

DIGITALIZATION OPPORTUNITIES FROM THE PERSPECTIVE OF THE PUBLIC SECTOR ORGANIZATIONS: A SYSTEMATIC LITERATURE REVIEW

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ABSTRACT

The main aim of the paper was to reveal the main opportunities that the environment offers to the digitalization of public organizations, based on the systematic review of the specialized literature published in the Web of Science databases. From a methodological point of view, the research was carried out according to the PRISMA 2020 flow chart for the systematic reviews. In the initial phase, 347 articles/studies published in Web of Science on the topic of digitalization in public institutions were identified from which 43 articles/studies were excluded because they were not relevant for the purpose of the study.

The systematic review of the literature that there is a significant amplification of concerns for the digitalization of public organizations, a fact demonstrated by the upward trend of publications and citations in the field, especially in recent years. The most important opportunities from the perspective of the digitalization of public institutions are economic (economic development and economic growth; Reducing administrative burden and designing a user-oriented approach; the delivery of appropriate services by the public sector and the restructuring of public institutions) and technological (big data, cloud storage, artificial intelligence, robots, chatbots, drones, virtual platforms and others).

KEYWORDS : *digitalization, opportunities, public, organizations*

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1. INTRODUCTION

In the current economic context, the improvement of the management process by integrating digitalization opportunities is a permanent concern at the level of organizations, especially at the level of the public sector, given that it is an essential premise for ensuring high-performance management systems that ensure the sustainability of public institutions and enhancing their capacity to ensure the implementation of public policies and good governance. Digitalization is the process of transforming activities, processes and business models through the use of digital technologies having a positive impact on competitiveness, productivity, innovation and economic growth.

At European Union level, the European Commission adopted the Digital Europe program for the period 2023-2024 which strengthens the EU's critical digital capabilities by focusing on the key areas of data technology, artificial intelligence, cloud, cyber security, advanced digital skills and deployment for optimal use of these technologies. Within this program, the development of elements with a major impact on managerial processes in public institutions is aimed at: the creation

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and continuous maintenance of digital public services and the support of interoperability and cross-border solutions in support of public administrations.

Regarding the theoretical context, the specialized literature includes numerous scientific articles that address research topics regarding the opportunities of digitalization, respectively the improvement of the management process, including in public institutions. Calderon-Monge & Ribeiro-Soriano (2023) analyzed 119 articles on the role of digitalization in management, the authors coming to the conclusion that there was a significant increase in the number of published articles, especially starting in 2020, most of them revealing the applicability of digital technologies in management organizations with an impact on information systems, designing flexible organizations to adapt to their business environment; and the impact of IoT and digitalization on logistics and supply management.

The opportunities of digitalization for public institutions are multiple and varied (Gabryelczyk, 2020). Digitalization can contribute to increasing the efficiency, transparency and quality of public services, as well as reducing costs and bureaucracy. Also, digitalization can facilitate citizens' participation in decision-making processes and in monitoring the activity of public institutions. Through digitalization, public institutions can benefit from innovative solutions, adapted to the needs and expectations of beneficiaries, and can respond more quickly to social, economic (Sohag et al., 2021) and environmental challenges (Kurniawan et al, 2022; Ha et al., 2022; Simion et al., 2023). Experience has shown that the Covid-19 crisis seems to have accelerated the digital transformation of public administration (Gabryelczyk, 2020).

However, there are relatively few studies that carry out a systematic analysis of the literature on the opportunities of digitalization from the perspective of the relationship between public institutions and the environment. The evolutions of the environment of public organizations, among which the extent of the expansion of digitalization, but also the state of the researches published so far, have led to the formulation of the following research questions:

- What are the main opportunities of digitalization from the perspective of public institutions?
- How are these opportunities reflected in the specialized literature?

Considering the stage of addressing the issue of the opportunity of digitalization from the perspective of public institutions, the systematic review of the literature had the following objectives: the identification of existing research that is relevant to the subject addressed; prevention of duplication of research results; knowledge of research methods and methodologies previously used and published in specialized literature studies; the identification of research areas less explored in previously published studies and the formulation on this basis of the directions of action for the analysis of digitalization opportunities from the perspective of the relationship between organizations in the public sector and the environment.

