

Digital Transformation in Public Accounting and Finance Management: a Clusters Literature Review

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Abstract. This study investigates the literary corpus on the role and potential of digital transformation in public accounting and finance management. A total of 890 research papers was extracted from Scopus and Web of Science for bibliometric analysis, to investigate publishing trends, productive countries, and keyword analysis around the topic, and 24 relevant research publications, divided into two clusters, were selected for an in-depth analysis. The findings demonstrate that technologies have significantly transformed accounting and public finance by automating processes to reduce errors and save time, increasing transparency and accountability, preventing fraud with analytical tools, improving budget planning and monitoring, and integrating systems for a comprehensive financial view.

Keywords: accountability, digital transformation, public accounting, public finances, public management

1. Introduction

In today's interconnected global landscape, the expectations placed on Public Administration by both citizens and organisations have intensified significantly. The State is expected to optimise bureaucratic processes, modernise the administrative systems, and be transparent and accountable. Information technologies play a key role in this process, fostering communication between Public Administration and society, reshaping public services, and enabling governments to leverage technological innovation for enhanced public service delivery [1]. Technology makes it possible to identify new opportunities for Public Administration, particularly in the implementation of e-government, creating public value for the services provided [2], [3].

At the end of the day, it all begins and ends with new public financial management because it is all about how effective, efficient, and economical Public Administration is

in managing public resources. In other words, it concerns whether New Public Management can perform public responsibilities “as one of the basic responsibilities accepted by governments, with citizens as the major suppliers of financial resources for public sector institutions” [4].

Technology not only makes it possible to offer more effective and accessible public services to citizens, but it also enables strategic decision-making based on integrated and centralised data, collecting and making data available for analysis, as a basic product for implementing, monitoring, and developing predictive models to anticipate the future. This emphasis on data requires the adoption of new accounting practices and, consequently, new digital skills for the professionals who are in charge of this task [1]. The need for timely responses poses additional challenges for Public Administration [5], such as a flexible organisational structure, strategic planning and efficient and effective resource management, without jeopardising the sustainability of public finances. Moreover, the public governance paradigm involves knowledge sharing, coordination and collaboration between various state, market and social actors.

It is therefore evident that the implementation of a new accounting framework applied to Public Administration has been gaining importance as regards the management of public finances, with the three subsystems of public accounting. The need to increase the level of transparency, credibility and reliability of budgetary, financial and management information is crucial for assessing and disseminating the results achieved by public policies [7]. At the same time, these changes in the accounting framework for public administrations will also have an impact on the future of the public audit process, which is a vital activity in democratic countries to guarantee the relationship between government bodies and citizens and businesses. Auditing in the public sector also faces the same problems as the private sector, challenging the public interest [8] [9] [10].

Yet, while there is great evidence of the use and impact of new technologies in the private sector, “in the public sector, a similar indication does not exist” [11]. Indeed, the above points highlight a lack of research exploring the significance and potential impacts of digital transformation on public sector accountability and finance management. To address this gap and promote new research in this field, this paper assesses the current landscape of public finance management in the context of digital transformation, answering the following research question: How does digital transformation affect Financial Management and Accounting in the Public Sector? To answer this question, the paper presents a bibliometric analysis of the literature in the field.

In section 2, this article presents a theoretical approach to digital transformation in Public Administration and finance. It then describes the methodology used to carry out the literature review (section 3). Next, in section 4, the results are analysed and discussed. Finally, section 5 summarises the main changes in the areas under study and identifies topics for future research, as well as the study’s limitations.

2. Theoretical Background

Governments worldwide are embracing digital tools, social media platforms, algorithms, and artificial intelligence to not only revolutionise public services but also to promote

deeper engagement with citizens [12] [13]. The digital transformation is enhancing public services through technologies like AI, blockchain, and IoT. This transformative wave is expected to fortify various aspects of governance, including decision-making, transparency, accountability, and citizen-government relationships [14] [15].

The European Commission's goals for the digital decade include making all key public services available online, providing citizens with access to medical records, and having 80% of citizens use digital identity solutions. To achieve these, initiatives like GovTech collaborations, the Innovative Public Service Observatory, and funding programs are being implemented to support innovation, promote interoperability, and foster public-private partnerships. The technology readily available to entities has a positive effect on the transformation of public services, which allows governments to implement solutions such as e-government, harnessing information and communication technologies (ICT) to create public value [2], [3].

[16] argue that digital transformation in government represents a two-way street, in which public bodies and citizens actively participate through the co-production of public services. Enhancing citizens' adoption of electronic services results in improved quality, efficiency, and effectiveness of public services. Also, digital technology fosters transparency because it facilitates citizen access to information on resource management and promotes and assists the implementation of robust governance practices. Thus, new doors are opening for citizens' socio-political participation through digital technologies [17].

However, digitalisation has had considerable consequences on the labour market, with greater income disparities and reduced access to social security systems, which can be negative if not managed properly [18]. Furthermore, this digital revolution presents huge challenges regarding cybersecurity vulnerabilities and data integrity [18].

Literature in the field emphasises the role of digital technology in modernising accounting and accountability, contributing to automating repetitive tasks, freeing up time for strategic activities with higher value creation [19]; enhancing data quality, namely accuracy, reliability, and consistency in accounting data [20]; and combatting corruption by identifying irregularities and fraud through advanced data analytics.

In the information-oriented world, the challenges professionals face also need to be addressed. The types of skills, competencies and mindset required of finance professionals to perform at the level demanded for organisations has been stated by several authors [21]. This paradigm shift is characterised by the automation of routine tasks, enabling accounting professionals to redirect their focus towards strategic analyses [2], [22]. Digital accounting systems are instrumental in facilitating real-time reporting and data-driven decision-making, thereby bolstering transparency and accountability [18]. Notably, these changes are poised to reverberate across public sector auditing, ensuring accountability and transparency in the interactions between government entities and citizens and businesses [8] [10]. Cumulatively, the management of public resources is increasingly associated with the responsibility of managers to obtain better results with fewer public resources [23].

Digital technology's integration into Public Administration has far-reaching implications, transcending mere efficiency gains to encompass broader dimensions of accountability and integrity in governance. It also demands substantial changes, rather than just technological changes. Indeed, within the public sector, knowledge management is a powerful facilitator in the current push for greater efficiency in all areas as stated by [24], "to be transforming,

changes in technologies must be accompanied by changes in other organizational elements (like people or processes)", leadership models and organisational culture.

In essence, the amalgamation of digital technology and Public Administration underscores the transformative potential of digitalisation in reshaping governance paradigms and fostering accountability and transparency in the public sector. One notable aspect highlighted by the literature is the dearth of research on the nexus between public service digitalisation and accountability, particularly within accounting scholarship. This emphasises the importance of bridging this gap to fully understand the implications of digital transformation on governance and accountability [25].

3. Methodology

Our review can be categorised as a Thematic synthesis [26] because it examines the state of the literature of a specific topical area and uses all themes from all papers to create theme clusters. Therefore, our research question can be formulated as follows: How does digital transformation affect Financial Management and Accounting in the Public Sector?

Data collection took place in January 2024. We did not apply any chronological filter. In the first phase, we tried a separate search for each of the keywords. In Web of Science Core Collection (WOS), we applied the following strategy: search strategy (TITLE-ABS-KEY ("accountability" OR "accounting" OR "transparency") AND TITLE-ABS-KEY ("public finance" AND "management") AND TITLE-ABS-KEY ("digital transformation" AND "digitalization" AND "public sector")). In SCOPUS, we followed the same criteria.

