

# Bibliometric Review: Current Trends and Future Direction of Public Sector Budgeting

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## ABSTRACT

**Research aim:** This study conducts a bibliometric analysis to delve into the current state and future direction of public sector budgeting globally by scrutinising the overall publishing patterns and knowledge landscape surrounding the evolution of public sector budgeting research.

**Design/ Methodology/ Approach:** A bibliometric analysis technique was employed to study the development of scientific publications about public sector budgeting. The Scopus database was selected as the main database, and all the data were collected as of November 3, 2023. The first stage involved identifying all relevant documents from the Scopus database. Inclusion and exclusion criteria resulted in a total of 1,925 documents within the period between 1913 to November 3, 2023. The bibliometric analysis of public sector budgeting yielded significant insights into publication patterns, influential literature, notable authors, highly referenced works, and prevalent themes within this domain.

**Research finding:** This analysis reveals a consistent growth in published material over time, with the United States emerging as the primary contributor in terms of volume. Distinguished scholars like Hou Yilin and Richard J. Cebula have made substantial impact, garnering noteworthy citations for their contributions. Moreover, the review outlines prominent themes in public sector budgeting, underscoring the multifaceted nature of research within this crucial area.

**Practitioner/ Policy implication:** The study findings offer valuable perspectives for researchers, practitioners, and policymakers, enhancing comprehension of the challenges and prospects in public sector budgeting. Furthermore, longitudinal studies tracking the evolution of themes and trends in public sector budgeting over time could offer valuable insights into the changing landscape of budgetary practices in the public sector. Additionally, comparative studies across different countries and regions could provide a more nuanced understanding of the diverse approaches to public sector budgeting and the factors influencing budgetary practices in various contexts.

**Research limitation:** The analysis was based on a specific set of data from the Scopus database, and therefore, might not capture all publications in the field of public sector budgeting.

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Additionally, the review focuses on quantitative analysis of publication trends and citations; thus, the qualitative aspects of the included works are not fully explored. Furthermore, the study is limited to the available data and might not encompass the most recent publications in the field.

**Keywords:** Public Sector Budgeting, Bibliometric Analysis, Literature Review, VOS-Viewer

**Type of article:** Conceptual paper

**JEL Classification:** H61, H72, H83, M41, M48

## 1. Introduction

Budgets play a multifaceted role in organisational operations by functioning as a strategic instrument for planning, allocating resources, assessing performance, and facilitating informed decision-making. Its utilisation significantly bolsters an organisation's financial well-being and ensures its long-term sustainability. According to Libby and Lindsay (2010), budgeting is vital for controlling and managing an organisation's expenditures in the private and public sectors. In public sector organisations, budgeting serves as a central function for managing and allocating the nation's resources (OECD, 2014). Hornngren et al. (2012) state that a budget generally includes financial and non-financial aspects. In addition, budgets are part of management control intended to enhance efficient resource use and support other critical functions in public sector organisations.

Traditionally, budgeting is viewed as a process of allocating funds to different government departments and agencies (Pendlebury, Jones, & Karbhari, 1992). Budgeting ensures that expenditures are limited to available funds and prevents budget mismanagement. In a broader context, budgeting is increasingly required to fulfil additional tasks and duties, such as enforcing management responsibility and fulfilling external accountability (Anessi-Pessina et al., 2016). Simultaneously, governments face the challenge of meeting a growing and diverse demand for services while being responsible for economic development (Alsharari, 2022; Onofrei et al., 2023). Therefore, budgeting has been confirmed to be vital to public sector organisations, but there is room in public sector budgeting studies to examine and evaluate its roles and features.

Existing reviews on budgeting mainly focus on subtopics within the budget study field. Recently, Milosavljević, Spasenić, and Krivokapić (2023) performed a bibliometric review of participatory budgeting. Another bibliometric study was conducted by Güngör Göksu (2023), who analyses information from the *Journal of Public Budgeting, Accounting, and Financial Management* from 2011 to 2021. Finally, Naciti et al. (2023) conducted a bibliometric analysis of gender budgeting in the public sector. Besides the bibliometric review, Anessi-Pessina et al. (2016) performed a systematic review of public sector budgeting, focusing mainly on existing European literature and examining the contributions of public administration, public management, and accounting to current budgeting theories and practices.

However, none of these recent reviews thoroughly examine publishing patterns and knowledge structures regarding the evolution of studies on public sector budgeting globally. Thus, the present study conducts a bibliometric analysis to delve into the current state and future direction of public sector budgeting globally by scrutinising the overall publishing patterns and knowledge landscape surrounding the evolution of public sector budgeting research. The bibliometric review offers a transparent and systematic analysis technique using

statistical analysis to evaluate the study processes (Aria & Cuccurullo, 2017). This study aims to answer the research questions (RQs) below:

- RQ1 What are the current publication trends in public sector budgeting?
- RQ2 Which are the most prominent articles on public sector budgeting?
- RQ3 Who are the most prominent authors on public sector budgeting?
- RQ4 Which articles on public sector budgeting are highly cited?
- RQ5 Which themes involving public sector budgeting are the most popular among scholars?

This study is crucial in developing a comprehensive understanding of the study phenomenon, specifically with regard to the prevailing trends in public sector budgeting publications. The current study contributes to the theoretical foundations of public sector budgeting. Employing a comprehensive bibliometric analysis using the Scopus and Web of Science (WoS) databases, with a dataset of 1,925 documents, the study provides a detailed overview of publication patterns, influential literature, notable authors, highly referenced works, and prevalent themes in public sector budgeting. Furthermore, the study strengthens the theoretical frameworks underpinning budgeting theories and practices by highlighting prominent themes, like budgetary reform under new public management (NPM), decentralisation, economic crisis, and accountability.

Practically, the study findings offer valuable insights with practical applications for public sector practitioners. By highlighting the most relevant and impactful themes, the analysis can guide practitioners in adopting best practices, improving budgeting efficiency, and addressing contemporary challenges such as budget deficits, austerity measures, and the influence of external factors like the Covid-19 pandemic. This knowledge equips practitioners with the tools necessary to enhance budgeting processes, promote transparency, and ultimately achieve improved outcomes in resource allocation and financial management.

The subsequent sections of this study are structured as follows: Section 2 presents the literature review on budgeting, bibliometric analysis, and gaps in the literature. Section 3 explains the methodology and the analytical structure of bibliometric analysis. Section 4 provides the results, Section 5 the discussion, and Section 6 presents the conclusions.

## **2. Literature Review**

### **2.1 Budgeting**

Public budgeting transcends its traditional role of mere financial control. It has evolved into a complex system serving many functions within the public sector (Sicilia & Steccolini, 2017). Since the 18th century, public budgets have facilitated bargaining, resource allocation, planning, and social and economic stimulation (Sicilia & Steccolini, 2017). This multifaceted nature extends to its political and managerial roles. Public budgets reflect stakeholder priorities, define the boundaries of government intervention, and redistribute wealth (Sicilia & Steccolini, 2017). Additionally, they serve as a tool for holding public organisations accountable to the citizenry.