2. RESEARCH METHODOLOGY

The systematic literature review was carried out using the PRISMA 2020 flowchart and taking into account all the studies and researches published in the Web of Science databases on the subject of digitalization in public institutions. The systematic review of the literature was carried out for the identification, selection and critical evaluation of primary sources relevant to the subject of digitalization in public institutions from the perspective of the relationship between organizations and the environment.

The main stages of the systematic revision of the specialized literature are presented in figure 1. In the first stage, all previously published studies from 1975 to August 2023 were identified in the Web of Science databases. The search in the Web of Science Core Collection databases was carried out using the following terms: "digitalization" (All Fields) AND "public institutions" (All Fields).

347 articles/studies published in Web of Science on the topic of digitalization in public institutions were identified. At this stage there were no: duplicate entries removed from Web of Science; records marked as ineligible by automation tools or records excluded for other reasons.

In the second stage, the screening stage, no other articles not included in the first stage, the article identification stage, were recovered. There were still 347 articles, from which 43 articles/studies were excluded because they were not relevant for the purpose of the study (analysis of digitalization opportunities from the perspective of the relationship between public sector organizations and the environment). Thus, there remained 304 articles included in the systematic review of the specialized literature.

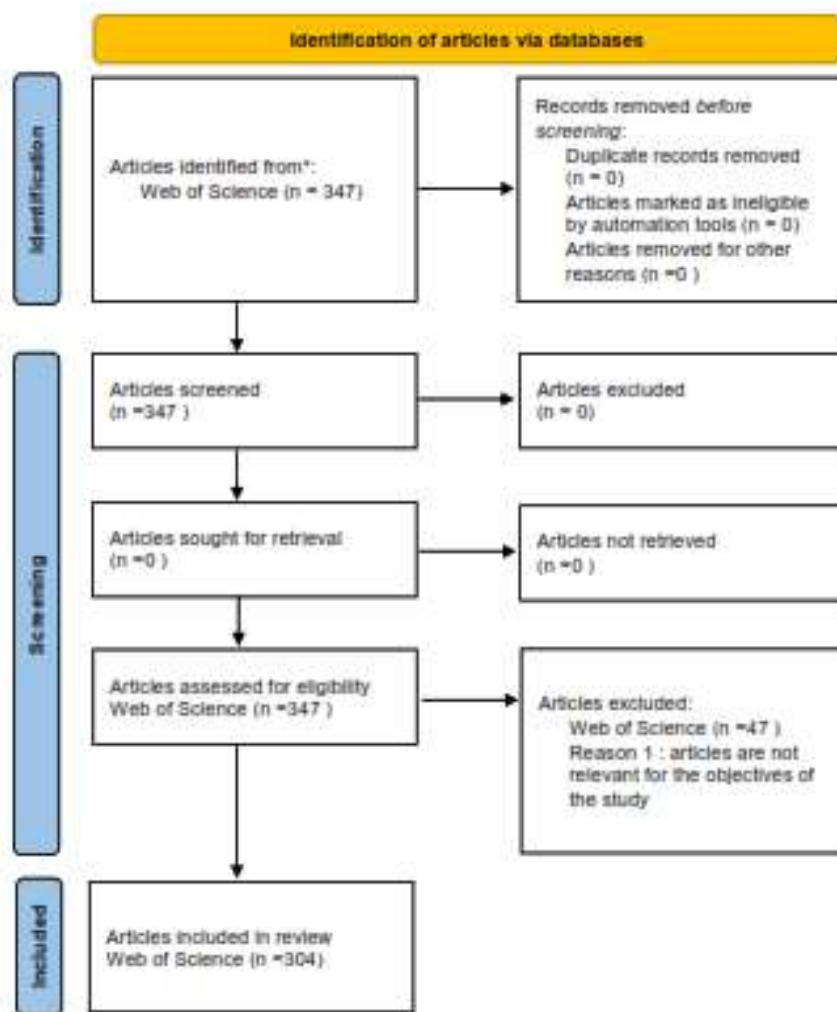


Figure 1. PRISMA 2020 flow chart for the systematic review of specialized literature on digitalization in public institutions