In Figure 1, we summarize the research layout and results that led to the final set of articles. The literature search yielded 890 articles. Three authors reviewed and screened the titles and abstracts for inclusion and exclusion criteria. After applying the exclusion criteria — namely: (1) duplicates; (2) articles not available (3) do not focus on the subject under study, and inclusion, namely (1) papers that do not address digital transformation in public accounting and finance management and (b) articles mapping and reviewing the literature — 172 articles remained.

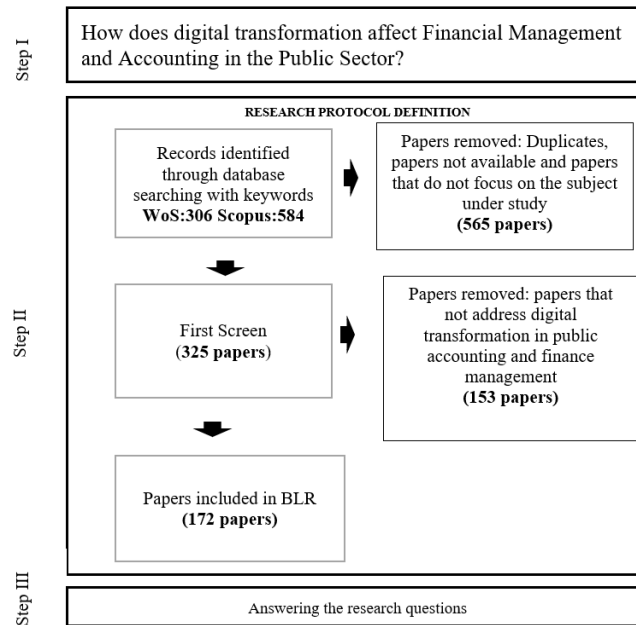


Fig. 1. Flowchart for literature selection

We used R Bibliometrix software [27] to perform bibliometric analysis and build data matrices for co-citation, clustering, scientific collaboration analysis and word analysis. Bibliometrics is increasingly applied across various disciplines to aid science mapping, addressing the growing volume and fragmentation of research driven by empirical contributions. For Network matrix creation, we used R Bibliometrix (<http://www.bibliometrix.org>). Based on the 172 manuscripts' database (title, abstract, keywords, authors, references), two clusters were created. The authors established a minimum of 30 citations in Web of Science or Scopus as inclusion criteria in the final clusters. Then, all titles, abstracts, literature reviews, and final considerations were read, and a document was created to contain the most relevant information extracted from those sections of each article. Finally, the contents were divided according to the main constructs to create a text that could explain the main theoretical approaches to each cluster, and the conclusions that had been drawn.

4. Results

4.1. Distribution of publications

Figure 2 shows an exponential increase in publications in the area under study from 2017 onwards. In 2022, there was an increase of 81 documents and in 2023 it reached 117 documents, which proves the novelty, relevance, and interest of the topic under investigation.

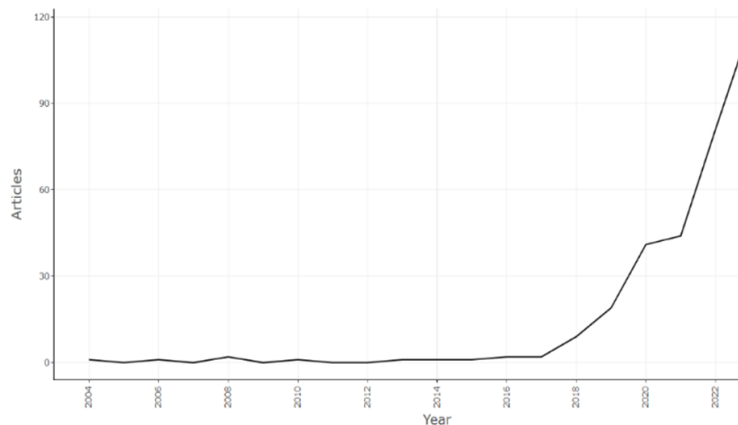


Fig. 2. Publication distribution per year

Regarding the number of publications by each author, if we use the lead author as a search criterion in this database sample, there are 10 authors with two or more articles published on the topic of digital transformation in public finance management. (Figure 3). Mergle and Stecollini stand out with 5 publications in the area, followed by Androniceanu with 4 publications.

As regards the journals with the highest visibility, Financial Accountability and Management and Government Information Quarterly is the journal with the highest impact measure H: 6, followed by Sustainability with 5 in the Impact measure H (see figure 4).

Figure 5 shows topics of interest over time. Advancements in technology have been pivotal in driving the digital transformation seen across the public sector. The COVID-19 pandemic has acted as a catalyst, accelerating this process. Digitalization began to have an impact from the year 2017, progressively intensifying. From 2022 onwards, the concepts that gained greater relevance were "digitalization/digitalisation," "digital transformation," and "public sector," followed by the term "public administration."

