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Digitization of public financial management: Trends and applications in the scientific literature

Digitalización de la gestión financiera pública: Tendencias y aplicaciones en la literatura científica

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ABSTRACT

The digitalization of public financial management has enhanced efficiency, transparency, and control in the administration of state resources. However, the scientific literature on this topic reveals gaps in the analysis of its trends and applications. In this context, the present study aimed to examine the scientific production on the digitalization of public financial management through a bibliometric analysis. To achieve this, 112 scientific articles retrieved from the Scopus database were analyzed. Bibliometric techniques were applied using the *Biblioshiny* tool to identify annual scientific output, key publication sources, the most productive institutions, and emerging trends in the literature. The results indicated a significant increase in scientific production since 2018, peaking in 2022. *Lecture Notes in Networks and Systems* was the most prolific source, while the *Lobachevsky State University of Nizhny Novgorod* and the *Rostov State University of Economics* led institutional research output. The most frequently occurring keywords were e-government, finance, and digital transformation, reflecting a predominant focus on the technological modernization of the public financial sector. The study concludes that financial digitalization is a growing field, presenting opportunities for further research on its implementation and impact on public sector management.

Keywords: fiscal transparency; public administration; public management; digital transformation; digital government

RESUMEN

La digitalización de la gestión financiera pública ha permitido mejorar la eficiencia, transparencia y control en la administración de los recursos estatales; sin embargo, la literatura científica sobre el tema presenta vacíos en el análisis de sus tendencias y aplicaciones. En este contexto, el presente estudio tuvo como objetivo examinar la producción científica sobre la digitalización de la gestión financiera pública mediante un análisis bibliométrico. Para ello, se analizaron 112 artículos científicos extraídos de Scopus. Se utilizaron técnicas bibliométricas a través de la herramienta *Biblioshiny* para identificar la producción anual, fuentes de publicación, instituciones más productivas y tendencias emergentes en la literatura. Los resultados indicaron un aumento en la producción científica desde 2018, con un pico en 2022. *Lecture Notes in Networks and Systems* fue la fuente con más publicaciones, mientras que la *Lobachevsky State University of Nizhny Novgorod* y la *Rostov State University of Economics* lideraron la producción institucional. Las palabras clave más frecuentes fueron e-government, finance y digital transformation, reflejando el enfoque en la modernización tecnológica del sector financiero estatal. Se concluye que la digitalización financiera es un campo en expansión, con oportunidades para nuevas investigaciones sobre su implementación y efectos en la gestión pública.

Palabras clave: transparencia fiscal; administración pública; gestión pública; transformación digital; gobierno digital

1. INTRODUCTION

The digitalization of public financial management has become a fundamental process for the modernization of administrative systems and the optimization of the use of state resources (Marcus et al., 2024). The implementation of digital technologies in financial administration allows the automation of processes, the improvement in transparency and the strengthening of fiscal control (Lino et al., 2022; Mojaki et al., 2024). In this context, the use of electronic platforms, artificial intelligence systems and emerging technologies has transformed the way governments manage budgets, income and expenditures, promoting greater efficiency and reduction of operating costs (Gao et al., 2024).

Despite advances in the digitalization of the public financial sector, challenges persist related to technological integration, system interoperability, and resistance to change in government institutions (Kaparbekov et al., 2024). In many countries, the adoption of digital tools has been heterogeneous, depending on factors such as the level of economic development, technological infrastructure, and institutional capacity. This situation has generated gaps in the efficiency and transparency of public financial processes, affecting the management of resources and decision-making based on reliable data (Darmawati et al., 2024; Guo, 2024).

Difficulties in implementing digitalization in public financial management can be attributed to several factors (Oliinyk et al., 2023). These include limited investment in technology, lack of staff training, and the absence of regulations governing digital transformation in the public sector (Koomson, 2024). Furthermore, data security and the protection of financial information are a constant challenge, as governments must ensure the confidentiality and integrity of administrative records in digital environments (Demidova et al., 2024; Szpor et al., 2022).

As a consequence of these limitations, public institutions face problems of operational efficiency, vulnerability to corruption, and difficulties in budget execution (Zhuk, 2023). The lack of integration of digital systems prevents the traceability of financial resources and limits the capacity to respond to economic crises or emergencies (Lino et al., 2023). Furthermore, inequality in access to advanced technologies generates disparities in the quality of public services, affecting citizens' trust in government administration (Arzumanova, 2023).