Source: own data processing according to the PRISMA 2020 flow chart for new systematic literature reviews including database searches

The inclusion criteria used were: the articles to be published in relation to the subject addressed; the articles should be in full-text format or in a format that allows identifying the particularities and opportunities of digitalization in the public sector; articles to be indexed in Web of Science databases; to be published in the period 1975-2023. In the 304 articles included in the specialized

literature review, the opportunities for digitalization from the perspective of the relationship between public sector organizations and the environment were searched for and identified.

3. RESEARCH RESULTS

According to the data presented in table 1, from the perspective of the Web of Science domains in which most of the studies were published, they primarily concerned domains such as economics and business, management, public administration, education, communication and only a few strictly technical domains such as computer science or information science. The high cumulative share (over 16%) of fields of a managerial nature (management and public administration) or fields related to them (economy, business, communication) is noteworthy.

Table 1. Publication frequency in Web of Science domains

No.	Web of Science domain	Number of publications	Share in total publications (%)
1.	Economics	49	16.12
2.	Business	28	9.21
3.	Education – Educational Research	27	8.88
4.	Management	25	8.22
5.	Public Administration	24	7.89
6.	Computer Science Information Systems	23	7.57
7.	Information Science Library Science	21	6.91
8.	Computer Science Interdisciplinary Applications	20	6.58
9.	Law	20	6.58
10.	Social Sciences Interdisciplinary	18	5.92
11.	Communication	17	5.59
12.	Computer Science Theory Methods	13	4.28
13.	Environmental Sciences	11	3.62
14.	Other domains	8	2.63

Source: own processing of data from Web of Science

The evolution of publications and citations in the field of digitalization in public institutions, in the last 20 years (2002-2023 period), is presented in figure 2, noting that:

- interest in the subject of digitalization in public institutions was relatively reduced in the period 2002-2017, registering less than 10 publications per year indexed in the Web of Science database;
- starting from 2018 and especially after the beginning of the Covid-19 pandemic (year 2020), there was a significant increase in the number of publications indexed in the Web of Science on the subject (under 20 publications in 2018, over 50 articles in 2020, over 80 in 2022);
- the number of citations followed a similar trend to the number of publications, starting from less than 10 citations/year until 2018 and exceeding 400 citations in 2022.

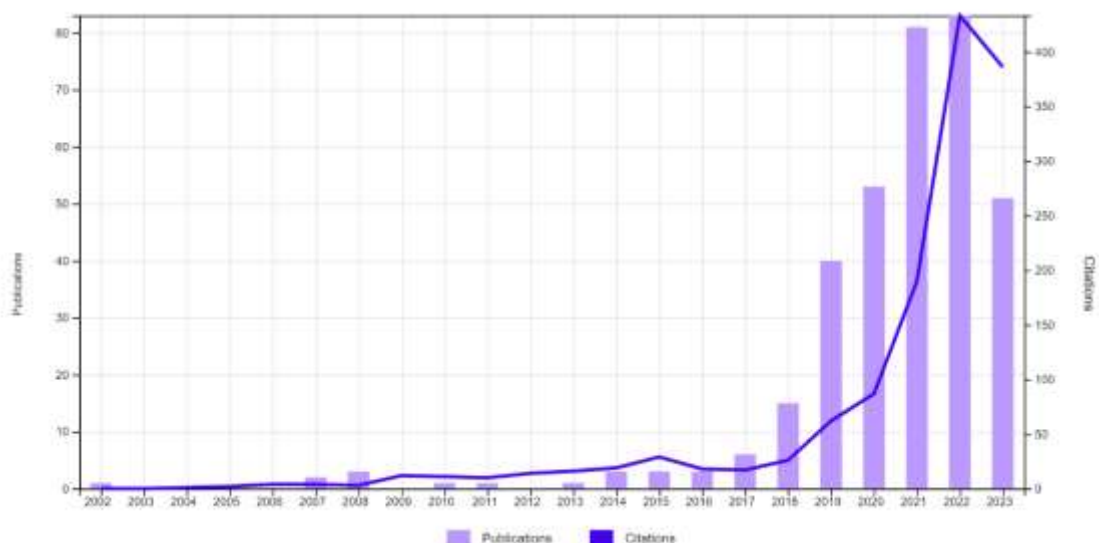


Figure 1. Evolution of the number of publications and citations in the period 2002-2023
 Source: Web of Science