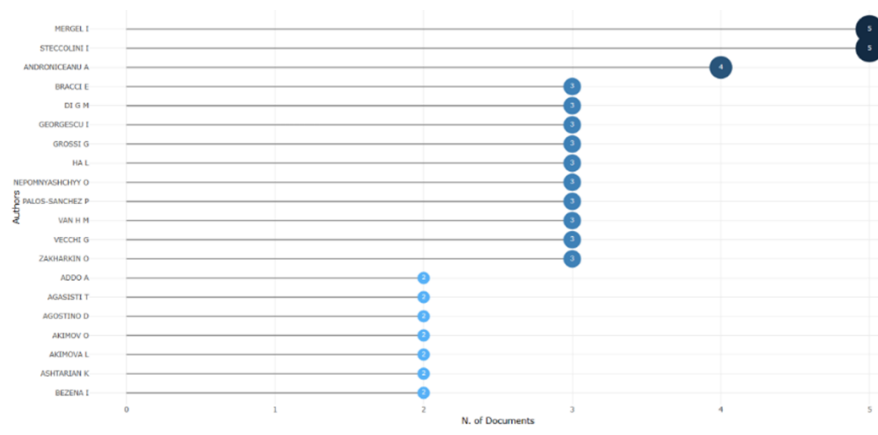


Fig. 3. Number of publications by author

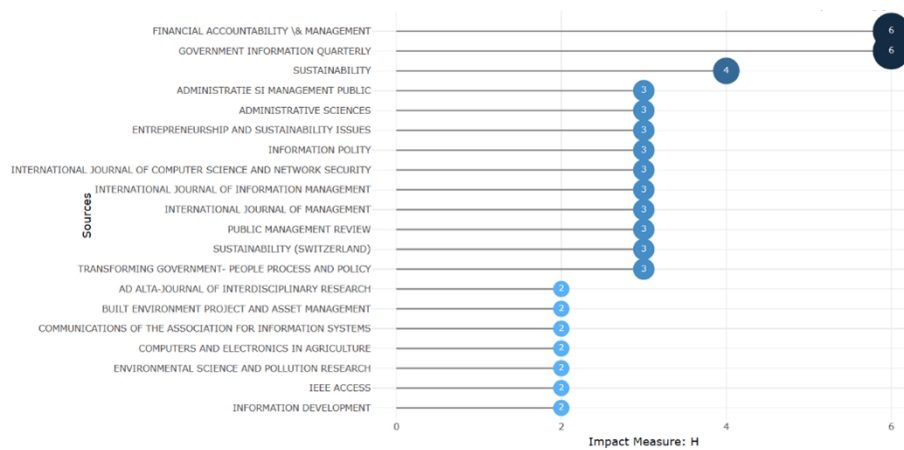


Fig. 4. Most relevant Sources

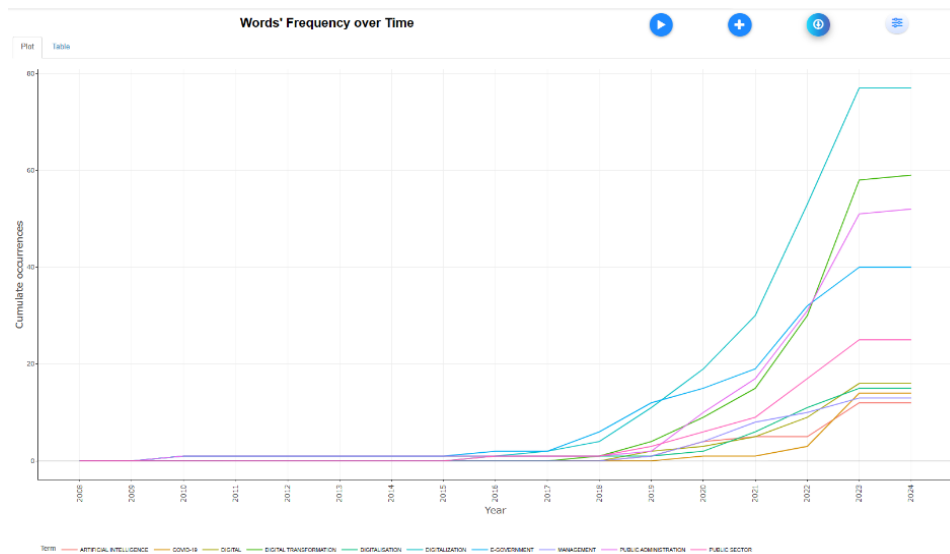


Fig. 5. Topics of interest over time

The Sankey diagram (Figure 6) illustrates relationships among authors, keywords, and countries. The size of each box is proportional to the frequency of occurrences of the respective theme. The flows connecting the boxes represent the thematic evolution, with thicker connecting lines indicating stronger associations between themes.[28].

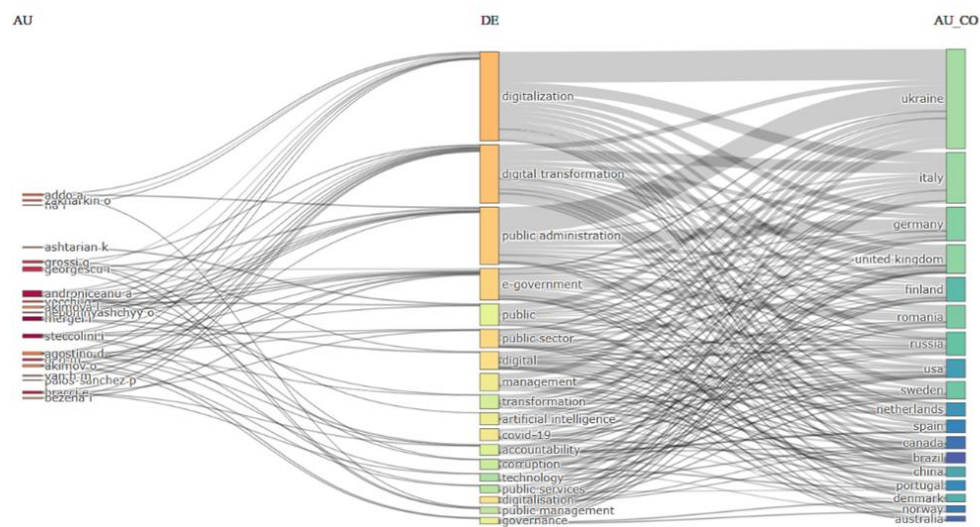


Fig. 6. Graph of three fields Authors (AU) - Keywords (DE) Countries (Au-CO)

Figure 6 shows that the most used keywords are "digitalisation", "digital transformation" and "Public Administration", with Androniceanu, Georgescu, Mergle, Steccolini and Agostino mentioning them the most. In terms of publications by country, the lead belongs to Ukraine, followed by Italy.

To understand how the contents of the selected articles converge in terms of the centrality of the study, correspondence factor analysis was used (see figure 7).

Figure 7 shows that the articles were correctly selected according to the main theme of digital transformation in the public sector, namely through digitization, big data, auditing, governance, and innovation.

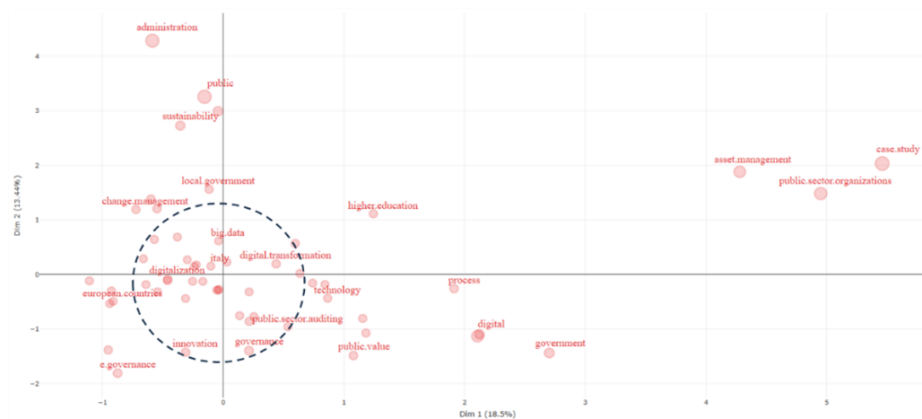


Fig. 7. Word Map

Also using factor analysis, figure 8 shows the dendrogram (grouping of similar items). The items with the greatest similarity are placed closer together and at the lowest level. There are 3 clusters and, within each cluster, the words that identify it.

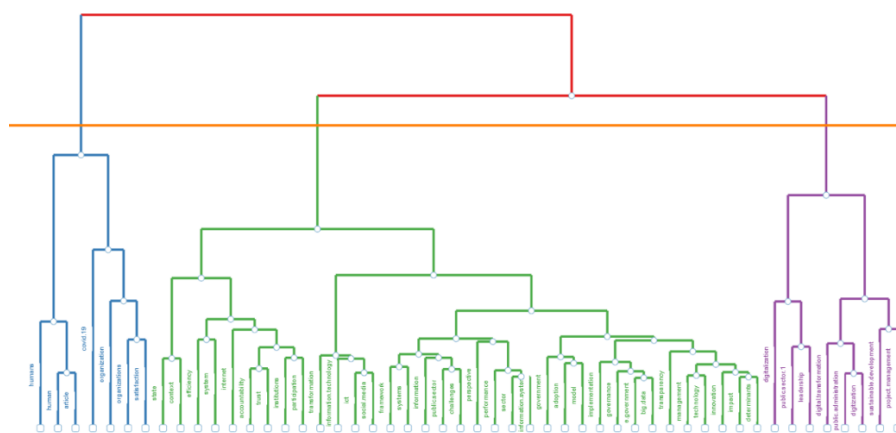


Fig. 8. Topic Dendrogram

The Bibliometrix package [27] grouped the 172 studies into 3 clusters. A comprehensive analysis of each study was carried out, with the authors identifying the focus and main characteristic of each cluster, resulting in the following synthesis: Cluster 1 is defined as the cluster of technologies applied to the public sector and its tangible effects (identified in green in figure 10); while Cluster 2 is defined as the cluster of digital transformation of public administration and its intangible effects. Cluster 3 has only one article and was therefore excluded.