Budgeting has a long history in public sector accounting. Public sector organisations have been using it since the 18th century. The evolution of the

budgeting system over eleven decades has witnessed ongoing endeavours by researchers worldwide to study government budgeting in public sector organisations. From performance budgeting in the 1950s to zero-based budgeting in the 1970s, each reform aimed to optimise the allocation and expenditure of public resources (Budding & Grossi, 2014). However, the complexity of public budgeting presents a significant challenge. Anessi-Pessina et al. (2016) argue that the interplay of various rationalities and institutional logic necessitates a critical re-evaluation of the roles and characteristics of budgeting. While some scholars lament the lack of a robust theoretical foundation (Anessi-Pessina et al., 2016), others celebrate the diversity of approaches stemming from the field's inherent complexity (Sicilia & Steccolini, 2017). This complexity offers a unique window into the political, social, economic, and psychological forces influencing public resource allocation.

NPM has also affected how government budgeting policies and practices have changed over the last few decades. According to Kolthoff, Huberts, and Van Den Heuvel (2006), the basic idea of the NPM approach is that it lets public-sector organisations operate as businesses. NPM advocates for applying business-oriented management practices, including budgeting methods, within the public sector (Hyndman & Lapsley, 2016). Proponents believe that emulating private sector budgeting techniques can enhance efficiency and effectiveness in resource allocation (Anessi-Pessina & Steccolini, 2005; Jackson & Lapsley, 2003). This approach emphasises cost-benefit analysis, performance targets, and results-oriented spending, potentially leading to a more streamlined allocation process.

However, implementing NPM principles in public budgeting is not without its challenges. Public sector organisations have fundamentally different objectives compared to for-profit businesses. Social welfare and long-term societal benefits often take precedence over pure profit maximisation. Additionally, the inherently political nature of public budgeting and the ever-present public scrutiny makes it difficult to directly translate private sector practices (Hood, 1991). Furthermore, as discussed earlier, the complexity of public budgeting presents another hurdle. Public budgets consider a broader range of factors than just financial return, making the direct application of private sector models, often focused on short-term financial performance, less suitable.

Despite these challenges, NPM has undoubtedly spurred a shift towards performance measurement, output-oriented budgeting, and a greater emphasis on accountability in public resource management. As public budgeting continues to evolve, embracing its complexity and fostering further research will be crucial to ensure its effectiveness in serving the multifaceted needs of the public sector.

## **2.2 Bibliometric analysis**

Bibliometric analysis used a quantitative approach to identify current trends of research in different topics and disciplines (Tao et al., 2021). Bibliometric analysis provides useful information that can be categorised according to the source of publications, articles, authors, and citations (Mathankar, 2018; Donthu et al., 2021). According to Nordin et al. (2023), the bibliometric analysis aims to analyse and visualise the research structure and field by classifying items based on journals, authors, articles, and keywords. The bibliometric technique has been used in

public sector accounting (Tajudin, Khan, & Ismail, 2022) and public administration (Ni, Sugimoto, & Robbin, 2017). This technique helps researchers study the evolution of the literature and research fields.

There are two components to the bibliometric technique, which consist of performance analysis and scientific mapping. Aksnes, Piro, and Rørstad (2019) indicate that performance analysis focuses on publications, which measures the publication citation effect from numerous variables in a study area, such as countries, institutions, and departments. In contrast, scientific mapping refers to a visualisation technique based on the structure and dynamics of the scientific field (Cobo et al., 2013). The scientific mapping technique is used to review publications in the study field (Milosavljević, Spasenić, & Krivokapić, 2023).

### 2.3 Gaps

Several studies have shown a significant and gradual increase in budget research until 2023. Several studies concentrate on subtopics within the budget study field and imply that multiple logics are involved. In a recent study by Milosavljević, Spasenić, and Krivokapić (2023), a bibliometric analysis was conducted with 396 papers focused on participatory budgeting and describing the trajectory of autonomous innovation over time and across different scientific disciplines.

Another analysis was conducted by Güngör Göksu (2023) with 301 papers aimed at providing a comprehensive bibliometric analysis of the prestigious *Journal of Public Budgeting, Accounting, and Financial Management*. The study analysed the information in its publications from 2011 to 2021 and adopted a journal-specific approach, focusing on a retrospective overview and bibliometric analysis. In contrast, the present study offers a broader perspective, exploring the global landscape of public sector budgeting with data extending from 1913 to November 3, 2023. This wider perspective provides a comprehensive view of influential literature, prominent authors, highly referenced works, and prevalent themes within the global public sector budgeting field.

The bibliometric analysis of Naciti et al. (2023) evaluates cognitive advancement, writer attributes, and documents related to gender budgeting in the government domain and examines patterns in research. Although these three studies use the bibliometric technique, none thoroughly examine publication patterns and knowledge framework regarding the evolution of studies on public sector budgeting globally.

Based on the Scopus database until 2023, the bibliometric analysis of budgeting is scarce. Prior bibliometric analyses on budgeting used different indicators and parameters (number of articles being examined) compared to the current study. Therefore, this establishes a gap in the present body of knowledge and motivates the necessity for future investigations. Table 1 shows the prior articles on budgeting studies and bibliometric analysis.