The hierarchy of the journals in which the most publications on the subject of digitalization in public institutions have appeared is presented in Table 2. Digitalization of public institutions most frequently in articles published in the field of sustainability and research related to the environment/public health (which denotes the positive impact of digitalization on the environment). These are followed by those in the field of networks and systems, as well as by publications with a managerial or economic theme.

Table 2. The publications with the largest number of appearances on the subject of digitalization of public institutions

No.	Publication title	Number of appearances	Share in total publications (%)
1.	Sustainability	8	2.63
2.	International Journal Of Environmental Research And Public Health	6	1.97
3.	Lecture notes in networks and systems	6	1.97
4.	Studies in systems decision and control	6	1.97
5.	AEBMR (Advances in Economics Business and Management Research)	5	1.64
6.	Innovation of businesses and digitalization during Covid 19 pandemic ICBT 2021	5	1.64
7.	INTED Proceedings	5	1.64
8.	Socio economic systems Vol 2	5	1.64
9.	Voprosy gosudarstvennogo i munitsipalnogo upravleniya public administration issues	4	1.32
10.	Economic Annals XXI	3	0.99

Source: own processing of data from Web of Science

Most publications in the field of Web of Science are made in the form of articles (over 71 %) and papers published in conference volumes, as can be seen from Figure 2.

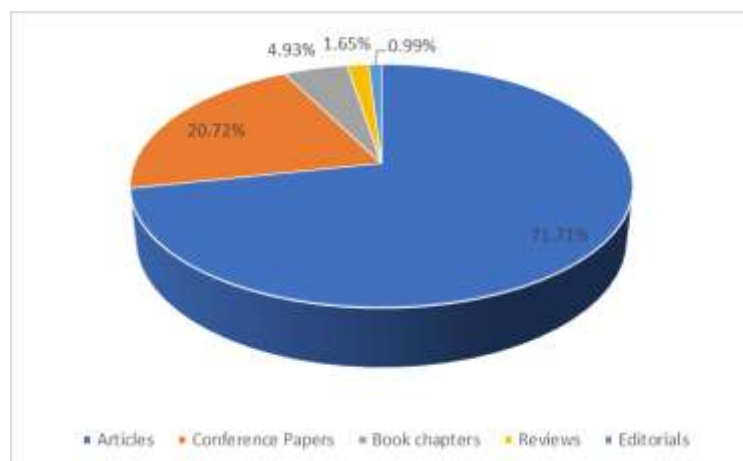


Figure 2. Typology of publications indexed in Web of Science
Source: Web of Science

According to the data presented in the previous figure, the literature review articles, book chapters and editorials published in specialized journals on the subject of digitalization in public institutions have a smaller weight. The situation is a normal one, which corresponds to the general dynamics of the main stream of publications, in which the most relevant news and research are published in the form of articles in specialized journals and less in books, editorials and articles that have as their object the literature review

The specialized literature on digitalization in public institutions mentions a series of opportunities that this process offers to public institutions/organizations. From the perspective of using the information in subsequent analyzes within this research paper, we have structured the data regarding the opportunities of digitalization into: opportunities of a political nature; economic opportunities; social opportunities; technological opportunities; legal opportunities; ecological opportunities.