Despite the growing interest in the digitalization of public financial management, the scientific literature presents gaps in the analysis of trends and specific applications in this area (El-Manaseer et al., 2023). Although there are studies on digital transformation in the public sector, few works have comprehensively addressed the evolution of scientific publications in this area. The lack of bibliometric studies that allow identifying the main approaches, authors and institutions dedicated to the subject makes it difficult to have a global understanding of its impact and development (Demidova et al., 2024; Mink, 2022).

In this context, the present study aims to analyze the trends and applications of digitalization in public financial management through a bibliometric approach. To do so, the evolution of scientific production on this topic will be examined, identifying research patterns, collaboration networks and main areas of interest. With this analysis, we seek to contribute to knowledge about the digital transformation of the state financial sector and provide relevant information for the formulation of public policies based on scientific evidence.

This study will allow not only to understand the current state of research in digitalization of public financial management, but also to identify opportunities for future research and implementation strategies. By providing a systematic analysis of the scientific literature, it is expected to generate information for decision-making in the governmental and academic spheres, promoting the development of innovative models that optimize the management of public resources at a global level. (Gąsiorkiewicz & Monkiewicz, 2022; Lima et al., 2022).

2. MATERIALS AND METHODS

We used a bibliometric method, which provides techniques to quantitatively analyze the production or impact of scientific research on a specific topic, offering a global view of the dynamics and trends in the academic field (McBurney & Novak, 2002). The indicators evaluated in this study were: 1) annual scientific production, 2) most productive publication sources, 3) institutions with the highest production, 4) most frequent keywords and 5) emerging topic map.

A total of 112 scientific articles, extracted from the Scopus database, were analyzed using a search string applied to titles, abstracts and keywords: ("digitalization" OR "digitization" OR "e-government" OR "digital transformation" OR "electronic government" OR "ICT adoption") AND ("public financial management" OR "public finance" OR "government finance" OR "financial governance"). These documents were subsequently exported in CSV format and imported into the Biblioshiny tool developed by Aria & Cuccurullo (2017), which works with the Bibliometric package of the RStudio application.

3. RESULTS AND DISCUSSION

The analysis of annual scientific production showed a sustained increase over the last decade, with more pronounced growth starting in 2018. Between 2020 and 2023, a significant increase in the number of publications was recorded, peaking in 2022, reflecting a greater interest in the digitalization of public financial management. This increase could be associated with the acceleration of digital transformation in the public sector. However, in 2024, a decrease in scientific production was identified, which could be attributed to a stabilization in research (Figure 1).
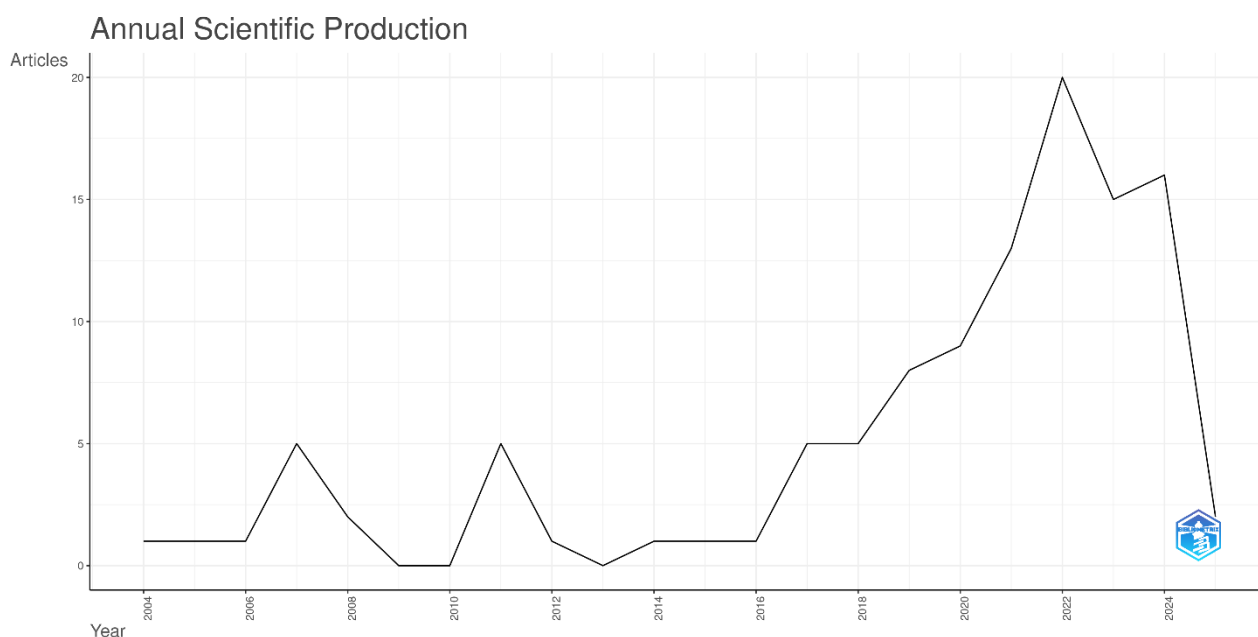