4.2. Structure and context of literature clusters

Cluster 1 encompasses one hundred and fifty-eight articles. Table 1 summarises the articles with at least 30 citations

Table 1. Cluster 1 articles

Authors	Title	Objectives	Methodology	Conclusions
[29]	Governance and innovation in public sector services: The case of the digital library.	Explore modes of governance and innovation in the public sector.	Longitudinal case study on modes of governance and innovation in the library sector.	Network Governance drives innovation by enhancing collaboration, knowledge sharing, and adaptability.
[30]	Digital transformation by SME entrepreneurs: A capability perspective	It assesses if SME entrepreneurs have led digital transformation despite scarce skills and resources.	Qualitative approach.	Successful digital transformation requires SMEs to upgrade skills in cognitive and social media management.
[31]	Digital service teams in government.	Understand the factors that lead to the initiation of digital service teams and identify the tasks of digital service teams in the public sector.	Qualitative interpretive approach comparative approach	EAGs improve digital service delivery through a hybrid IT governance model balancing centralisation and decentralisation.
[32]	Value positions viewed through the lens of automated decision-making: The case of social services.	State of the art of the public sector in e-governance.	Qualitative case study using interviews.	Greater accountability, lower costs and increased efficiency observed.
[33]	The study examines opportunities and challenges of blockchain in Japan's energy transition.	Responding to institutional challenges such as low renewable energy targets and grid interconnection.	Design research	It examined challenges and opportunities across technology, economy, society, environment, and institutions for Japan's blockchain-based microgrid.
[51]	Open innovation 4.0 as an enhancer of sustainable innovation ecosystems.	Identifying university links in sustainable innovation ecosystems. Proposing a package of policies for green governance.	Multiple case studies	Open innovation structures and university knowledge flows promote intelligent and responsible innovation cycles and funding
[34]	Digital transformation challenges: strategies emerging from a multi-stakeholder approach.	It outlines digital transformation strategies in the Tirol-Veneto region, highlighting challenges, actions, and the role of digital skills and culture.	Qualitative method with text mining and content analysis.	Digital transformation requires multifaceted strategic actions in three main pillars: Culture and Skills, Infrastructures and Technologies.
[35]	Digital transformation and knowledge management in the public sector.	It assessed how digital transformation affects knowledge management in	Quantitative method.	The success of digital government is strongly related to the quality of

		Portuguese public administration.		knowledge management in organisations.
[36]	Machine learning based system for managing energy efficiency of public sector as an approach towards smart cities.	Incorporating Big Data and machine learning into energy efficiency in the public sector.	Data analysis, using deep neural networks, Rpart regression tree and random forest.	It proposes the MERIDA system that integrates predictive models for improving energy efficiency.
[37]	Functions of public management of the regional development in the conditions of digital transformation of economy.	Develop a methodological approach based on the system of differential equations.	Questionnaire survey	It highlights how decentralisation in Europe strengthens regional and local governance in Ukraine.
[38]	Digital government transformation: A structural equation modelling analysis of driving and impeding factors.	It quantitatively assesses factors enabling or hindering government digital transformation, emphasizing the need for change and collaboration.	Questionnaire survey	Urgency, collaboration, and management engagement drive TDG success.
[39]	It investigates RPA's opportunities, challenges, and implementation in supply management.	It analyses RPA's effects and implementation challenges in public and private procurement.	Multiple case study carried out to provide initial insights and generalisable propositions.	It examines RPA in Procurement and Supply Management, showing sector-specific advantages and challenges.
[40]	Knowledge management and digital transformation for Industry 4.0: a structured literature review,	Explore the interactions between knowledge management, digital transformation and Industry 4.0.	Literature review integrating qualitative and bibliometric analysis.	Identifies the link between CG, DT and the public sector. It stresses the crucial role of DT in the development of KM.
[41]	Co-production in digital transformation of public administration and public value creation: The case of Denmark.	It examines co-production in Denmark's digital strategy, highlighting citizen, economic, administrative, and social value.	Qualitative approach with interviews.	It explores co-production in Denmark's digital transformation, identifying four types of public value: citizen, economic, administrative, and social.
[42]	Government tax policy in the digital economy.	Identify the current problems, the changes required in tax policy in the context of the digital economy,	Discussion	International collaboration is essential to combat tax evasion, enhance transparency, and innovate tax systems.
[43]	It studies digital government units and their role in modernizing public management..	Kickstarting a public management research agenda focused on Digital Government Units	Qualitative approach. Multiple case studies, using interviews.	It outlines research questions on DGUs and the role of open standards and platforms in digital government transformation.
[44]	Digitalization, accounting and accountability: A literature review and reflections on future research in public services.	It examines research trends on digitalisation and accountability in public services.	Systematic literature review	It highlights accountability and inclusivity in digitalisation.
[45]	Drivers and outcomes of digital transformation: The case of public sector services.	Identify the expectations of public managers regarding the ongoing digital transformation projects	Case study approach with expert interviews	Long-term benefits need deep organisational change, hindered by training gaps and bureaucracy.

Cluster 1 emphasises the challenge of implementing new technologies, namely digitalisation, blockchain, big data, artificial intelligence, machine learning and cloud computing, to improve processes and interact with stakeholders in the digital economy. It

also highlights the risks associated with the digital economy, particularly in terms of security. Problems of interoperability and a lack of qualified training for human resources working in Public Administration have also been identified.

The cluster 2 encompasses six articles, as described below.

Table 2. Cluster 2 articles

Authors	Title	Objectives	Methodology	Conclusions
[53]	Formation of professional competences and soft skills of public administration employees for sustainable professional development.	Identify the skills required to perform the functions of public administration and identify the skills required.	Quantitative research with questionnaires	Digitalisation boosts public administration skills and service efficiency.
[46]	Socioeconomic and resource efficiency impacts of digital public services	It evaluates digitalisation's socio-economic, environmental, and welfare impacts in Europe.	It uses econometric techniques to estimate the impacts of digital public services.	Digital public services enhance the economy, society, and resource efficiency.
[47]	Public administration of planning for the sustainable development of the region in the context of total digitalization.	It develops a planning framework and evaluates public administration's role in sustainable regional development.	The functional graphic construction method portrays the public administration's mechanism for sustainable development.	The study highlights state management functions and their importance for regional development.
[48]	C-suite Leadership of Digital Government.	It outlines digital government leadership and a framework for research.	Literature review	It highlights the need for inclusive approaches in leading digitalisation. It introduces a conceptual framework with leadership roles for digital transformation.
[49]	Technology and digital transformation for the structural reform of the sports industry: building the roadmap	Design and create a tool to understand the digital structure. Develop a consultation tool for the digitisation needs of sports organisations.	Questionnaire survey	The creation of a consultation tool is crucial for the digital transformation. The tool's design makes it easy to collect data to understand the sports industry
[50]	An operational framework for the implementation of digital systems in public administration processes in the design phase	Define an operational framework that supports PAs to implement and check the digitalisation of their workflows for the design phase	Literature Review, interviews, conceptual discussion.	Proposal of an operational framework for implementation of digitalisation o

4.3. Analysis and discussion of results

The global rise in governmental adoption of digital tools and technologies finds substantial support in numerous studies, reflecting a concerted drive to modernise governance structures and bolster citizen engagement [12] [13]. Notably, a significant uptick in publications on this subject emerges from 2017 onward, particularly evident in 2022 (81 documents) and 2023 (117 documents), underscoring the burgeoning interest, relevance, and innovation within this domain. Leading the pack of impactful authors are Mergle and Stecollini, each boasting five publications, closely trailed by Androniceanu

with four. Cumulatively, the ten most cited articles have amassed a total of 2,611 citations, indicative of their considerable impact within the research sphere. Journals such as *Financial Accountability and Management* and *Government Information Quarterly* stand out with commendable H-index scores, attesting to their prominence in this field. Ukraine takes the lead in publications by country, closely followed by Italy. Key terms such as "Digitalisation," "Digital transformation," and "Public Administration" emerge as recurrent keywords, with Androniceanu, Georgescu, Mergle, Steccolini, and Agostino notably leveraging them.

