobé et al., 2013). Furthermore, scholars have explored the relationship between knowledge, power, and international policy coordination (Haas, 1992). These studies have enriched the understanding of policy advisory systems, highlighting the need to reconcile different theoretical approaches to policy process theory (Howlett et al., 2015).

Cluster 2 (Blue): Policy advice & policy analysts' role
This cluster covers a wide range of topics related to policy making and advisers' roles in politics. The role of ministerial advisers and their influence in policy making is a prominent theme in these articles, and several authors highlight the tension between popular control and bureaucratic permanence in this regard (Eichbaum & Shaw, 2007). Eichbaum and Shaw (2007, 2008) explore ministerial advisers' role in policy making and highlight the importance of ministerial advisers in executive government policy making. It examines the perceptions of political advisers as threats to civil service neutrality and describes the various manifestations of those threats. Eichbaum and Shaw (2010) examine the role of partisan appointees and public servants in various countries and analyze how these actors interact in policy making. Some authors discuss the distinctive policy roles of ministerial advisers in different government systems (Fleischer, 2009; Maley, 2000) and the limits of contracting out policy advice (Boston, 1994). Others examine the capacity and evolving role of public service in advising federal governments (Tiernan, 2011) and the impact of think tanks on policy making (Bertelli & Wenger, 2009). In addition, some works explore the broader concept of policy analysis, such as policy sub-systems and policy cycles (Howlett, 2009) and the evaluation of policy advice (Weller & Stevens, 1998). Overall, the articles in this group offer valuable insights into the complex and dynamic nature of policy making, advising, and analysis in different political systems.

The co-word analysis

We used co-word analysis through the network (Figure 7) to determine whether and how the topic of 'policy advisory systems' interacts with other issues. The co-word analysis highlights literature themes using noun phrases or terminology (Castriotta et al., 2021). The dataset was screened before analysis to prevent deviant results. Keywords were harmonized (e.g., singular and singular, English and American styles, hyphenated or not).

Since policy advice is closely tied to policy advisory systems, it is one of the most frequently recurring topics (Keywords = 20). It, therefore, appears that policy advice is a significant component of the policy advisory literature. Traditionally, it has been seen as a formulation stage activity involving analyzing problems and proposing solutions (Halligan, 1995, p. 139). To be more precise, it refers to the provision of recommendations, guidance, and the articulation of preferences in support of policy making (Craft & Halligan, 2017). According to Howlett (2018) and Craft and Howlett (2013), "cold" types of policy advice are long-term and proactive, while "hot" types of policy advice are short-term and crisis-driven. Cold advice involves a more strategic and planned approach, where policy makers seek advice in advance of a problem or issue. On the other hand, hot advice is reactive and often occurs in response to a crisis or urgent situation. Practical policy advice requires a robust and transparent process that involves consultation with stakeholders, rigorous analysis of evidence, and consideration of the potential impacts of policy decisions. The PAS must be responsive to changing circumstances, emerging issues, and the evolving needs of society (Craft & Wilder, 2017; Marciano & Craft, 2023).

Another prominent topic is 'externalization' linked to PAS (Keywords = 7). Policy advisory systems encompass diverse actors who exist and collaborate with each other. These actors may be located within or outside the government (Craft & Howlett, 2013). As such, PAS goes beyond the confines of internal government expertise and knowledge dissemination activities (Howlett & Migone, 2013a). Externalization of policy advice is a shift from government-supplied policy advice to suppliers outside the government. Demand-side users of advice expect greater political

FIGURE 7 Most recurring issues.

control and responsiveness over the administration, as well as solutions to the 'wicked' problems posed by globalization. On the supply side, public-sector reforms have eroded the policy capacities of the civil service, and external sources of advice are now providing more advice. As policy advice increasingly externalizes, such a phenomenon reflects a more pluralized and polycentric universe of advice-giving (Craft & Howlett, 2013; Veselý, 2013). According to Howlett (2009), the externalization of policy advice is a common trend in contemporary policy advisory literature. This trend has been driven by the increasing complexity of policy problems and the need for specialized expertise to address them. This prevalence of externalization is due to the growing emphasis on evidence-based policy making and policy makers seeking expert advice from various sources, including academia, think tanks, and consulting firms, to make informed decisions based on the best available evidence. This has also been facilitated by advances in technology, which have made it easier to access and share information across different organizations and sectors (Craft & Halligan, 2017; Howlett, 2009).