Figure 1. Annual scientific production (2004-2024)

On the other hand, Figure 2 shows the most productive publication sources, showing that Lecture Notes in Networks and Systems was the journal with the largest number of published documents on the digitalization of public financial management, with a total of nine articles. It was followed by ACM International Conference Proceeding Series with five publications. Other prominent sources, such as 2011 International Conference on E-Business and E- and Financial and Credit Activity: Problems of Theory, registered three publications each. In addition, journals such as American Review of Public Administration and Critical Debates in Public Finance presented two articles each, as did other sources with lower relative impact. These results reflect the diversity of media in which knowledge in this area has been disseminated, with a greater concentration in journals on networks, systems and digital business conferences.
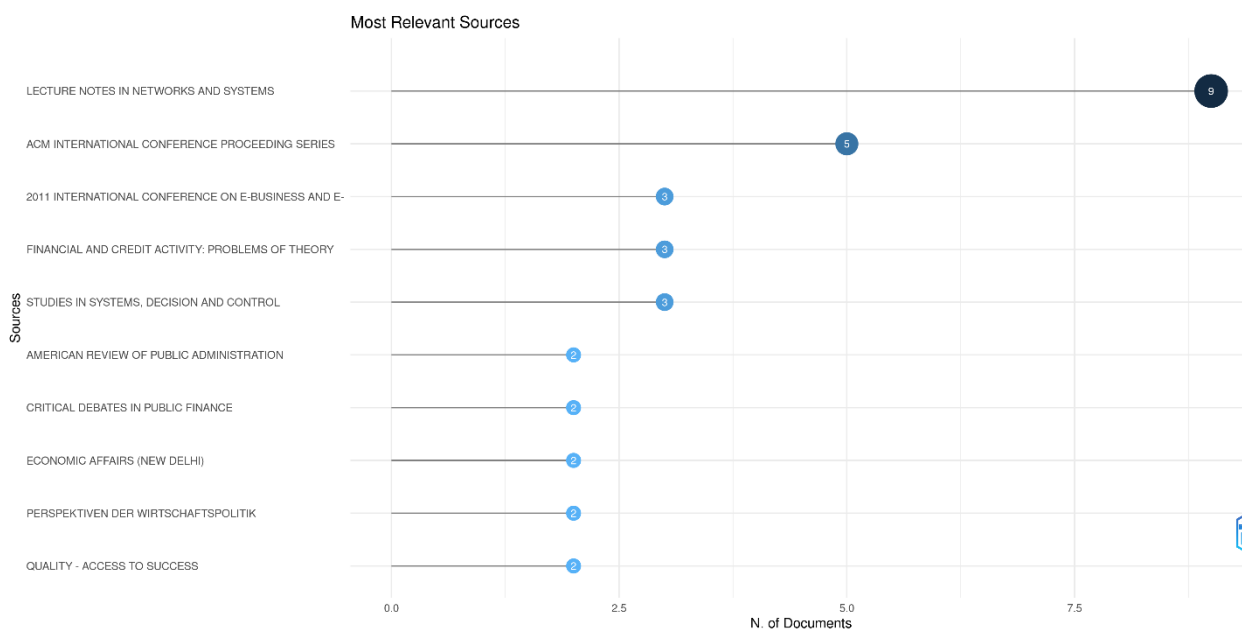
Figure 2. Most productive publishing sources