**Table 1. Previous Publications on the Bibliometric Study of Budget**

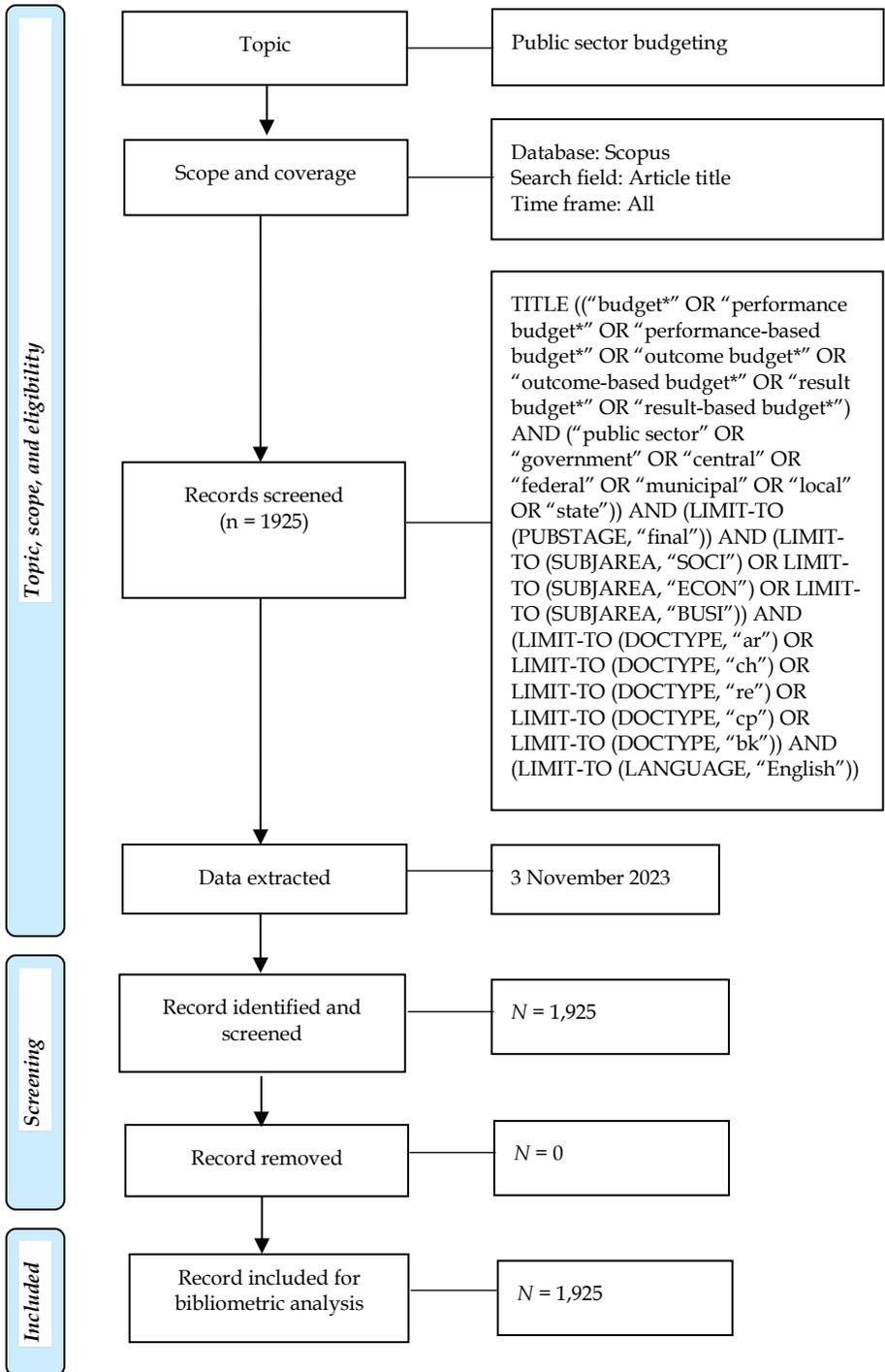
Author	Domain/ Search strategy	Data source and scope	TDE	Bibliometric attributes examined
G. Güngör	<i>Journal of Public</i>	Scopus	301	Authors

Göksu	<i>Budgeting, Accounting, and Financial Management (JPBAFM)</i>	(2011 and 2021)		Countries Documents Themes Topics Sources Citation Bibliographic coupling
M. Milosavljević, Ž. Spasenić, and J. Krivokapić	“participatory budgeting” or “participatory budget”	WoS (1989 to January 2023)	396	Distribution of publications Structure of publications Geographical publications Citations Co-occurrence network and clustering

### 3. Methodology

A bibliometric analysis technique was employed to study the development of scientific publications pertaining to the subject of public sector budgeting. The search strategy used here is adapted from the flow diagram in Zakaria et al. (2021), as shown in Figure 1. The Scopus database was selected as the main database, and all the data were collected as of November 3, 2023. The first stage involved identifying all relevant documents from the Scopus database. Comerio and Strozzi (2019) assert that the Scopus database is a prominent academic resource, surpassing WoS by 60%, and offering a superior selection of articles (Salisbury, 2009). In addition, Moya-Anegón et al. (2007) show that the Scopus database offers a wider variety of published documents from emerging nations than WoS. Furthermore, recent bibliometric studies on budgeting use the Scopus database as a primary source of information (Güngör Göksu, 2023). The string of keywords was used in the Scopus search engine to identify published subjects that include titles, as depicted in Table 2.

Figure 1. Research Flow Diagram for Budget in Public Sector



Source: Zakaria et al. (2021)

**Table 2. Search String Keywords on Public Sector Budgeting**

String keywords without inclusion and exclusion criteria	String keywords with inclusion and exclusion criteria
TITLE ( ("budget*" OR "performance budget*" OR "performance-based budget" OR "outcome budget*" OR "outcome-based budget*" OR "result budget*" OR "result-based budget*" ) AND ( "public sector" OR "government" OR "central" OR "federal" OR "municipal" OR "local" OR "state" ) )	TITLE ( ("budget*" OR "performance budget*" OR "performance-based budget" OR "outcome budget*" OR "outcome-based budget*" OR "result budget*" OR "result-based budget*" ) AND ( "public sector" OR "government" OR "central" OR "federal" OR "municipal" OR "local" OR "state" ) ) AND ( LIMIT-TO ( PUBSTAGE , "final" ) ) AND ( LIMIT-TO ( SUBJAREA , "SOCI" ) OR LIMIT-TO ( SUBJAREA , "ECON" ) OR LIMIT-TO ( SUBJAREA , "BUSI" ) ) AND ( LIMIT-TO ( DOCTYPE , "ar" ) OR LIMIT-TO ( DOCTYPE , "ch" ) OR LIMIT-TO ( DOCTYPE , "re" ) OR LIMIT-TO ( DOCTYPE , "cp" ) OR LIMIT-TO ( DOCTYPE , "bk" ) ) AND ( LIMIT-TO ( LANGUAGE , "English" ) )
TOTAL = 3,403	TOTAL = 1,925

The initial search combined two keywords utilising the Boolean operators "OR" and "AND" associated with "budget" and "public sector." The second stage of the search inquiry was conducted using the inclusion and exclusion criteria to limit the research data. The search inquiry was restricted to the final publication stage, subject area, document type, and publication language in English. The described search inquiry, after inclusion and exclusion criteria, resulted in a total of 1,925 documents within the period from 1913 to November 3, 2023. A total of 1,925 documents were downloaded from the Scopus database with complete record information such as authors, titles, publishers, years, countries, affiliations, abstracts, keywords, etc., as a CVS file.

The third stage involved bibliometric analysis using VosViewer software. The bibliometric analysis was conducted in three steps: (i) study samples were analysed based on document profiles using descriptive analysis; (ii) descriptive analysis was used to gain insight into the evolution of publications over time and the structure of the research sample, based on different types of publications and annual growth, geographical distribution of publications, productivity of authors and journals, and publications with the highest number of citations; (iii) the themes of the main author keywords that have emerged from the current literature were analysed.

The methodology described above offers a robust foundation for conducting a bibliometric study and visually presenting the development of literature within the field of public sector budgeting. Furthermore, the study findings illuminate the current state of the budget research domain and provide helpful suggestions for future research related to public sector budgeting.

## 4. Results

This section provides the answers to the research questions. The document profile on public sector budgeting, the publication trend of public sector budgeting, including annual growth, and countries were addressed to answer RQ1; the productivity of authors and journals were analysed to answer RQ2 and RQ3; authorships and citations were analysed to address RQ4; and the main topic and sub-topics of the public sector budgeting field were investigated for RQ5.

### 4.1. Document profile

This section analyses the data to identify the document and source types, languages, and subject areas pertaining to RQ1, on current publication trends in public sector budgeting. Most of the results were reported in terms of percentages and frequencies.

