

Review

Impact of technological barriers on the efficiency and transparency of public management: A systematic review

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CITATION

Lozano JMV, Bardales JMD (2024). Impact of technological barriers on the efficiency and transparency of public management: A systematic review. *Journal of Infrastructure, Policy and Development*. 8(13): 9116.
<https://doi.org/10.24294/jipd9116>

ARTICLE INFO

Received: 13 September 2024
Accepted: 26 September 2024
Available online: 8 November 2024

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Abstract: The study has formulated the objective of synthesizing the extent to which technological barriers intervene in the transparency and effectiveness of public management (PM). Methodologically, the study was of a fundamental or basic nature, with a systematic review design, the databases of Scopus (369), SciELO (2), Web of Science (184) were explored, after the review process a set of 22 articles was available. The registration was made in an Excel table where the main data of the articles were included. 32% of the articles selected for the analysis of the evidence are from the period 2020, 27% were from 2022 and 18% from the year 2023; as far as origin is concerned, 14% of the articles come from Peru and 9% from Australia, Brazil, South Korea, Spain and Indonesia. In summary, the study points out that government institutions are making progress in digitizing and improving the citizen experience through electronic services, but they face challenges in areas such as resource management, the low adoption of advanced technologies such as blockchain and artificial intelligence, as well as the lack of transparency in PM. Despite this, it is highlighted that e-government improves citizen satisfaction, and the need to invest in digital innovation, training and overcoming technological barriers to achieve an effective transformation in state administration and promote a more inclusive and advanced society is emphasized.

Keywords: technological barriers; public management; open government; technologies

1. Introduction

We are immersed in an era of dizzying change, largely driven by the impact of technology companies and advances in technology-related research. This revolution is undeniable and is leading us towards what some experts have called a “transformation of humanity” (Kempeneer and Heylen, 2023; Martins and Veiga, 2022). However, it is essential to recognize that this transformation is not happening uniformly or equitably in all corners of our society (Seok-Jin and Jooh, 2022). In the field of public administration, technology plays a fundamental role that goes beyond modernization; by providing tools that optimize the management of information and services, allowing procedures to be carried out more quickly and comfortably for citizens (Castro and Lopes, 2022; Osorio-Sanabria and Barreto-Granada, 2022). This digital transformation represents a significant advance in the provision of government services and in the relationship between citizens and their governments (Chu et al., 2023; Xiao et al., 2022).

In the Latin American environment, the concept of digital government has experienced significant growth in the last 10 years, this increase has been driven by the paradigm shift towards a knowledge society, in which the importance of using Information and Communication Technologies (ICT) more extensively to develop a community with a greater focus on the digital is recognized (Medina, 2022). This

means that government institutions use technology to deliver public services more effectively and transparently, and to establish a more direct communication channel with the population (Carolina, 2023). Under this scenario, in 2022, of the 33 countries that make up the Latin American and Caribbean region, 58%; that is, 19 states exceeded the global average (0.6102) and 6 countries (Uruguay, Chile, Argentina, Brazil, Costa Rica and Peru) are located at a very high level in the Electronic Government Development Index (EDGI); being Mexico, Grenada, Bahamas and Colombia; those that are with the highest rating of the EDGI group and have been rising progressively; although they may need to make adjustments to their policy approaches and make strategic investment decisions to ensure that the momentum is significant for the entire region (Kain et al., 2022; Pieterse et al., 2023).

However, while these results are encouraging, challenges were also identified on the road to a more advanced digital government that need to be addressed, such as anytime, anywhere accessibility to online services and citizen participation to ensure a truly effective and citizen-oriented e-government. These aspects are essential to build more inclusive and democratic societies in the digital age (Barragán and Martínez, 2022; Morillo et al., 2020). Although various research has been carried out focused on digital management in public entities; were not aimed at assessing the impact of technological barriers on the efficiency and transparency of public management (Támara and Espinoza, 2023). For this reason, addressing a systematic review of technological barriers in public management and their impact on efficiency and transparency is essential for its purpose of improving the provision of public services to citizens (Quispe, 2022).