Policy advisory systems may lack diversity regarding the types of expertise and perspectives represented, which can lead to narrow policy advice. Externalization of policy advice may also have negative consequences, such as reducing the capacity for internal learning, accountability, and the ability to reflect public values (Craft & Howlett, 2013; Diamond, 2020a). The reliance on external consultants or think tanks can limit the institutional capacity of PAS. Externalization may result in the fragmentation of advice and a lack of coordination between advice givers, leading to policy incoherence (Howlett & Migone, 2013a). External consultants may also prioritize their interests over those of the public or government they advise, leading to conflicts of interest (Craft & Halligan, 2017). Overall, the externalization of policy advice has become an essential feature of contemporary PAS, enabling policy makers to draw on expertise and evidence to address complex policy problems. It is also crucial for policy makers to carefully consider the potential impacts of externalization when designing policy advisory systems.

The other critical dynamic that affects policy advice is politicization (Keywords = 6). The deinstitutionalization of policy making has led to the engagement of a diverse range of actors in the policy process, which has resulted in the politicization of policy advice (Diamond, 2020a; Reid, 2012). Politicization is replacing non-partisan sources of policy advice with partisan/political ones (Craft & Howlett, 2013). As a result of politicization, political advice is increasingly used within government; political acumen is increased; political appointees are increasing in numbers and roles, and ministerial advisors are hired to assist elected officials (Bleiklie & Michelsen, 2022). It is no longer the responsibility of civil servants to give expert advice on policy matters based on political considerations, but also of political advisers, who are increasingly responsible for providing technical policy advice and coordinating and brokering actions. But there are also differences in the extent to which this occurs across states, countries, and sectors (Craft, 2013; Eichbaum & Shaw, 2007; Gouglas, 2015; Maley, 2000).

The addition of advisers to the PAS serves multiple purposes. Firstly, it aims to enhance ministers' control over policy decisions. Secondly, it addresses perceived shortcomings in public service advice and provides additional expertise. Thirdly, it increases ministers' capacity to navigate the political dimensions of policy work. However, the effects of advisers have sparked debates regarding politicization (Craft & Halligan, 2020b). The politicization of policy advice can lead to the erosion of "frank and fearless" advice, which is essential for effective policy making (Mulgan, 1998; Reid, 2012). The ongoing trend of politicization in policy work had a dampening impact on overall policy capacity (Sapeha et al., 2020).

Another important topic that is linked with PAS is policy capacity (keywords = 6). Policy capacity is a key determinant of effective policy implementation (Craft & Howlett, 2012, 2013;

Diamond, 2020a, 2020b). It refers to the ability of government organizations to effectively design, develop, and implement policies that address complex societal problems (Craft & Howlett, 2013; Howlett & Mukherjee, 2014). It depends on the availability and quality of skills, resources, and networks that policy actors possess or can access. It can be assessed at different levels, such as individual, organizational, and system levels, and across dimensions, such as analytical, operational, and political skills (Wu et al., 2015). It is acknowledged among policy experts, and professionals that governments possessing strong policy capacity have a greater ability to devise and execute policies to achieve their desired objectives (Saguin et al., 2018). Goyal and Saguin (2019) examine the capacity of think tanks in India and find their limited capacity due to resource constraints and a lack of institutionalization. Lindquist and Tiernan (2011) examine the capacity of the Australian Public Service. Fraussen and Halpin (2017) investigate the capacity of think tanks to contribute to strategic policy making and their role in PAS and argue that think tanks can play a valuable role in strategic policy making by providing high-quality research, independent advice, and long-term perspectives.

OPERATIONALIZATION OF PAS AND FUTURE RESEARCH DIRECTIONS

The empirical evidence on the operationalization of PAS is presented in Table 6. Twenty-nine articles are empirical out of 62 in this sample. There is no doubt that policy advisory scholarship has taken both conceptual and empirical approaches to delve into PAS.

Based on the location of PAS, it has been categorized into internal and external PAS. The predominant focus of empirical research on internal PAS (inside to government) has been on Europe and Canada. Policy scholars have focused on the civil service, exploring a variety of concepts related to policy advisory scholarships, such as externalization and politicization of policy advice (Diamond, 2020a), deinstitutionalization and hybridization (Diamond, 2020b), scientification of policy advice (Laage-Thomsen, 2022), policy capacity (Evans & Wellstead, 2013; Sapeha et al., 2020) and meta-governance (Albert & Manwaring, 2019). Specifically, Schiffino and Krieger (2019) examine the role of Belgium's Advisory Committee on Bioethics (BACB) in determining the morality policies for Assisted Reproductive Technologies (ART) (e.g., abortion, euthanasia, stem cell research, and cloning).