The domain of qualitative approaches is well-defined, encompassing single case studies [32] [45], multiple case studies [34] [31] [43] [41] [39] and longitudinal case studies. Concerning quantitative studies, a variety of methods are employed, including econometric estimations [51] [52]), the development of machine learning-based models, correlation analysis [53], differential equations [37], and structural equation modelling [38]. These studies are predominantly exploratory, although a few incorporate international comparative data [31] [46]. Additionally, there are studies utilising systematic literature reviews [40] [35] [44] [48], as well as combinations of different methodologies [35] [42]. Furthermore, there are theoretical discussions [42], analytic models and frameworks [47] [49].

The clusters identified in the Bibliometric analysis demonstrate the multifaceted nature of digital transformation within Public Administration. Cluster 1 focuses on technologies applied to the public sector and their tangible effects; while Cluster 2 delves into the digital transformation of public administration and its intangible effects.

Cluster 1 focuses on technologies applied in Public Administration, highlighting the impact of digital transformation on performance; e-governance, decision-making processes, citizen engagement; and the role of knowledge management as an important facilitator for efficiency and quality in public services. Public Administration needs rigour and transparency in the management of public finances, creating "new forms of dialogic accountability with stakeholders" [44]. In addition to digitisation, other emerging technologies, such as blockchain [33], robotic automation process [39] and automated decision-making [32], artificial intelligence [54], cloud computing [55], big data and machine learning [36], are mentioned as crucial for improving processes and interactions with stakeholders in the digital economy.

Digital technologies have the potential to encourage a paradigm shift to greater transparency, accountability, and citizen-centricity [32], sustainability and innovation ecosystems [56] [57] [51] cost savings, and increased operational efficiency and quality [58], create public value [41] [45] and regional development [37]. Special mention is made of the "potential of digitalization in reshaping governance structures and accountability challenges that accompany digital government transformation" [43]. Tax transparency is another advantage of IT pointed out in the literature. Emphasis is placed on the role of technologies in the design and implementation of a tax policy that stimulates innovation, ensures efficiency, improves the quality of tax services, and prevents tax evasion [42]. These findings align with the broader literature, which underscores the global trend of leveraging digitalisation to revolutionise public services and enhance citizen engagement [13] [5] [9] as well as automating repetitive tasks, enhancing data quality, and promoting corporate governance [19] [20].

Despite the prevalence of an optimistic perspective of digital transformation outcomes, the obstacles, the risks, and failures are also pointed out in literature. Digital Government Units are described as an instrument to overcome the failings of public sector IT [43]. In addition to the existing IT governance organisational units, Digital Service teams are expected to fulfil the digital transformation of government, “bridging the gap between traditional forms of IT governance and modern, agile or networked IT governance forms” [31]. Additionally, the training and education of workers, the creation of a culture for adopting digital tools and changing the bureaucratic structures of the organisation emerge as crucial conditions for the successful utilisation of new technologies [45]. Digital transformation in the public sector also raises concerns regarding interoperability, cybersecurity and data integrity, as pointed out by [18]. Further, results draw attention to how effective digital transformation depends on knowledge management [35] and how it is directly demanding new practices and professional competencies as well as digital leadership and capacity building of human resources to drive digital transformation in Public Administration [21] [44] [59].

In the context of accounting within the public sector, the analysis underscores the need for transparency, credibility, and reliability in financial reporting, which are essential for maintaining accountability and trust in government entities [44]. Moreover, technologies have significantly transformed accounting and public finance by automating processes to reduce errors and optimise time; increasing transparency and accountability through online portals; preventing fraud using analytical tools; improving the planning and monitoring of public budgets; and integrating systems for a more comprehensive and unified view of accounting and finance [44]. These findings are in line with other authors in the field [5] [8] [9] [10].

Cluster 2 focuses on the socio-economic impacts and resource efficiency of digital public services, emphasising the dimensions of human resource development, digital leadership, and performance evaluation. Digital public services are highlighted for their positive impact on the economy, society, and resource efficiency, promoting sustainable development and improving social well-being [46] [47]. Thus, there is a great need to push Public Administration towards a change of mentality, framing in technical and organisational aspects the implementation of digital systems [50]. Administrative modernisation and investment in human resource development are considered essential to drive digital transformation in Public Administration. Along with digital (technical) skills, the demand for soft skills is growing in the context of digitalisation of Public Administration [53]. It reinforces the importance of inclusive leadership in digitisation, promoting an effective work environment and enhancing resource management in Public Administration. At this level, Kristensen and Andersen [48] call for attention to leadership of digitalisation and “their ability to cope with the high speed of digital change and deep shift in organizational culture”.

Studies in the two clusters converge with previous studies: digital transformation is highly impacted by several external factors, including the adoption of cutting-edge technology by different stakeholders in public organisations [45], “the sense of urgency, the need for change, the definition of a shared vision, and the creation of a collaborative environment” [38] or, as stated by, [31], there are different internal and external factors that influence digital transformation. Internal factors include the management model and bureaucracy, while external factors include legislation, the administrative, political, social,

economic, technological and environmental components [29]. Literature on impeding and driving factors of digital transformation in public sector suggests that more effort is required to include public managers in the current debate on DGT. So, to be successful, digital transformation requires a multifaceted set of strategic actions falling into three main pillars, namely “culture and skills”, “infrastructures and technologies”, and ecosystems” [34]. Therefore, the creation of monitoring tools is seen as crucial to guide public policies, assess the impact of changes, support the definition of corrective measures, and maintain the sustainability of public finances, ideas also advocated by [8] and [23].

The results also reinforce and support the idea that digital transformation is revolutionising Public Administration, seeking to improve the performance of public services, increase transparency, and strengthen accountability [44] [3] [2]. The results highlight the importance of streamlining bureaucracy, administrative modernisation, and transparency as key pillars of Public Administration in the current context [23].

Overall, the results indicate that over time, technologies have revolutionized public finance management, offering restructuring processes to minimize errors and improve efficiency; provide greater transparency and accountability through online platforms; facilitate fraud prevention through analytical solutions; offer better planning and oversight of public budgets; and perform systems integration for a comprehensive and unified perspective on accounting and finance.

In conclusion, the synthesis of empirical findings and theoretical insights stresses the multifaceted nature of digital transformation in Public Administration. By leveraging digital technologies, governments can better manage modern governance complexities, improve service delivery, and strengthen accountability mechanisms. However, fully realising the potential of digitalisation requires addressing challenges and investing in human capital and leadership. Integrating digital innovation with sound governance principles promises a new era of responsive, transparent, and accountable Public Administration.