#### 4.1.1. Document and source type

Firstly, descriptive analysis was conducted to ascertain the types and sources of documents in the Scopus database. According to Table 3, the types of documents in the Scopus database consist of articles, book chapters, review papers, conference papers, and books. Most published documents were articles, contributing 81% of the total publications, followed by book chapters, which represent 11%. The other document types collectively made up less than 5%, with each type contributing less than 75 documents in total. The lowest type was books, accounting for less than 2%. According to Sweileh et al. (2017), conference papers categorised under documents and source types differ. The conference papers categorised under the type of document refer to delivered papers at conferences that may be published as full documents. Although the initial documents were from a conference, several documents were published as conference proceedings or book chapters (Ahmi, Elbardan, & Ali, 2019).

**Table 3. Document Type**

Document type	Total publications (TP)	Percentage (%)
Article	1,550	81%
Book chapter	213	11%
Review	74	4%
Conference paper	49	3%
Book	39	2%
Total	1,925	100%

Table 4 presents five distinct source types. With 84.7% of the representation, journals were the most prevalent type, and books came in second with 11.4%. Meanwhile, the book series and conference proceedings contributed less than 3% of the documents. Trade journal books made the lowest contribution, with less than 1% of the total documents.

**Table 4. Source Type**

Source type	Total publications (TP)	Percentage (%)
Journal	1,630	84.7%
Book	219	11.4%
Book series	42	2.2%
Conference proceeding	26	1.4%
Trade journal	8	0.4%
Total	1,925	100.0%

#### 4.1.2. Language

Table 5 indicates that most of the obtained documents were published in English (98.5%). The remaining documents were published in Portuguese, Russian, Ukrainian, and French, each contributing less than 1% of the overall documents. The analysed documents revealed that Croatian and German were the least popular languages among the documents studied.

**Table 5. Languages**

Language	Total publications (TP)	Percentage (%)
English	1,925	98.5%
Portuguese	11	0.6%
Russian	5	0.3%
Ukrainian	5	0.3%
French	3	0.2%
Spanish	3	0.2%
Croatian	1	0.1%
German	1	0.1%
Total	1,954	100.0%

#### 4.1.3. Subject area

Published documents were also categorised according to their subject areas. The majority of studies conducted on public sector budgeting focused on the social sciences, with 40.3% of the documents, followed by studies in the areas of economics, econometrics, and finance (28.7%), and studies in business, management, and accounting (18.2%). The remaining subject areas addressed in public sector budgeting studies are illustrated in Table 6 below.

**Table 6. Subject Area**

Subject area	Total publications (TP)	Percentage (%)
Social sciences	1,301	40.3%
Economics, econometrics, and finance	926	28.7%

Business, management, and accounting	588	18.2%
Environmental science	105	3.3%
Decision sciences	57	1.8%
Arts and humanities	56	1.7%
Computer science	40	1.2%
Engineering	40	1.2%
Energy	28	0.9%
Medicine	22	0.7%
Mathematics	17	0.5%
Earth and planetary sciences	12	0.4%
Agricultural and biological sciences	10	0.3%
Psychology	8	0.2%
Health professions	4	0.1%
Nursing	3	0.1%
Pharmacology, toxicology and pharmaceuticals	3	0.1%
Biochemistry, genetics and molecular Biology	2	0.1%
Chemical engineering	2	0.1%
Materials science	2	0.1%

## 4.2. Research trends

This section analyses the research trends of the total documents related to annual growth in overall publications, countries' productivity, authorships, and citations.

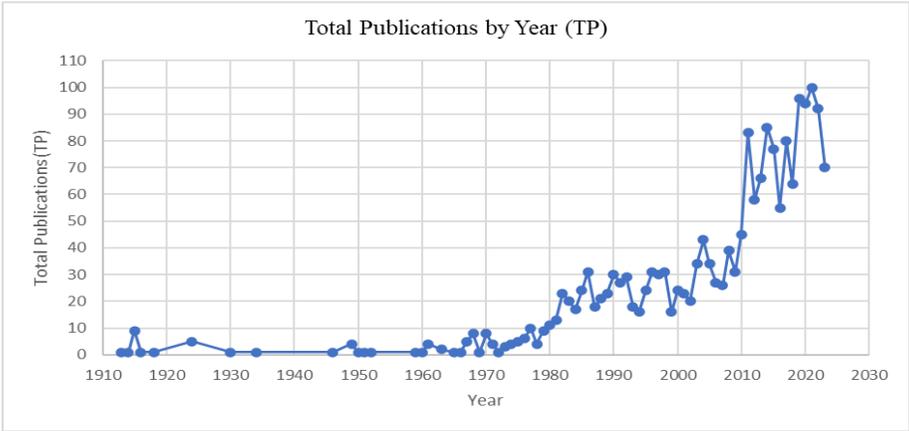
### 4.2.1. Publications and annual growth

A total of 1,925 papers, which are indexed in Scopus, were published within a span of 110 years. Figure 2 displays the first public sector budgeting publication published in the Scopus dataset in 1913. The article "Suggestions for a State Budget" was published by S. Gale Lowrie in 1913. In addition, the limited and stagnant publication activity in public sector budgeting before the 1970s can be attributed to historical factors and a lack of academic recognition and institutional support. The historical context likely led to less emphasis on academic research and scholarly publications focusing on public sector budgeting, as the field may not have been well-established or recognised as a distinct research domain before that. In contrast, the observed surge in public budgeting publications during the 1980s can likely be attributed to a confluence of factors, and this period witnessed a rise in public interest and scrutiny of government spending, potentially fuelled by concerns about accountability and value for money.

Furthermore, the emergence of NPM philosophies in the 1980s, emphasising efficiency and effectiveness in the public sector, likely spurred research on budgeting practices that could achieve these goals. Additionally, the prevailing economic climate of the era, marked by high inflation and fiscal constraints, may have driven governments to seek more efficient and cost-effective ways to manage public resources, further incentivising research on budgeting techniques for better

resource allocation and control. Moreover, the number of relevant publications had significantly increased, surging from 26 in 2007 to 83 in 2011. Thus, this demonstrates the evolution of information in this field. However, the number of publications fluctuated from 2012 to 2022, as depicted in Figure 2.

**Figure 2. Year of Publications**



Based on Table 7, the number of documents published from 2019 to 2022 held largely constant, with slight decreases and increases. As for 2023, the number of publications is anticipated to decrease, reaching its lowest number since 2019. The multiple citation thresholds were developed to understand the impact of citation structure on public sector budgeting publications. Table 7 shows that the number of documents published peaked in 2021. Conversely, the documents published in 2014 garnered the most citations, resulting in a h-index of 16.

**Table 7. Top Ten Publications by Year**

Year	TP	NCP	TC	C/P	C/CP	<i>h</i>	<i>g</i>
2014	85	64	1016	11.95	15.88	16	30
2015	77	44	553	7.18	12.57	15	21
2016	55	47	514	9.35	10.94	14	20
2017	80	61	659	8.24	10.80	15	23
2018	64	47	310	4.84	6.60	9	14
2019	96	71	443	4.61	6.24	11	15
2020	94	64	309	3.29	4.83	10	12
2021	100	68	399	3.99	5.87	9	16
2022	92	50	190	2.07	3.80	7	10
2023	70	14	45	0.64	3.21	2	6
Total	813						

Notes: TP = total number of publications; NCP = number of cited publications; TC = total citations; C/P = average citations per publication; C/CP = average citations per cited publication;  $h$  = h-index; and  $g$  = g-index.