The study is also of great social relevance, as it addresses technological challenges that directly affect efficiency and transparency in government organizations, which impacts the quality of public services and citizens' trust in government. From a practical perspective, this study allows us to identify specific obstacles in the adoption of technology in the public sector, which, in turn, facilitates informed decision-making to improve public management and promote innovation in this area. In addition, it is of strategic convenience, as it provides a solid evidence base that can guide public policies and investments in technology, thus contributing to a more efficient, transparent and citizen-oriented government. Finally, it is appropriate to make it known that the study has formulated the objective of synthesizing the extent to which technological barriers intervene in the transparency and effectiveness of PM. The following specific objectives were proposed: To evaluate the application of digital government in government institutions, to identify the use of technological tools in PM, to examine the effectiveness and transparency of PM, to analyze the opportunities for technological implementation in public management.

2. Materials and methods

The study was of a fundamental or basic nature, because the researcher focused on the creation and consolidation of knowledge through the exploitation and compilation of scientific articles. The design was systematic review, which has made it possible to synthesize the evidence extracted from the studies related to the topics of interest. To facilitate and speed up the categorization stage of the articles, it was

decided to use the PRISMA methodology to strengthen the validity and credibility of the study. The study was used to identify, select and comprehensively analyze relevant studies that addressed technological barriers in public management and their impact on both operational efficiency and levels of institutional transparency, with the objective of ensuring transparency and methodological rigor at all stages of the review process. This ensured the validity of the results and facilitated their replication, contributing to a more robust theoretical framework for future research (Page et al., 2021). The search strategy began the process of identifying and recognizing evidence related to technological barriers in public management, using databases such as Scopus, SciELO and Web of Science; Therefore, in order to expedite the identification and selection of relevant literature, the following descriptors or key words were recorded: “technological barriers”, “technological barriers”, “technological handicap”, “technological limitation”, “technological obstacle”, “practical barrier”, “technological limit”, “technological hitch”, “public management”, “public management”, “transparency”, “efficiency”. Similarly, Boolean operators (AND, OR) were used so that the search can be carried out objectively (**Table 1**).

Table 1. Search equation.

| Database | Search strategy |
|----------------|---|
| Scopus | TITLE-ABS-KEY (“technological barriers” OR “technological barriers” OR “technological handicap” OR “technological limitation” OR “technological obstacle” OR “practical barrier” OR “technological limit” OR “technological hitch” AND “public management”) TITLE-ABS-KEY (technological OR barriers AND “public management”) |
| SciELO | technological barriers AND public management |
| Web of Science | technological barriers (Topic) and public management (Topic) |

For the selection criteria of the articles to be examined, a rigorous selection and exclusion criterion has been followed to guarantee the quality and relevance of the information that was incorporated into the analysis; Some of the key factors were the time of study (2019–2023), type of research, availability of data, methodological quality, and relevance of the information that was subsequently reviewed in its abstract and content. In an initial phase, a total of 555 articles were identified, which were obtained from the following databases: Scopus (369), SciELO (2), Web of Science (184). Subsequently, exclusions were carried out that included 267 articles due to the study period, 98 by review, 3 by abstract, 7 not available in open access and 3 by duplication. As a result of this exclusion process, a set of 22 articles was available to carry out the necessary review and respond to each of the objectives set out in the study (**Figure 1**).