5. Conclusion

The exploration of Financial Management and Accounting in the Public Sector underscores its profound impact on modern governance. Through a synthesis of empirical findings and theoretical insights, this article illuminates the multifaceted nature of this transformation. It becomes evident that digitalisation is not merely a buzzword; it represents an essential paradigm shift reshaping Public Administration.

The clusters identified through Bibliometric analysis reveal crucial dimensions of this transformation. Cluster 1 underscores the transformative potential of technologies in enhancing organisational performance, citizen engagement, and knowledge management. From blockchain to big data analytics, technologies offer unprecedented opportunities while also posing challenges such as cybersecurity risks and interoperability issues. Cluster 2 delves into the socio-economic ramifications of digital public services, highlighting the imperative of human resource development, digital leadership, and performance evaluation. This cluster emphasises the interconnectedness of administrative modernisation, inclusive leadership, and sustainable development, advocating for a holistic approach grounded in governance principles.

This comprehensive analysis underscores the transformative potential of digitalisation in public administration, accentuating the evolving role of public sector accounting and financial management. From evolving accounting standards to the imperative of transparency and accountability, there is a clear call for new practices and competencies to navigate digital complexities. The findings demonstrate that, over time, technologies have significantly transformed accounting and public finance by automating processes to reduce errors and optimise time; increasing transparency and accountability through online portals; preventing fraud with analytical tools; improving the planning and monitoring of public budgets; and integrating systems for a more comprehensive and unified view of accounting and finance. However, realising this vision necessitates concerted efforts to address challenges, invest in human capital, and cultivate digital leadership capabilities. Ultimately, the fusion of digital innovation with robust governance principles holds the promise of ushering in an era of effective, efficient, and citizen-centric Public Administration.

The main limitation of this study was not the methodology since this was chosen carefully and with scientific method; instead, it was the fact that the literature analysed only extended to the WOS and SCO databases, and the study performed an in-depth analysis only of the most cited articles, potentially overlooking valuable insights from other sources and less-cited studies.

Overall, this review and mapping of the literature provide a detailed overview of the existing knowledge on digital transformation in accounting and public finance; highlight the most important and relevant works, identify key research areas and keywords, and offer insights into topics of high academic interest. This study is a valuable resource for researchers and professionals because state-of-the-art knowledge helps to implement digital transformation in Public Administration, reduce process inefficiencies and increase the quality, credibility and timeliness of information to support the decision-making process.

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References

1. D. Agostino, E. Bracci, and I. Steccolini, "Accounting and accountability for the digital transformation of public services," *FINANCIAL ACCOUNTABILITY & MANAGEMENT*, vol. 38, no. 2, SI. WILEY, 111 RIVER ST, HOBOKEN 07030-5774, NJ USA, pp. 145–151, May 2022. doi: 10.1111/faam.12314.
2. J. I. Criado and J. R. Gil-Garcia, "Creating public value through smart technologies and strategies: From digital services to artificial intelligence and beyond," *International Journal of Public Sector Management*, vol. 32, no. 5, pp. 438–450, Jan. 2019, doi: 10.1108/IJPSM-07-2019-0178.
3. A. Cordella and C. M. Bonina, "A public value perspective for ICT enabled public sector reforms: A theoretical reflection," *Government Information Quarterly*, vol. 29, no. 4, pp. 512–520, Oct. 2012, doi: 10.1016/j.giq.2012.03.004.
4. M. Fatemi and M. R. Behmanesh, "New public management approach and accountability," *International Journal of Management, Economics and Social Sciences (IJMESS)*, vol. 1, no. 2, pp. 42–49, 2012.

5. A. F. Lino, R. R. de Azevedo, and G. S. Belote, "The influence of public sector audit digitalisation on local government budget planning: evidence from Brazil," *Journal of Public Budgeting, Accounting and Financial Management*, vol. 35, no. 2. Emerald Publishing, pp. 198–218, 2023. doi: 10.1108/JPBAFM-05-2022-0090.
6. S. Osborne, "The New Public Governance?," Taylor & Francis. Accessed: May 24, 2024. Online.. Available: <https://www.tandfonline.com/doi/abs/10.1080/14719030600853022>
7. N. Hyndman and M. Liguori, "Public Sector Reforms: Changing Contours on an NPM Landscape," *Financial Accountability & Management*, vol. 32, no. 1, pp. 5–32, 2016, doi: 10.1111/faam.12078.
8. L. Ferry, V. S. Radcliffe, and I. Steccolini, "The future of public audit," *FINANCIAL ACCOUNTABILITY & MANAGEMENT*, vol. 38, no. 3, SI. WILEY, 111 RIVER ST, HOBOKEN 07030-5774, NJ USA, pp. 325–336, Aug. 2022. doi: 10.1111/faam.12339.
9. C. J. Cordery and D. C. Hay, "Public Sector Audit," Routledge & CRC Press. Accessed: May 24, 2024. Online.. Available: <https://www.routledge.com/Public-Sector-Audit/Cordery-Hay/p/book/9780367650629>
10. C. Free, V. S. Radcliffe, C. Spence, and M. J. Stein, "Auditing and the Development of the Modern State," *Contemporary Accounting Research*, vol. 37, no. 1, pp. 485–513, 2020, doi: 10.1111/1911-3846.12497.
11. A. Di Vaio, R. Hassan, and C. Alavoine, "Data intelligence and analytics: A bibliometric analysis of human–Artificial intelligence in public sector decision-making effectiveness," *Technological Forecasting and Social Change*, vol. 174, no. C, 2022, Accessed: May 24, 2024. Online.. Available: <https://ideas.repec.org/a/eee/tefoso/v174y2022ics004016252100634x.html>
12. Y. Charalabidis and Z. Lachana, "Towards a science base for digital governance," *ACM International Conference Proceeding Series*. Association for Computing Machinery, pp. 383–389, 2020. doi: 10.1145/3396956.3400062.
13. I. Munteanu and K. Newcomer, "Leading and Learning through Dynamic Performance Management in Government," *Public Administration Review*, vol. 80, no. 2, pp. 316–325, 2020, doi: 10.1111/puar.13126.
14. Y. Ramírez and Á. Tejada, "Digital transparency and public accountability in Spanish universities in online media," *Journal of Intellectual Capital*, vol. 20, no. 5, pp. 701–732, Jan. 2019, doi: 10.1108/JIC-02-2019-0039.
15. S. Royo, A. Yetano, and J. García-Lacalle, "Accountability Styles in State-Owned enterprises: The good, the bad, the ugly ... and the pretty," *Revista De Contabilidad*, vol. 22, no. 2, 2019, doi: 10.6018/rcsar.382231.
16. T. Polzer and G. Goncharenko, "The UK COVID-19 app: The failed co-production of a digital public service," *FINANCIAL ACCOUNTABILITY & MANAGEMENT*, vol. 38, no. 2, SI. WILEY, 111 RIVER ST, HOBOKEN 07030-5774, NJ USA, pp. 281–298, May 2022. doi: 10.1111/faam.12307.
17. S. Sharma, A. K. Kar, M. P. Gupta, Y. K. Dwivedi, and M. Janssen, "Digital citizen empowerment: A systematic literature review of theories and development models," *Information Technology for Development*, vol. 28, no. 4, pp. 660–687, Oct. 2022, doi: 10.1080/02681102.2022.2046533.
18. L. Mura, T. Zsigmond, and R. Machová, "The effects of emotional intelligence and ethics of SME employees on knowledge sharing in Central-European countries," *Oeconomia Copernicana*, vol. 12, no. 4, pp. 907–934, 2021.
19. S. Marwah and R. Thapar, "A Study of Factors Affecting Consumers' Behavioural Intention Towards Online Shopping: An Exploratory Study," presented at the International Conference on Emerging Trends in Business and Management (ICETBM 2023), Atlantis Press, May 2023, pp. 155–164. doi: 10.2991/978-94-6463-162-3_14.
20. K. C. Laudon and J. P. Laudon, *Laudon, Management Information Systems: Managing the Digital Firm*, 16th Global Edition. Pearson, 2020.