4.2.2. Countries' productivity

Figure 3. Geographical Distribution

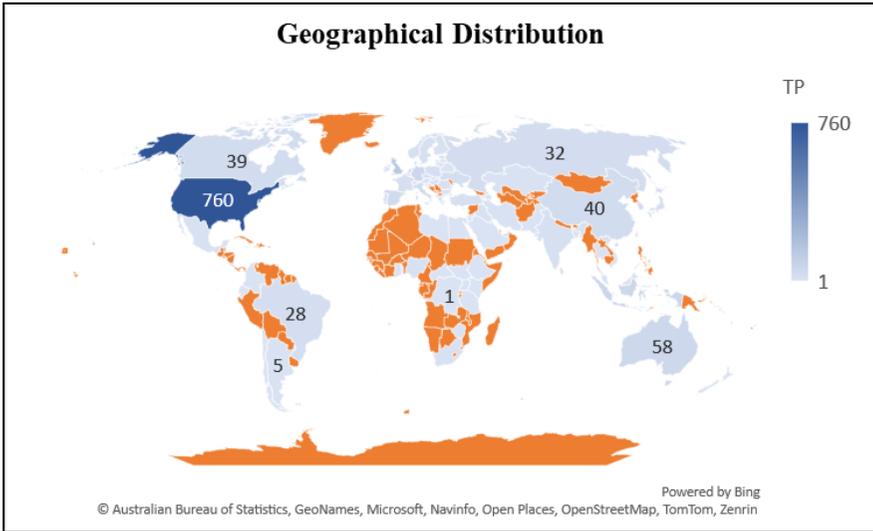


Figure 3 depicts the geographical distribution of published documents within the top ten countries. Regarding the publication's distribution, 89 different countries contributed documents to the publication. Table 8 shows the top ten countries that contributed to the publications in public sector budgeting studies. The United States was listed as the top ranking with a total of 760 documents, followed by the United Kingdom with 147 published documents, Germany and Indonesia (64) and Australia (58). In terms of the number of citations by country, the US came in at the top with 11,368 citations and 52 h-indexed, followed by the UK with 2,074 citations and 22 h-indexed. Interestingly, most of the top ten countries that actively contribute to public sector budgeting studies are developed countries, except for one country from a developing country, Indonesia. Indonesia was one of the top three countries that productively contributed to the publication.

Table 8. Top 10 Countries Contributed to the Publications

Country/ territory	TP	NCP	TC	C/P	C/CP	$h$	$g$
United States	760	575	11368	14.96	19.77	52	86
United Kingdom	147	123	2074	14.11	16.86	22	38
Germany	64	54	965	15.08	17.87	17	29
Indonesia	64	35	240	3.75	6.86	9	14

Australia	58	44	407	7.02	9.25	12	17
Italy	44	38	630	14.32	16.58	14	24
Spain	42	40	813	19.36	20.33	17	27
China	40	32	484	12.10	15.13	12	21
Canada	39	35	498	12.77	14.23	11	21
Russian Federation	32	24	74	2.31	3.08	5	6

Notes: TP = total number of publications; NCP = number of cited publications; TC = total citations; C/P = average citations per publication; C/CP = average citations per cited publication;  $h$  = h-index; and  $g$  = g-index.

#### 4.2.3. Productivity of authors and journals

This section answers RQ3 on the most prominent authors on public sector budgeting. A total of 159 authors wrote a total of 1,925 documents. Table 9 summarises the most productive authors who produced at least six public sector budgeting documents, with detailed information on affiliation, country, total publication, and total citations. Richard J. Cebula of George Mason University is the most active author pertaining to the contribution in the number of documents published, which are 22 documents with 150 citations and eight h-indexed.

However, Yilin Hou from Syracuse University contributed 12 documents with the highest number of cited documents (482), and 10 h-indexed. Hou's most cited article is "A Framework for Understanding State Balanced Budget Requirement Systems: Re-examining Distinctive Features and an Operational Definition," published in *Public Budgeting and Finance* in 2006, with 158 citations. Another highly cited article by Hou is "State Performance-Based Budgeting in Boom and Bust Years: An Analytical Framework and Survey of the States," published in *Public Administration Review* in 2011.

**Table 9. Most Productive Authors in Public Sector Budgeting**

Author's name	Affiliation	Country	TP	NCP	TC	C/P	C/CP	$h$	$g$
Richard J. Cebula	George Mason University	United States	22	17	150	6.82	8.82	8	11
Yilin Hou	Syracuse University	United States	12	11	482	40.17	43.82	10	12
Philip G. Joyce	University of Maryland, College Park	United States	12	10	243	20.25	24.30	7	12
Bernardino Benito	Universidad de Murcia	Spain	9	9	306	34.00	34.00	9	9
Francisco Bastida	Prince Sultan University	Saudi Arabia	8	8	296	37.00	37.00	8	8
Laurence Ferry	Durham University Business School	United Kingdom	8	8	182	22.75	22.75	7	8

Marc Labonte	Government and Finance Division	United States	8	0	0	0.00	0.00	0	0
Robert D. Lee	Pennsylvania State University	United States	8	8	82	10.25	10.25	4	8
Kurt Thurmaier	Northern Illinois University	United States	7	6	47	6.71	7.83	4	6
Peter Eckersley	Institute for Research on Society and Space e.V.	Germany	6	6	111	18.50	18.50	6	6
Thomas P. Lauth	University of Georgia	United States	6	6	34	5.67	5.67	4	5
Mindy R. Levit	No Information Florida	No information	6	0	0	0.00	0.00	0	0
Thomas D. Lynch	International University	United States	6	5	5	0.83	1.00	1	1

Notes: TP = total number of publications; NCP = number of cited publications; TC = total citations; C/P = average citations per publication; C/CP = average citations per cited publication;  $h$  =  $h$ -index; and  $g$  =  $g$ -index.

Table 10 shows detailed information on the most active source titles in public sector budgeting. *Public Budgeting and Finance* has the top publications in the public sector budgeting field, with 87 documents published in this domain. Nonetheless, the *Public Administration Review* published the most esteemed papers with the highest quality, scoring 3.311 and 3.233 for SCImago Journal and Country Rank (SJR) 2022 and Source Normalised Impact per Paper (SNIP) 2022, respectively.