The digitalization of public institutions can benefit from countless opportunities of a political nature. As shown by Pūraitė et al. (2020) in recent decades, human rights have dominated the discourse of legal and political systems, and the balance between the protection of human rights and public safety in the context of digitalization requires the need to reflect anew the concept of fundamental rights. Hammerschmid et al. (2023) considered that digitalization does not necessarily remove traditional visions based on the recentralization of power and the protection of the citizen and Onyango (2019) believes that ensuring the integration of policies and programs at the public administration level can favor its digitalization. Studies carried out in states in the process of public administration reform treat it as a contextual factor favorable to the digitalization of public institutions (Zankina, 2020; Zotov, Djordjević & Cherkasova, 2021). The development of E-government and the strategies/policies that many states in the European Union and in other geopolitical spaces have in this direction is revealed in many previously conducted researches as one of the most important opportunities for the digitalization of institutions/organizations. Among these, some of the most significant are those made by Ziolo et al. (2022) and Ha et al. (2021).

As can be seen from Table 3, there are, according to the studies published so far in the specialized literature, a series of economic opportunities that act as favorable factors in the digitalization process of public sector organizations. A first economic opportunity, mentioned by Sohag et al. (2021) is represented by economic growth and economic development. Not only from these studies, but also from others, it can be observed that the most developed states or those that are in the

process of economic growth are also those that allocate the most resources to the digitalization of public institutions and that, consequently, also have a more accentuated digitalization of them.

Table 3. Economic opportunities of digitalization from the perspective of the relationship between public institutions and the environment

No.	Economic opportunities	Relevant bibliographic sources
1.	Economic development and economic growth	Sohag et al. (2021)
2.	Reducing administrative burden and designing a user-oriented approach	Henriksen Hagen (2023)
3.	The delivery of appropriate services by the public sector and the restructuring of public institutions	Schou & Hjelholt (2019)
4.	Continuous adaptation to citizens' requirements through quality services	Kipervar & Mamay (2020)
5.	Globalization (including information)	Sohag et al. (2021);
6.	Human capital	Sohag et al. (2021);
7.	Support for regional projects	Kipervar & Mamay (2020)
8.	Financial resources	Khurshid et al. (2020)
9.	The transformation of the labor market and the change of the socio-economic situation	Ivanova (2019)
10.	The accelerated expansion of the Internet as a communication tool, mobile Internet, social networks and commercial platforms	Milošević et al. (2018)
11.	Accelerated development of innovative sectors of the economy	Dyatlov & Selishcheva, (2020)

Source: own processing of data from Web of Science

According to the data presented in the previous table, apart from economic development, there are other economic opportunities for the digitalization of public institutions, such as the delivery of appropriate services by the public sector and the restructuring of public institutions; the transformation of the labor market and the change of the socio-economic situation or the accelerated development of the innovative sectors of the economy. Also, the accelerated expansion of the Internet as a communication tool, mobile Internet, social networks and commercial platforms affects both organizations and citizens (Milošević et al., 2018).

Many studies published so far capture a series of elements that can constitute opportunities for the digitalization of public institutions: the unification of real and virtual social spaces, the emphasis on the need for communication and public relations, the proliferation of telemedicine and the amplification of the accessibility and quality of medical services for people with disabilities, the degree of concentration of economic, political, social, informational and other resources in cities and the emergence of the concept of smart cities, the proliferation of distance education/training and the need to develop digital skills. Mentioned by Vasilenko, Meshcheryakova, and Zotov (2022) and also by Laužikas & Miliūtė (2020) the unification of real and virtual social spaces refers to the process of integrating social interactions that take place in physical and digital environments through emerging technologies, such as augmented reality, virtual reality and mixed reality.

Most of the opportunities of digitalization are technological in nature, as can be seen from the following table. The study of specialized literature shows the multitude of new technologies and their potential/area of application in the case of public institutions. The use of big data, cloud storage, artificial intelligence, robots, chatbots, drones, virtual platforms alone or in combination have a huge potential for use in public institutions.