21. J. Schmitz and G. Leoni, "Accounting and Auditing at the Time of Blockchain Technology: A Research Agenda," *Australian Accounting Review*, vol. 29, no. 2, pp. 331–342, 2019, doi: 10.1111/auar.12286.
22. M. J. A. Gonçalves, A. C. F. da Silva, and C. G. Ferreira, "The Future of Accounting: How Will Digital Transformation Impact the Sector?," *Informatics*, vol. 9, no. 1, Art. no. 1, Mar. 2022, doi: 10.3390/informatics9010019.
23. I. Steccolini, "Accounting and the post-new public management: Re-considering publicness in accounting research," *Accounting, Auditing & Accountability Journal*, vol. 32, no. 1, pp. 255–279, Jan. 2018, doi: 10.1108/AAAJ-03-2018-3423.
24. D. Špaček, M. Navrátil, and D. Špalková, "New development: Covid 19 and changes in public administration—what do we know to date?," *Public Money and Management*, vol. 43, no. 8, pp. 862–866, 2023, doi: 10.1080/09540962.2023.2199545.
25. D. Petrakaki, "Re-locating accountability through technology From bureaucratic to electronic ways of governing public sector work," *INTERNATIONAL JOURNAL OF PUBLIC SECTOR MANAGEMENT*, vol. 31, no. 1. EMERALD GROUP PUBLISHING LTD, HOWARD HOUSE, WAGON LANE, BINGLEY BD16 1WA, W YORKSHIRE, ENGLAND, pp. 31–45, 2018, doi: 10.1108/IJPSM-02-2017-0043.
26. Y. Xiao and M. Watson, "Guidance on Conducting a Systematic Literature Review." Accessed: May 24, 2024. Online.. Available: <https://journals.sagepub.com/doi/full/10.1177/0739456X17723971>
27. M. Aria and C. Cuccurullo, "bibliometrix: An R-tool for comprehensive science mapping analysis," *Journal of Informetrics*, vol. 11, no. 4, pp. 959–975, Nov. 2017, doi: 10.1016/j.joi.2017.08.007.
28. K. Meng et al., "Wearable Pressure Sensors for Pulse Wave Monitoring," *Advanced Materials*, vol. 34, no. 21, p. 2109357, 2022, doi: 10.1002/adma.202109357.
29. A. Scupola and A. Zanfei, "Governance and innovation in public sector services: The case of the digital library," *GOVERNMENT INFORMATION QUARTERLY*, vol. 33, no. 2. ELSEVIER INC, 525 B STREET, STE 1900, SAN DIEGO, CA 92101-4495 USA, pp. 237–249, Apr. 2016, doi: 10.1016/j.giq.2016.04.005.
30. L. Li, F. Su, W. Zhang, and J.-Y. Mao, "Digital transformation by SME entrepreneurs: A capability perspective," *INFORMATION SYSTEMS JOURNAL*, vol. 28, no. 6, SI. WILEY, 111 RIVER ST, HOBOKEN 07030-5774, NJ USA, pp. 1129–1157, Nov. 2018, doi: 10.1111/isj.12153.
31. I. Mergel, "Digital service teams in government," *GOVERNMENT INFORMATION QUARTERLY*, vol. 36, no. 4. ELSEVIER INC, 525 B STREET, STE 1900, SAN DIEGO, CA 92101-4495 USA, Oct. 2019, doi: 10.1016/j.giq.2019.07.001.
32. A. Ranerup and H. Z. Henriksen, "Value positions viewed through the lens of automated decision-making: The case of social services," *GOVERNMENT INFORMATION QUARTERLY*, vol. 36, no. 4. ELSEVIER INC, 525 B STREET, STE 1900, SAN DIEGO, CA 92101-4495 USA, Oct. 2019, doi: 10.1016/j.giq.2019.05.004.
33. A. Ahl et al., "Exploring blockchain for the energy transition: Opportunities and challenges based on a case study in Japan," *RENEWABLE & SUSTAINABLE ENERGY REVIEWS*, vol. 117. PERGAMON-ELSEVIER SCIENCE LTD, THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, ENGLAND, Jan. 2020, doi: 10.1016/j.rser.2019.109488.
34. F. Brunetti, D. T. Matt, A. Bonfanti, A. De Longhi, G. Pedrini, and G. Orzes, "Digital transformation challenges: strategies emerging from a multi-stakeholder approach," *TQM JOURNAL*, vol. 32, no. 4, SI. EMERALD GROUP PUBLISHING LTD, HOWARD HOUSE, WAGON LANE, BINGLEY BD16 1WA, W YORKSHIRE, ENGLAND, pp. 697–724, Jul. 21, 2020, doi: 10.1108/TQM-12-2019-0309.
35. A. Alvarenga, F. Matos, R. Godina, and J. C. O. Matias, "Digital Transformation and Knowledge Management in the Public Sector," *SUSTAINABILITY*, vol. 12, no. 14. MDPI,