**Table 10. List of Most Active Source Titles**

Source title	TP	TC	C/P	Publisher	Cite score	SJR 2022	SNIP 2022
<i>Public Budgeting and Finance</i>	87	1,162	13.36	Wiley-Blackwell	1.6	0.541	1.008
<i>Public Budgeting Finance</i>	62	357	5.76	Wiley-Blackwell	1.6	0.541	1.008
<i>International Journal of Public Administration</i>	32	149	4.66	Taylor and Francis	4.4	0.691	1.186
<i>Public Choice</i>	31	884	28.52	Springer Netherlands	3.2	0.591	1.116
<i>Public Administration Review</i>	28	1,044	38.67	Wiley-Blackwell	12.2	3.311	3.233
<i>Annals of the American Academy of Political and Social Science</i>	23	173	7.52	SAGE	4.9	0.943	1.611
<i>Journal of Public Budgeting Accounting and Financial Management</i>	22	86	3.91	Emerald Publishing	5.3	0.838	1.278

<i>Public Money and Management</i>	22	196	8.91	Routledge	4.4	0.667	1.175
<i>Public Finance Review</i>	18	230	12.78	SAGE	1.2	0.248	0.631
<i>Applied Economics</i>	17	166	9.76	Routledge	3.4	0.59	1.089

Notes: TP = total number of publications; TC = total citations; C/P = citation per paper; SJR = SCImago Journal Rank; SNIP = Source Normalised Impact per Paper

#### 4.2.4. Citation analysis

This study used Harzing's Publish or Perish software to obtain the citation metrics for the retrieved data from the Scopus database. The data were imported into this software based on Google Scholar citations. Next, the software calculated the citation metric and the total number of citations for each document. Table 11 presents the citation metrics for the obtained documents extracted from the Scopus database as of November 3, 2023. The summary provides the total number of citations, along with their annual citation rate, citation per document, and number of citations by author.

**Table 11. Citation Metrics**

Metrics	Data
Publications years	1913-2022
Citation years	100 (1913-2023)
Papers	1925
Citations	20,955
Citations per year	190.5
Citations per paper	10.89
Citations per author	13,428.8
Paper per author	1.8
h-index	62
g-index	99

Next, Table 12 lists the top ten cited documents in public sector budgeting. The article "Budget Spillovers and Fiscal Policy Interdependence: Evidence from the States" by Case, Rosen, and Hines (1993) earned the most citations. According to the citation count of Google Scholar on November 3rd, 2023, the same documents achieved the highest number of citations, totalling 710 and an average of 23.67 per year.

**Table 12. Top 10 Highly Cited Articles**

No.	Authors	Title	Year	Cites	Cites per year
1	A. C. Case, H. S. Rosen, and J. R. Hines Jr.	Budget Spillovers and Fiscal Policy Interdependence: Evidence from the States	1993	710	23.67

2	J. E. Alt and R. C. Lowry	Divided Government, Fiscal Institutions, and Budget Deficits: Evidence from the States	1994	487	16.79
3	N. Roubini and J. Sachs	Government Spending and Budget Deficits in Industrial Countries	1989	350	10.29
4	J. Melkers and K. Willoughby	Models of Performance-Measurement Use in Local Governments: Understanding Budgeting, Communication, and Lasting Effects	2005	281	15.61
5	B. Trehan and C. E. Walsh	Common Trends, the Government's Budget Constraint, and Revenue Smoothing	1988	266	7.6
6	G. Guo	China's Local Political Budget Cycles	2009	186	13.29
7	R. J. Barro	Government Spending, Interest Rates, Prices, and Budget Deficits in the United Kingdom, 1701-1918	1987	177	4.92
8	A. Downs	Why the Government Budget Is Too Small in a Democracy	1960	174	2.76
9	V. Larcinese, L. Rizzo, and C. Testa	Allocating The U.S. Federal Budget to the States: The Impact of the President	2006	152	8.94
10	J. Melkers and K. Willoughby	The State of the States: Performance-Based Budgeting Requirements in 47 out of 50	1998	148	5.92

#### 4.2.5. Main topic and sub-topics in the field of public sector budgeting

Finally, the main sub-topics within the public sector budgeting studies were analysed. This study analysed author keywords by using the total number of publications from the Scopus database. Additionally, the co-occurrence of author keywords was analysed as stated in publications. The results are shown in Table 13 and Figure 4, respectively.

The most frequently used author keywords in public sector budgeting studies were local government (108), fiscal policy (55), public sector (42), participatory budget (41), and budget control (39). Table 9 displays the top 20 keywords used in the public sector budgeting studies.

**Table 13. List of Top 20 Author Keywords**

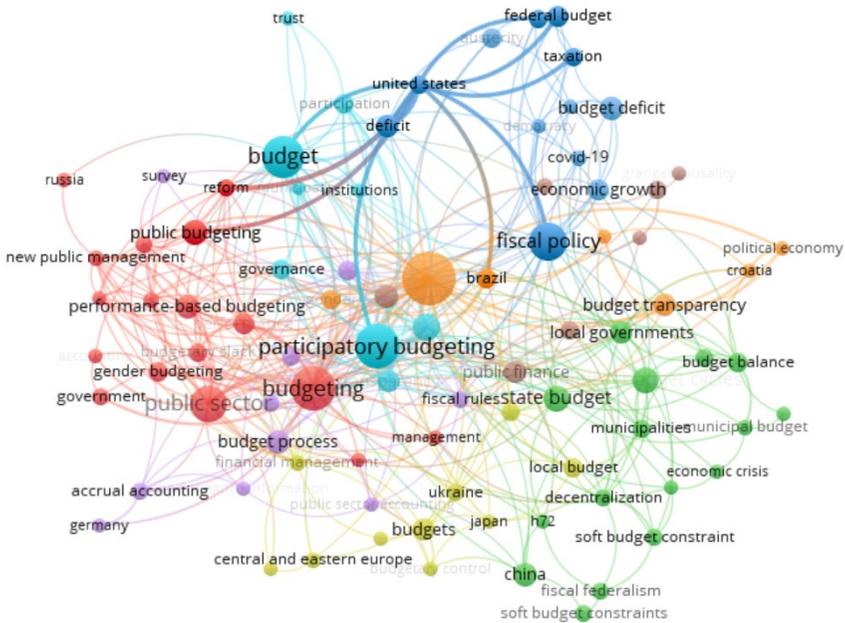
Author keywords	Total publications (TP)	Percentage (%)
Local government	108	5.6%
Fiscal policy	55	2.8%
Public sector	42	2.2%
Participatory budgeting	41	2.1%
Budget control	39	2.0%
Budget deficit	39	2.0%
Public spending	39	2.0%
Governance approach	25	1.3%
Accountability	20	1.0%

Decision making	19	1.0%
Financial management	19	1.0%
Political economy	19	1.0%
Expenditure	17	0.9%
State budget	17	0.9%
Political budget cycles	16	0.8%
Tax system	16	0.8%
State role	14	0.7%
Budget process	13	0.7%
Performance-based budgeting	13	0.7%
Budget transparency	12	0.6%

Next, VOSviewer software was used to map the author's keywords. Additionally, the software was used for creating and visualising bibliometric networks. Furthermore, the VOSviewer was used to conduct a co-occurrence analysis of author keywords in a sample of 1,925. Figure 4 displays a network visualisation of the author keywords using colour, square size, font size, and line thickness to represent the connection and relationships with other keywords.

In this study, colours differentiate between themes or clusters, with brighter hues indicating more dominant themes, while lighter shades represent less prominent topics. Square size is typically proportional to the frequency or importance of a keyword or theme, with larger squares denoting higher significance and smaller squares suggesting lower relevance. Font size highlights the prevalence or influence of keywords, with larger fonts assigned to more prominent terms and smaller fonts to less significant ones. Line characteristics, including thickness and style, depict relationships between keywords or themes, with thicker lines indicating stronger connections and dashed or dotted lines representing weaker associations. For example, keywords with the same colour are commonly grouped. Hence, in this study, the keywords new public management (NPM), performance-based budgeting, reform, and public sector are represented in red, signifying that these keywords have a strong correlation and frequent co-occurrence.