Externalization has been an evident trend in PAS research. This can be correlated with the results of science mapping (Figure 7). The empirical evidence supporting the externalization thesis is predominantly in Anglophone countries focusing on ministerial advisers, think tanks, interest groups, policy labs, academia, and international policy actors. The focus of policy scholars is to examine think tanks and issues such as policy capacity (Fraussen & Halpin, 2017; Goyal & Saguin, 2019), policy agenda setting (Grömping & Halpin, 2021), and voter behavior and think tank ideology (Jacobsen, 2019). The work of Schlaufer (2019) examines how the International Monetary Fund (IMF), as an international policy actor, influences countries' policy cycles and instrument selection.

Governments rely on advice from various actors, including think tanks, lobbyists, political advisors, experts, and others inside and outside the government (Craft & Howlett, 2013). Think tanks are essential actors in PAS because they can provide expert-based, long-term, and anticipatory policy input (Grömping & Halpin, 2021) and play their role in strategic policy making (Fraussen & Halpin, 2017). Jacobsen (2019) examines how different sources of policy analysis affect the policy preferences of US voters. Non-partisan sources have more impact

TABLE 6 Empirical evidence on policy advisory systems.

	Manifestation of PAS	Relevant issues	Jurisdiction	Empirical evidence
Internal PAS	Government Institutions (bureaucracy, research institutions, policy workers, advisory commission)	Externalization, politicization, policy capacity, partnerships/network governance, scientization of policy advice	UK, Brazil, Canada, Denmark, Bangladesh, Italy, Germany, Netherlands, Norway	Albert and Manwaring (2019); Diamond (2020a, 2020b), Doberstein (2017a, 2017b); Evans and Wellstead (2013), Laage-Thomsen (2022), Howlett et al. (2014), Roy Chowdhury (2019), Sapeha et al. (2020), Galanti and Lippi (2022), Veit et al. (2017), Van den Berg (2017), Christensen (2018)
	Belgian Advisory Committee on Bioethics	Morality policies	Belgium	Schiffino and Krieger (2019)
External PAS	Ministerial Advisors	Policy roles in the policy process and policy advice utilization	Greece, Belgium	Gouglas (2015), Squevin and Aubin (2022).
	Political Staff	Political staff as policy advisory brokerage	Canada	Craft (2013)
	Think Tanks	Strategic Policy making (capacity, autonomy, long-term policy)	Australia	Fraussen and Halpin (2017)
		Policy capacity, control content	India	Goyal and Saguin (2019)
		Agenda setting	Australia	Grömping and Halpin (2021).
		Voter behavior and non-partisan Policy analysis	USA	Jacobsen (2019)
	Interest groups	Internal policy agenda setting	Australia	Halpin and Fraussen (2019).
	Consultants	Externalization and politicization	Canada	Howlett and Migone (2013b)
	International Policy Actor (IMF)	Policy cycle and instruments	Multiple	Schlaufer (2019)
	Policy Labs	Policy design and innovation	Australia & NZ	Lewis (2021), McGann et al. (2021)
	Academics	Partnerships	Canada, Belgium & Germany	Migone et al. (2022), Pattyn et al. (2022)

than partisan sources, especially when the partisan sources are not aligned with the voters' ideology. However, other factors may influence the impact of policy analysis from think tanks, such as the quality, credibility, visibility, and timeliness of the analysis (Rich, 2004). Think Tanks' capacity, control, and content are influenced by their funding sources, organizational structures, and policy networks. They face trade-offs between credibility, relevance, and legitimacy in their policy advice (Goyal & Saguin, 2019). However, their funding sources, organizational structures, and policy networks influence think tanks' capacity, control, and content. They face trade-offs between credibility, relevance, and legitimacy in their policy advice (Goyal & Saguin, 2019).

The science mapping and the presentation of empirical evidence on the operationalization of PAS provide insights for future research. The existing literature on PAS tends to focus on advanced industrialized democracies, particularly Anglophone and OECD countries, and there is a lack of attention given to PAS in developing countries (Craft & Halligan, 2016; Howlett, 2019). This neglect of the Global South limits our understanding of how policy advice is given and received in different contexts. It raises questions about the applicability of the PAS concept to these countries. These countries or regions may have different political systems, cultures, and development stages that affect the organization and functioning of PAS. They may also face different policy challenges, opportunities, and constraints that require different types and sources of policy advice (Howlett et al., 2018; Migone et al., 2022; Van den Berg, 2017).

Furthermore, the PAS within developing countries have less capacity to generate strategic policy advice, and variations can be expected in the kinds of policy advice supplied by the PAS in developing countries vis-à-vis developed (such as OECD) countries (Goyal & Saguin, 2019). Therefore, the application of the PAS concept to the Global South could be beneficial in understanding the strengths and weaknesses of PAS in these countries and identifying factors that influence their effectiveness. This knowledge could help improve policy formulation and implementation in the Global South. It would be helpful for policy makers, scholars, and practitioners in these regions and those interested in comparative policy-making research.