- ST ALBAN-ANLAGE 66, CH-4052 BASEL, SWITZERLAND, Jul. 2020. doi: 10.3390/su12145824.
36. M. Zekic-Susac, S. Mitrovic, and A. Has, "Machine learning based system for managing energy efficiency of public sector as an approach towards smart cities," *INTERNATIONAL JOURNAL OF INFORMATION MANAGEMENT*, vol. 58. ELSEVIER SCI LTD, THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, OXON, ENGLAND, Jun. 2021. doi: 10.1016/j.ijinfomgt.2020.102074.
 37. O. Popelo, O. Garafonova, S. Tulchynska, M. Derhaliuk, and D. Berezovskyi, "Functions of public management of the regional development in the conditions of digital transformation of economy," *AMAZONIA INVESTIGA*, vol. 10, no. 43. UNIV AMAZONIA, SEDE PRINCIPAL CALLE 17 DIAGONAL 17 CON CARRERA 3F-BARRIO PORVENIR, FLORENCE, 00000, COLOMBIA, pp. 49–58, Jul. 2021. doi: 10.34069/AI/2021.43.07.5.
 38. L. Tangi, M. Janssen, M. Benedetti, and G. Noci, "Digital government transformation: A structural equation modelling analysis of driving and impeding factors," *INTERNATIONAL JOURNAL OF INFORMATION MANAGEMENT*, vol. 60. ELSEVIER SCI LTD, THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, OXON, ENGLAND, Oct. 2021. doi: 10.1016/j.ijinfomgt.2021.102356.
 39. C. Flechsig, F. Anslinger, and R. Lasch, "Robotic Process Automation in purchasing and supply management: A multiple case study on potentials, barriers, and implementation," *JOURNAL OF PURCHASING AND SUPPLY MANAGEMENT*, vol. 28, no. 1. ELSEVIER SCI LTD, THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, OXON, ENGLAND, Jan. 2022. doi: 10.1016/j.pursup.2021.100718.
 40. A. de B. Machado, S. Secinaro, D. Calandra, and F. Lanzalonga, "Knowledge management and digital transformation for Industry 4.0: a structured literature review," *KNOWLEDGE MANAGEMENT RESEARCH & PRACTICE*, vol. 20, no. 2. TAYLOR & FRANCIS LTD, 2-4 PARK SQUARE, MILTON PARK, ABINGDON OX14 4RN, OXON, ENGLAND, pp. 320–338, Mar. 04, 2022. doi: 10.1080/14778238.2021.2015261.
 41. A. Scupola and I. Mergel, "Co-production in digital transformation of public administration and public value creation: The case of Denmark," *GOVERNMENT INFORMATION QUARTERLY*, vol. 39, no. 1. ELSEVIER INC, 525 B STREET, STE 1900, SAN DIEGO, CA 92101-4495 USA, Jan. 2022. doi: 10.1016/j.giq.2021.101650.
 42. O. Pylypenko, H. Matvienko, A. Putintsev, I. Vlasenko, and N. Onyshchuk, "Government Tax Policy in the Digital Economy," *CUESTIONES POLITICAS*, vol. 40, no. 72. UNIV ZULIA, FAC CIENCIAS JURIDICAS & POLITICAS, AV 4 BELLAVISTA CON CALLE 74, EDIF FUNDALUZ, PISOS 10 & 4, MARACAIBO, 4002, VENEZUELA, pp. 279–296, Jun. 2022. doi: 10.46398/cuestpol.4072.15.
 43. A. Clarke, "Digital Government Units: What Are They, and What Do They Mean for Digital Era Public Management Renewal?," *INTERNATIONAL PUBLIC MANAGEMENT JOURNAL*, vol. 23, no. 3. ROUTLEDGE JOURNALS, TAYLOR & FRANCIS LTD, 2-4 PARK SQUARE, MILTON PARK, ABINGDON OX14 4RN, OXON, ENGLAND, pp. 358–379, May 03, 2020. doi: 10.1080/10967494.2019.1686447.
 44. D. Agostino, I. Saliterer, and I. Steccolini, "Digitalization, accounting and accountability: A literature review and reflections on future research in public services," *FINANCIAL ACCOUNTABILITY & MANAGEMENT*, vol. 38, no. 2, SI. WILEY, 111 RIVER ST, HOBOKEN 07030-5774, NJ USA, pp. 152–176, May 2022. doi: 10.1111/faam.12301.
 45. F. Kitsios, M. Kamariotou, and A. Mavromatis, "Drivers and Outcomes of Digital Transformation: The Case of Public Sector Services," *INFORMATION*, vol. 14, no. 1. MDPI, ST ALBAN-ANLAGE 66, CH-4052 BASEL, SWITZERLAND, Jan. 2023. doi: 10.3390/info14010043.
 46. L. T. Ha, "Socioeconomic and resource efficiency impacts of digital public services," *ENVIRONMENTAL SCIENCE AND POLLUTION RESEARCH*, vol. 29, no. 55.

- SPRINGER HEIDELBERG, TIERGARTENSTRASSE 17, D-69121 HEIDELBERG, GERMANY, pp. 83839–83859, Nov. 2022. doi: 10.1007/s11356-022-21408-2.
47. O. Voronov, L. Kurnosenko, I. Bezena, N. Petryshyn, S. Korniiievskiy, and B. Ilychok, “Public Administration of Planning for the Sustainable Development of the Region in the Context of Total Digitalization,” *International Journal of Sustainable Development and Planning*, vol. 18, no. 1. International Information and Engineering Technology Association, pp. 61–67, 2023. doi: 10.18280/ijstdp.180106.
 48. K. Kristensen and K. N. Andersen, “C-suite Leadership of Digital Government,” *Digital Government: Research and Practice*, vol. 4, no. 1. Association for Computing Machinery, 2023. doi: 10.1145/3580000.
 49. A. M. Magaz-González, M. García-Tascón, C. Sahelices-Pinto, A. M. Gallardo, and J. C. Guevara Pérez, “Technology and digital transformation for the structural reform of the sports industry: Building the roadmap,” *Proceedings of the Institution of Mechanical Engineers, Part P: Journal of Sports Engineering and Technology*. SAGE Publications Ltd, 2023. doi: 10.1177/17543371231197323.
 50. M. Marocco, E. Cacciaguerra, and I. Garofolo, “An operational framework for implementing digital systems in public administrations’ processes in the design phase,” *Architectural Engineering and Design Management*. Taylor and Francis Ltd., 2023. doi: 10.1080/17452007.2023.2187752.
 51. J. Costa and J. C. O. Matias, “Open Innovation 4.0 as an Enhancer of Sustainable Innovation Ecosystems,” *SUSTAINABILITY*, vol. 12, no. 19. MDPI, ST ALBAN-ANLAGE 66, CH-4052 BASEL, SWITZERLAND, Oct. 2020. doi: 10.3390/su12198112.
 52. L. T. Ha, “Socioeconomic and resource efficiency impacts of digital public services,” *ENVIRONMENTAL SCIENCE AND POLLUTION RESEARCH*, vol. 29, no. 55, pp. 83839–83859, Nov. 2022, doi: 10.1007/s11356-022-21408-2.
 53. P. Krpálek, K. Berková, A. Kubišová, K. K. Krelová, D. Frendlovská, and D. Spiesová, “Formation of professional competences and soft skills of public administration employees for sustainable professional development,” *Sustainability (Switzerland)*, vol. 13, no. 10. MDPI AG, 2021. doi: 10.3390/su13105533.
 54. M. A. Wimmer, A. C. Neuron, and J. T. Frece, “Approaches to Good Data Governance in Support of Public Sector Transformation Through Once-Only,” *ELECTRONIC GOVERNMENT (EGOV 2020)*, vol. 12219. in *Lecture Notes in Computer Science*, vol. 12219. SPRINGER INTERNATIONAL PUBLISHING AG, GEWERBESTRASSE 11, CHAM, CH-6330, SWITZERLAND, pp. 210–222, 2020. doi: 10.1007/978-3-030-57599-1_16.
 55. I. Nanos, E. Papaioannou, E. Androutsou, and V. Manthou, “The role of cloud computing and citizens relationship management in digital government transformation,” *International Journal of Internet Marketing and Advertising*, vol. 13, no. 2. Inderscience Publishers, pp. 120–136, 2019. doi: 10.1504/IJIMA.2019.099495.
 56. A. Scupola and A. Zanfei, “Governance and innovation in public sector services: The case of the digital library,” *Government Information Quarterly*, vol. 33, no. 2, pp. 237–249, Apr. 2016, doi: 10.1016/j.giq.2016.04.005.
 57. A. Ahl et al., “Exploring blockchain for the energy transition: Opportunities and challenges based on a case study in Japan,” *Renewable and Sustainable Energy Reviews*, vol. 117, p. 109488, Jan. 2020, doi: 10.1016/j.rser.2019.109488.
 58. C. Flechsig, F. Anslinger, and R. Lasch, “Robotic Process Automation in purchasing and supply management: A multiple case study on potentials, barriers, and implementation,” *Journal of Purchasing and Supply Management*, vol. 28, no. 1, p. 100718, Jan. 2022, doi: 10.1016/j.pursup.2021.100718.
 59. D. Špaček, M. Navrátil, and D. Špalková, “New development: Covid 19 and changes in public administration—what do we know to date?,” *Public Money and Management*, vol. 43, no. 8. Routledge, pp. 862–866, 2023. doi: 10.1080/09540962.2023.2199545.

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