**Figure 4. Author Keywords Co-occurrence Analysis of Public Sector Budgeting Publications**



Lastly, we performed a co-occurrence analysis of author keywords to find the thematic groups, with eight themes (clusters) identified. The themes are categorised according to their respective colours, as shown in Figure 4. The top frequent author keywords are included in themes one, two, and three. The result and keyword appearances in each theme are summarised in Table 14.

Although there is evidence of overlap, these themes may still be defined in a broader context. Theme one (red) is a cluster of budgetary slack, gender budgeting, performance-based budgeting, and budgeting reform under the NPM approach in public sector organisations. Theme two (green) is a cluster of decentralisation, economic crises, as well as political and budget constraints. Theme three (dark blue) is a cluster of austerity, budget deficits, Covid-19, fiscal policy, and taxation. Theme four (yellow) comprises budgetary control, capital budgeting, and sustainability. Theme five (purple) contains accrual accounting, budget processes, citizen participation, fiscal rules, and performance information. Theme six (light blue) includes accountability, governance, institutions, participation, participatory budgeting, transparency, and trust. Theme seven (orange) comprises budget transparency, expenditures, gender, and a political economy. Theme eight (brown) is a corruption, granger causality, and public finance cluster.

The emergence of themes revealed the main trends in public sector budgeting. In the earlier research, budgetary reform in the context of the NPM approach was analysed from the central government's perspective to the local government level in both developed and developing nations. The effects of the Covid-19 outbreak on economic growth, fiscal policy, and budget austerity in public sector organisations. On the other hand, the performance budgeting issue is often

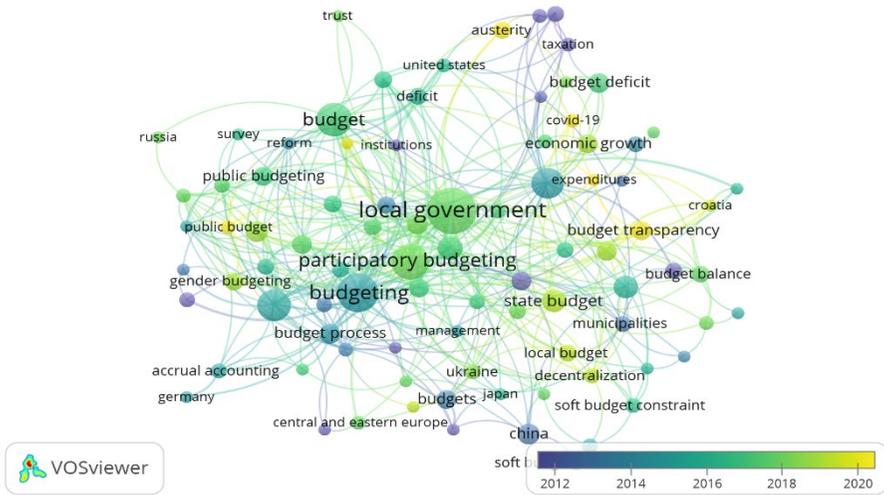
associated with the accrual accounting, budget process, participation, regulation, and performance information. It is important to highlight that co-occurrence analysis does not give definitive distinctions between the primary subtopics of discussion. Thus, the list of authors' keywords enhances comprehension of the public sector budgeting studies by providing a more profound understanding.

**Table 14. Explanation of the Main Clusters in the Co-occurrence Analysis**

Theme	Keywords
Theme one (red)	Accounting, budgetary slack, budgeting, central government, gender budgeting, government, management, new public management, performance, performance management, performance-based budgeting, public budget, public budgeting, public sector, reform, Russia, state government
Theme two (green)	Budget balance, China, decentralisation, economic crisis, European Union, fiscal decentralisation, fiscal federalism, local governments, H72, municipal budget, municipalities, panel data, political budget cycles, soft budget constraints, soft budget constraints, state budget
Theme three (dark blue)	Austerity, budget deficit, Covid-19, deficit, democracy, economic growth, federal budget, fiscal policy, government debt, public opinion, taxation, United States
Theme four (yellow)	Budgetary control, budgets, capital budgeting, central and eastern Europe, financial management, Japan, local budgets, state budgets, sustainability, Ukraine
Theme five (purple)	Accrual accounting, budget process, citizen participation, fiscal rules, Germany, Latin America, performance budgeting, performance information, public sector accounting, survey
Theme six (light blue)	Accountability, budget, governance, institutions, municipality, participation, participatory budgeting, transparency, trust
Theme seven (orange)	Brazil, budget transparency, Croatia, expenditures, gender, local government, political economy
Theme eight (brown)	Corruption, government budget, granger causality, Indonesia, local budgets, public finance, taxes

Figure 5 illustrates the evolution of the study on public sector budgeting from 2012 to 2022. The prior studies conducted in 2012 focused on state (local) budgeting and municipal budgeting issues related to taxation and budget balance. Conversely, the studies on public sector budgeting for 2022 focused more on austerity measures, spending management, and enhancing budget transparency. This gives researchers room to examine more of the subject area.

**Figure 5. The Evolution of the Study on Public-Sector Budgeting**



## 5. Discussion

Public sector organisations have been using budgeting since the 18th century. The evolution of the budgeting system in the time since has witnessed ongoing endeavours by researchers around the world to study public sector budgeting. The primary goal of public sector budgeting is to propose and enforce rules for fiscal resource allocation, expenditure, and accounting to maximise the value of public resources. In this study, we analysed the public sector budgeting documents in a bibliometric analysis.

The bibliometric analysis of public sector budgeting provides valuable insight into several key research questions. Understanding trends in public sector budgeting publications aids in comprehending the evolving landscape of fiscal policies and governance mechanisms. It includes analysing the quantity, quality, and geographic distribution of publications, the dissemination, and the global impact of budgeting practices (Dewi et al., 2021; Prayoga, 2022). The current publication trends of public sector budgeting indicated a steady increase in publications over the years, with 1,925 documents published between 1913 and 2022. The annual growth rate of publications had remained relatively stable, with an average of 190.5 citations per year and 10.89 citations per paper.

Naturally, most documents and research were from developed nations, mainly Western countries, since these countries are pioneers in budgeting practices. The US continued to be one of the nations with the most significant number of publications, followed by the UK, Australia, and Canada. Interestingly, the public sector budgeting field has gained significant attraction in developing countries such as Indonesia. Indonesia was one of the top three nations that have productively contributed to the literature.

Despite growing research interest in public sector budgeting, a critical gap remains in empirical studies of emerging economies. Therefore, this study emphasises the need for further empirical research in developing countries. Expanding the research scope to encompass emerging economies offers valuable

insights into the dynamics and challenges influencing budgeting practices within these unique contexts. Such insights will ultimately contribute to a more comprehensive and nuanced understanding of public sector budgeting on a global scale. Furthermore, the most active source title in public sector budgeting is *Public Budgeting and Finance*, with 87 documents published in this domain. *Public Administration Review*, meanwhile, stood out for publishing the most esteemed sources with high scores, indicating the quality and impact of the articles.