According to Figure 3, Lobachevsky State University of Nizhny Novgorod and Rostov State University of Economics were the entities with the highest number of publications, with a total of 10 articles each. The Federal University of Espírito Santo (UFES) registered seven publications, while other institutions, such as Lviv Polytechnic National University, Minin Nizhny Novgorod State Pedagogical University, Nanhu Lab, State Tax University, and Sumy State University, contributed six papers each. In addition, Bucharest University of Economic Studies and the Academy of Financial Management presented five publications. These results reflected a significant share of universities from Russia, Brazil, and Eastern Europe in scientific production on digitalization in public financial management, suggesting a concentration of research interest in regions with a focus on financial modernization and digital transformation of the public sector.
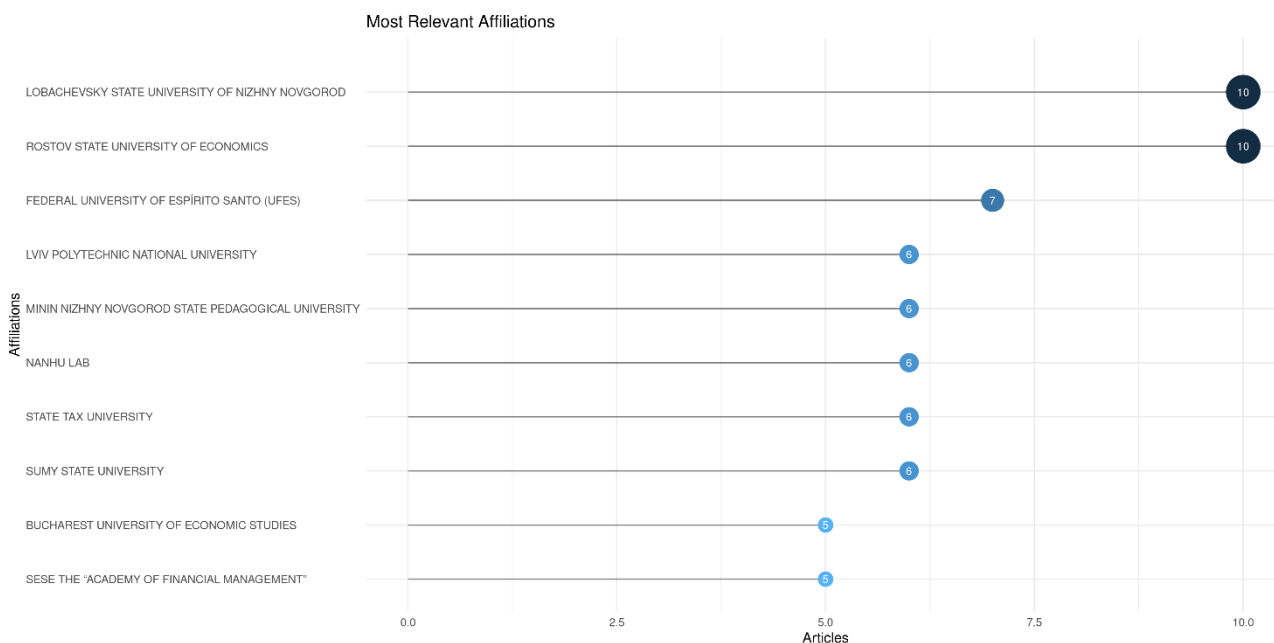

Figure 3. Institutions with the highest production

The analysis of the most frequent keywords in the literature on digitalization in public financial management showed that the most frequently used terms were "e-government", "finance" and "public finance", indicating a predominant focus on the digital transformation of public administration and its impact on state finances (Figure 4). Other recurring concepts included "digital transformation",

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"government data processing" and "information management", reflecting the central role of technology in the modernization of government financial systems. Likewise, terms such as "taxation", "budget control" and "information use" highlighted the relevance of digitalization in fiscal management and budgetary control. The presence of terms related to artificial intelligence, blockchain and digital economy suggests a trend towards the integration of emerging technologies in public financial management. These results evidenced the evolution of the field and the importance of continuing to explore its impact on the efficiency and transparency of government financial processes.

Figure 4. Most frequent keywords

The analysis of strategic themes in the digitalization of public financial management, represented in the thematic map (Figure 5), showed that concepts such as "public finance", "digitalization" and "digital transformation" were located in the area of basic themes, indicating their high centrality and relevance within the field of study. Likewise, terms such as "e-government", "blockchain" and "e-procurement" were also found in this category, suggesting that these themes form the fundamental basis on which research in public financial digitalization is structured.

On the other hand, the driving themes, those with a high degree of development and centrality, included concepts such as "artificial intelligence", "digitalization" and "digital finance", highlighting the importance of emerging technologies in the evolution of public financial management. These results indicate that artificial intelligence and financial digitalization have been areas of growing interest, driving the modernization and optimization of administrative processes in the public sector.