The PAS literature has traditionally focused on the supply side of policy advice; recent scholarship has called for a more comprehensive approach that takes into account both the demand and supply side of policy advice and reorients the unit of analysis from the public service to advisory systems themselves (Craft & Wilder, 2017). This includes a focus on the demand for policy advice, such as the political context, the policy agenda, and the preferences of decision-makers, which influence the demand for policy advice (Craft & Halligan, 2017; Craft & Wilder, 2017). Only two studies in the sample, Albert and Manwaring (2019) and Pattyn et al. (2022), have explored the demand side of policy advice. Albert and Manwaring (2019) address the demand side of policy advice by exploring how decision-makers in Brazil seek, receive, and use policy advice from various sources within a system of networked governance, while Pattyn et al. (Pattyn et al., 2022) compare the supply side and the demand side of academic policy advice in two consensus-seeking countries: Belgium and Germany using existing evidence and a survey of federal ministerial officials.

Another gap in the literature is the lack of comparative analysis across different contexts and dimensions of PAS. Most studies focus on single cases or specific aspects of PAS, such as politicization, externalization, or institutionalization of policy advice (Hustedt & Veit, 2017). However, there is a need for more systematic and comprehensive comparisons of PAS across countries, regions, levels of government, policy sectors, and types of policy issues. Such comparisons can help identify the factors that shape the demand and supply of policy advice, the patterns and trends of PAS change and stability, and the implications of PAS for policy

outcomes and democratic accountability (Craft & Halligan, 2020a; Van den Berg, 2017; Veit et al., 2017).

CONCLUSION

The Policy Advisory System concept is crucial for comprehending policy advice's intricate and constantly changing nature in contemporary governance. It considers the diverse range of actors and organizations that contribute to policy development and the interactions and relationships among them. By viewing policy making as a system rather than a structure, the PAS acknowledges the complexity and interdependence of the various components involved in policy development, facilitating a more comprehensive analysis of policy outcomes. This approach provides a more nuanced understanding of the processes and dynamics involved in policy making, which acknowledges the importance of different sources of advice available to policy makers and the broader policy environment in which policy decisions are made. Overall, the PAS concept offers a valuable tool for policy makers, scholars, and practitioners to better understand and navigate the complex world of modern governance by providing a more holistic view of the policy-making process and identifying potential areas for intervention or reform.

Based on Web of Science and Scopus databases exploration, the study can claim to be the first to use a quantitative approach and map this scientific field in a comprehensive and systematic way. The study conducts a bibliometric analysis of PAS research of 62 articles published in 29 journals from 1993 to 2022. It applies various bibliometric techniques such as performance analysis, citation analysis, collaboration analysis, and science mapping (co-citation & co-word analysis) to reveal PAS research's evolution and current state. The study reveals that PAS research has shown 69% growth during the last 5 years, with Canada, Australia, Germany, and the Netherlands being the most productive and influential countries. The study also identifies the most cited and impactful articles, authors, and journals in PAS research and the main research themes and trends based on science mapping. Furthermore, the study uncovers the operationalization of PAS concepts by detailing their empirical application in different contexts. The study provides valuable insights for policy scholars and practitioners interested in examining policy advice and its channelization in the public policy system and uncovering the role of different policy actors. A bibliometric approach has proved helpful in investigating and providing a comprehensive picture of PAS research and future research directions.

The policy advisory system is a valuable tool for informing policy decisions, but it is not without its limitations. One such limitation is the influence of power dynamics, which can marginalize underrepresented voices and grant greater access to policy advice for those with more influence or resources. This can lead to policies that do not adequately address all stakeholders' needs and concerns; eventually, policy makers may prioritize their interests or partisan agendas over objective advice. Moreover, the increased use of external consultants and other sources of advice can change advisory systems, leading to a dual dynamic of externalization and politicization that can impact policy advice and undermine the public service, a traditional source of policy advice. Additionally, reliance on experts can introduce biases and limited perspectives, potentially narrowing the range of policy options considered. Inadequate public engagement further exacerbates these limitations, undermining inclusivity and democratic accountability. Lastly, the PAS often focuses on policy formulation, neglecting implementation challenges. Recognizing and addressing these limitations is crucial to enhance the effectiveness and legitimacy of the policy advisory system.

Despite its valuable contributions, the paper has some limitations, mainly concerning bibliometric methodology. The search strategy was only based on keywords such as "policy advisory system" or "policy advice system," resulting in a smaller dataset. Linking this concept with other similar topics might have produced a larger dataset. However, this limitation has been tried to overcome by qualitative discussion besides statistics and by providing the operationalization of PAS in different jurisdictions.

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ENDNOTE

[1] Zotero and MS Excel were used to merge or delete the entries manually.

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