Moving on to RQ2, analysing influential articles is essential because it helps researchers identify the key contributions to the field. It highlights the work of prominent scholars and the topics that have significantly shaped the discourse on public sector budgeting. This information is valuable for understanding the current state of knowledge and identifying areas where further research is needed (Güngör Göksu, 2023; Sicilia & Steccolini, 2017). Notably, the work of Yilin Hou, of Syracuse University stood out, with 12 documents, the highest number of citations (482), and a h-index of 10. Hou's "A Framework for Understanding State Balanced Budget Requirement Systems: Re-examining Distinctive Features and an Operational Definition," published in *Public Budgeting and Finance* in 2006, has 158 citations, underscoring its impact on the literature. Additionally, Richard J. Cebula of George Mason University contributed substantially with 22 documents and 150 citations, reflecting a noteworthy level of scholarly influence. Other influential articles included works by Philip G. Joyce, which has significantly shaped the discourse on public sector budgeting.

Prominent authors play a crucial role in shaping the field of public sector budgeting. Identifying these authors helps researchers understand the key individuals who have contributed significantly to the literature. This information is important for recognising the expertise and influence of these scholars, as well as for identifying potential collaborators (Milosavljević, Spasenić, & Krivokapić, 2023). Regarding RQ3, and as noted above, Cebula is the most active author in terms number of documents published, while Hou had the highest number of citations. These prolific authors have made significant contributions to the scholarly discourse in this field, reflecting their substantial impact on the literature.

Moving on to RQ4, highly cited articles are those that have received a lot of attention and citations from other researchers. Identifying these articles is important because it helps researchers understand the most relevant and important topics in the field (Güngör Göksu, 2023). It also provides insights into the impact of specific research findings on the broader literature. Notable works by Hou and Cebula have garnered significant attention among scholars, with citations ranging from 150 to 482, indicating the influence and relevance of these articles in the field.

Finally, addressing RQ5, the review sheds light on the themes involving public sector budgeting that are most popular among scholars. Understanding the prevalent themes in public sector budgeting is essential for identifying current trends and challenges in the field. It helps researchers align their research with the most relevant and pressing issues, ensuring their work remains relevant and impactful. A co-occurrence analysis of the author's keywords revealed several prominent themes, including budgetary reform under the NPM approach,

decentralisation and economic crisis, austerity measures, budget deficits, and Covid-19. These themes reflect the current challenges and trends in public sector budgeting, such as the need for more efficient and effective budgeting practices, the impact of economic crises on government budgets, and the challenges posed by the Covid-19 pandemic. Other themes that have received attention from scholars include budget transparency, citizen participation, and accountability, reflecting the multifaceted nature of research in this critical domain.

## 6. Conclusions

The bibliometric analysis of public sector budgeting has yielded significant insights into prevalent publication patterns, influential literature, notable authors, highly referenced works, and prevalent themes within this domain. This analysis reveals a consistent growth in published materials over time, with the US emerging as the primary contributor in terms of volume. Distinguished scholars like Yilin Hou and Richard J. Cebula have made substantial impacts, garnering noteworthy citations for their contributions. Moreover, the review outlines prominent themes in public sector budgeting, underscoring the multifaceted nature of research within this crucial area. These findings offer valuable perspectives for researchers, practitioners, and policymakers, enhancing comprehension of the challenges and prospects in public sector budgeting.

While the bibliometric review provides valuable insights, it is not without limitations. The analysis was based on a specific set of data from the Scopus database, and therefore, might not capture all publications in the field of public sector budgeting. Additionally, the review focused on quantitative analysis of publication trends and citations, and thus, the qualitative aspects of the included works were not fully explored. Furthermore, the study was limited to the available data and might not encompass the most recent publications in the field.

Future studies in the field of public sector budgeting could build upon this bibliometric review by incorporating a more comprehensive dataset that includes publications from additional databases and sources such as EconLit (American Economic Association), Emerald Insight, and Google Scholar. Qualitative analyses, such as content analysis of influential articles, could provide deeper insights into the specific contributions of key works in shaping the discourse on public sector budgeting. Furthermore, longitudinal studies tracking the evolution of themes and trends in public sector budgeting over time could offer valuable insights into the changing landscape of budgetary practices in the public sector. Additionally, comparative studies across different countries and regions could provide a more nuanced understanding of the diverse approaches to public sector budgeting and the factors influencing budgetary practices in various contexts.

The bibliometric analysis facilitated a comprehensive examination of public sector budgeting literature. By meticulously selecting the Scopus and WoS databases and collecting a diverse range of relevant documents, this study ensured a robust foundation for analysis. This analysis offers a valuable approach to complement studies on current public sector budgeting trends by aiding the identification of under-researched areas. Analysing citation patterns, publication trends, and keyword usage, bibliometrics can pinpoint topics with low scholarly engagement or stagnant publication rates, potentially signifying underexplored

territories. This targeted approach empowers future researchers to strategically position their work by addressing knowledge gaps and emerging themes within the field. Moreover, bibliometrics strengthens research proposals by providing evidence of a topic's significance and novelty while highlighting aspects that warrant further investigation.

This study offers valuable theoretical contributions. It sheds light on prevalent publication patterns, influential literature, notable authors, highly referenced works, and popular themes in public sector budgeting. These insights offer valuable perspectives for researchers, enabling them to align their work with current trends and challenges in public sector budgeting. This knowledge guides researchers toward areas requiring further exploration and investigation, thereby shaping future research directions within the field. Additionally, by identifying prominent authors and highly cited articles, the study facilitates the recognition of key contributors and fosters collaboration opportunities, promoting knowledge exchange among scholars. Furthermore, the analysis may reveal gaps in current research, prompting researchers to address these knowledge deficiencies and contribute to advancing public sector budgeting scholarship.

For practitioners, the study provides a nuanced understanding of the evolving landscape of budgetary practices, offering insights into effective strategies and potential areas for improvement. Practitioners can also benefit from the study's findings by gaining practical insights into current trends and challenges. Their knowledge empowers them to align their practices with the latest research and best practices in public sector budgeting. Understanding key themes and influential literature also equips practitioners to implement effective evidence-based budgetary practices. Staying informed about notable authors and highly cited works further enhances their professional development. Policymakers can benefit from the findings by gaining insights into diverse approaches to public sector budgeting across different countries and regions, thereby informing evidence-based policy decisions.

Policymakers gain a deeper understanding of current challenges and opportunities, allowing them to make informed decisions and develop evidence-based budgetary policies. The study also highlights the benefits of longitudinal and comparative analyses. By tracking trends over time and exploring diverse approaches across countries, policymakers can leverage evidence from various sources to inform policy development.

Overall, the study's insights serve as a valuable resource for informing and guiding policymakers, researchers, and practitioners in the public sector budgeting domain. This knowledge exchange fosters evidence-based decision-making, shapes future research directions, and promotes professional development in the realm of public sector budgeting.

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