Table 4. Technological opportunities of digitalization from the perspective of the relationship between public institutions and the environment

No.	Technological opportunities	Relevant bibliographic sources
1.	Big data	Borja et al. (2020); Piunko, Lyusiena & Tolkacheva(2020)
2.	Blockchain	Juszczyk & Shahzad (2022); Fiorentino & Bartolucci (2021); Gharat et al. (2021)
3.	Cloud-Based Data Storage	Yadav (2018); Kaivo-oja, & Stenvall (2022).
4.	Artificial intelligence	Nissim & Simon (2021); Piunko, Lyusiena & Tolkacheva (2020); Moran-Sanchez et al. (2021)
5.	Artificial intelligence	Piunko, Lyusiena & Tolkacheva(2020)
6.	Robots	Vanderhorst et al (2021); Sanchez-Uran Azana (2021)
7.	BIM – Building Information Modelling	Nordhaus et al. (2020)
8.	Drone, UAS (Unmanned Aircraft Systems), UAV (Unmanned Aerial Vehicle), Remotely Piloted Aircraft System (RPAS)	Vanderhorst et al.(2021); Hognogi (2021)
9.	GIS (Geographic Information System)	Hognogi (2021)
10.	Virtual platforms	Appolloni et al. (2021); Guzzo et al. (2023); Iolanda Voda et al (2022)
11.	3 D Printing/ 3 D Streaming	Achille et al. (2019);
12.	Cybersecurity	Zakharov, Starovoitova, & Shishkova (2021); Willing (2020)
13.	Mobile applications	Ajouz, Abuamria & Hammad (2021)
14.	ERP (Enterprise Resource Planning)	Bulut & Aslan (2022)

Source: own processing of data from Web of Science

The most relevant of the previous researches (presented in table no. 4) clearly highlight the technological opportunities of the digitalization of public institutions. Big Data in the public sector contributes to a better substantiation of decision-making, encourages citizen participation, increases the transparency of government management, as well as efficient management of resources (Borja et al., 2020). ERP (Enterprise Resource Planning) can be used in decision-making in public administration, as information technology and robotics have played an effective, innovative role serving as a catalyst for rapid data collection tools (Vanderhorst et al., 2021). Virtual platforms have a wide area of application, from medical institutions, those of public administration to the educational field.

The legal-institutional environment also offers a series of opportunities of a legal nature regarding the digitalization of public institutions. Very important, from the perspective of public institutions, are those that impose the transposition of data in digital form (Di Natale, & Cordella, 2022), because they constitute a favorable factor for the digitalization of public institutions. Cappelli et al.

(2022) showed that public institutions have the ability to integrate digitalization in anti-corruption strategies.

The last category of opportunities identified are those generated by ecological imperatives and from the sphere of sustainable development. The integration of the SDGs into the categorical system of objectives of public organizations, mentioned by Onyango & Ondiek (2021) and Behr, Oertzen & Dienst (2021), is an opportunity for digitalization. The role of the SDGs in the digitalization of organizations is to guide and stimulate responsible innovation that contributes to solving social, economic and environmental challenges.

4. CONCLUSIONS

The environment of today's public organizations offers countless opportunities that can potentiate and accelerate their digitalization process. The systematic review of the literature, presented in this article and which included the publications indexed in Web of Science, showed that there is a significant amplification of concerns for the digitalization of public organizations, a fact demonstrated by the upward trend of publications and citations in the field, especially in last years. From a methodological point of view, the research was carried out according to the PRISMA 2020 flow chart for the systematic reviews.

The majority of specialized publications are represented by articles in which research results are published, followed by scientific communications published in conference volumes and book chapters. From the perspective of the frequency of publications on Web of Science domains, the best represented are: economics; business; education; management and public administration.

The research presented in this article revealed a series of political, economic, social, technological, legal-institutional and environmental opportunities of the digitalization of public institutions. The most numerous and important opportunities are those of an economic and technological nature. Among the most important economic opportunities for the digitalization of public organizations are: economic development and economic growth; Reducing administrative burden and designing a user-oriented approach; the delivery of appropriate services by the public sector and the restructuring of public institutions and continuous adaptation to citizens' requirements through quality services. The most important technological opportunities, from the perspective of the frequency of their approach in specialized literature, are: big data, cloud storage, artificial intelligence, robots, chatbots, drones, virtual platforms.

Considering the large number of opportunities that can be taken advantage of by public institutions in the digitalization process, it is important for their management to identify and select the most appropriate ones for the effective redesign of the execution and management processes.

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