Finally, in the niche topics category, concepts such as "financial transparency" and "fiscal sustainability" were identified, which, although highly developed, are less central in the research network. In contrast, emerging or declining topics, such as "performance evaluation", showed a lower level of development and relevance, which could indicate a decrease in interest in these aspects or the need for further research in the area. These results allowed us to characterize current trends in the digitalization of public financial management and pointed out priority areas for future research.
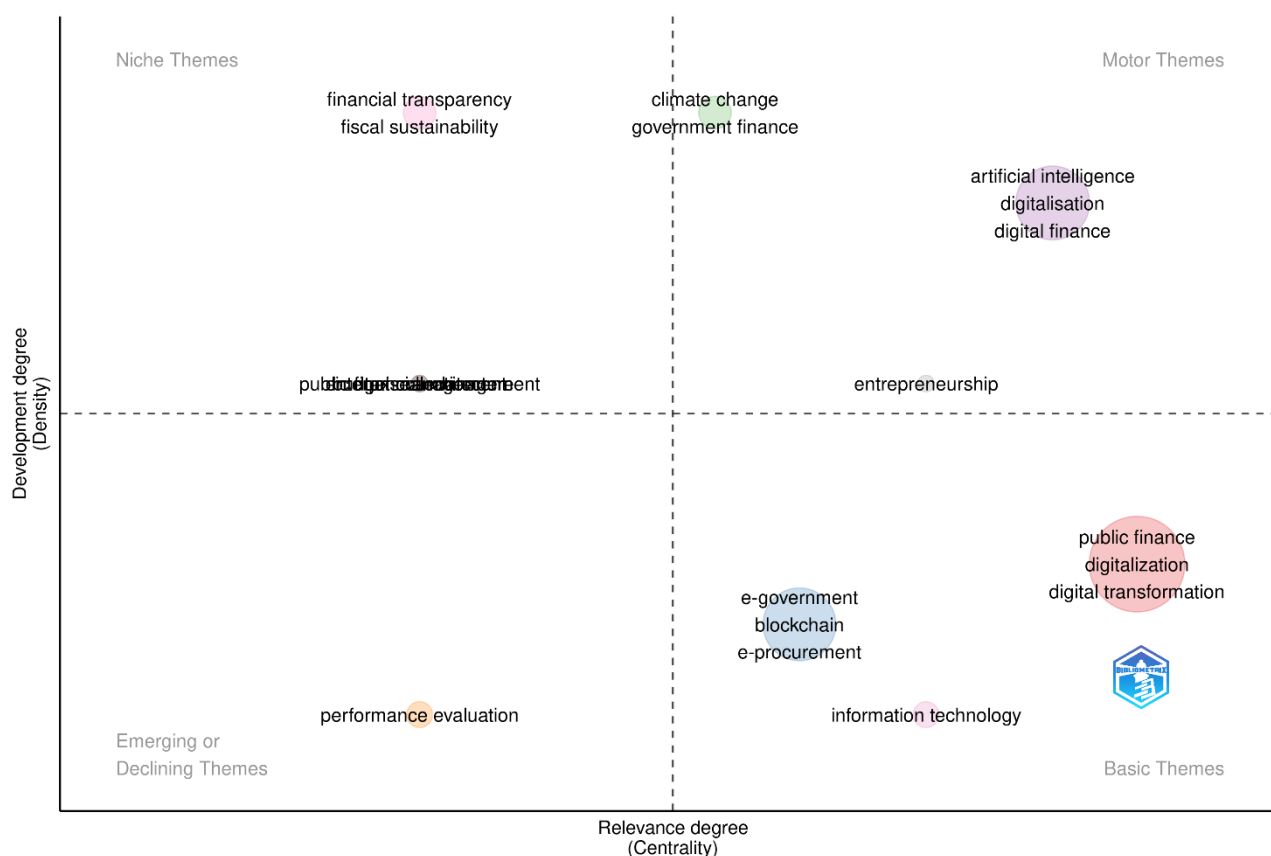
Figure 5. Map of emerging issues

CONCLUSIONS

This study allowed us to analyse the evolution of scientific production on the digitalization of public financial management, identifying key trends, relevant publication sources and the institutions with the greatest contribution in this field. The results showed a significant increase in academic interest in the last decade, with an emphasis on emerging technologies such as artificial intelligence, blockchain and the automation of financial processes. In addition, fundamental topics were identified in the scientific literature, such as government data management and digital transformation, which have served as a basis for the development of research in this area. However, the analysis also revealed the existence of gaps in knowledge, particularly in the impact assessment and in the effective integration of these technologies in public administration.

From a practical perspective, the findings of this study have important implications for policy formulation and the modernization of public financial management. The identification of the main trends and applications allows decision-makers to design more effective strategies for the implementation of digital technologies in the public sector. Likewise, the evidence collected can serve as a basis for the development of training and capacity building programs aimed at strengthening technological adoption in government institutions. Finally, this study provides a frame of reference for future research seeking to assess the impact of digitalization on the efficiency, transparency and sustainability of state financial management.

FINANCING

CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest related to the development of the study.

AUTHORSHIP CONTRIBUTION

Conceptualization; Data curation; Formal analysis; Research; Methodology; Visualization; Writing - original draft; Writing - review and editing: Bernales-Vásquez, R. and Sánchez-Dávila, K.

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