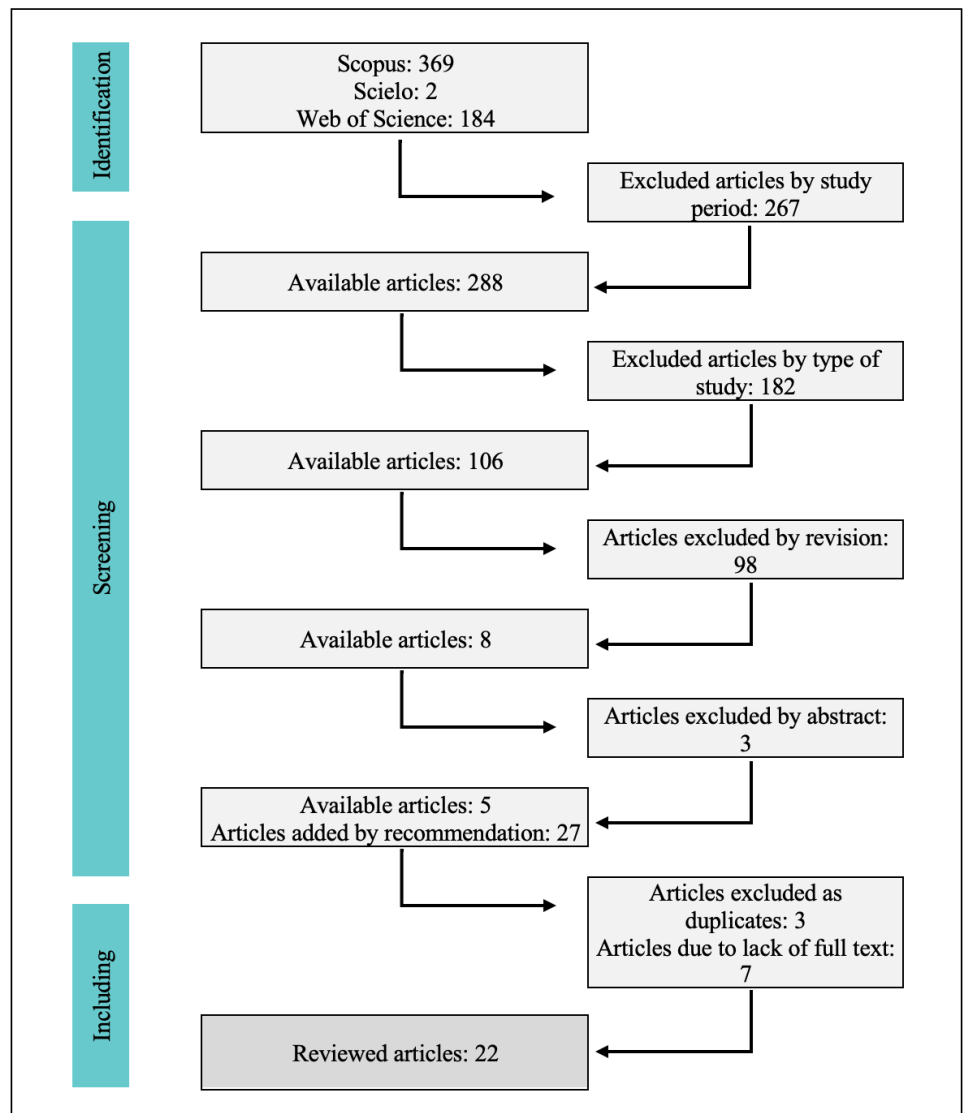


Figure 1. Selection of articles according to PRISMA.

3. Results and discussion

In relation to the characteristics of the articles as shown in **Table 2** as in **Figures 2 and 3**; 32% of the articles selected for the analysis of the evidence are from the period 2020, 27% were from 2022 and 18% from the year 2023; as far as origin is concerned, 14% of the articles come from Peru and 9% from Australia, Brazil, South Korea, Spain and Indonesia.

Table 2. Characteristics of the selected articles ($n = 22$).

| Author | Year | Country |
|----------------------|------|-----------|
| Vértiz-Osores et al. | 2023 | Peru |
| Joukhadar et al. | 2023 | Australia |
| Gracia et al. | 2022 | Peru |
| Lindquist | 2022 | Canada |
| Flach | 2022 | Brazil |

Table 2. (Continued).

| Author | Year | Country |
|---------------------------|-------------|----------------|
| Thøgersen et al. | 2020 | Denmark |
| Waheduzzaman | 2019 | Australia |
| Curto | 2023 | Spain |
| Park et al. | 2020 | United States |
| Sandoval-Almazán et al. | 2021 | Mexico |
| Moon | 2020 | South Korea |
| Myeong et al. | 2021 | South Korea |
| Chen and Chang | 2020 | Taiwan |
| Tejedo-Romero and Ferraz | 2020 | Portugal |
| Franciskovic et al. | 2020 | Colombia |
| Melati and Janissek-Muniz | 2023 | Brazil |
| Huamán | 2019 | Peru |
| Barragán | 2022 | Ecuador |
| Mensah et al. | 2022 | Indonesia |
| Guenduez et al. | 2020 | Switzerland |
| Criado and Gil-Garcia | 2019 | Spain |
| Indah and Majid | 2022 | Indonesia |

Source: Article systematization results (2019–2023)

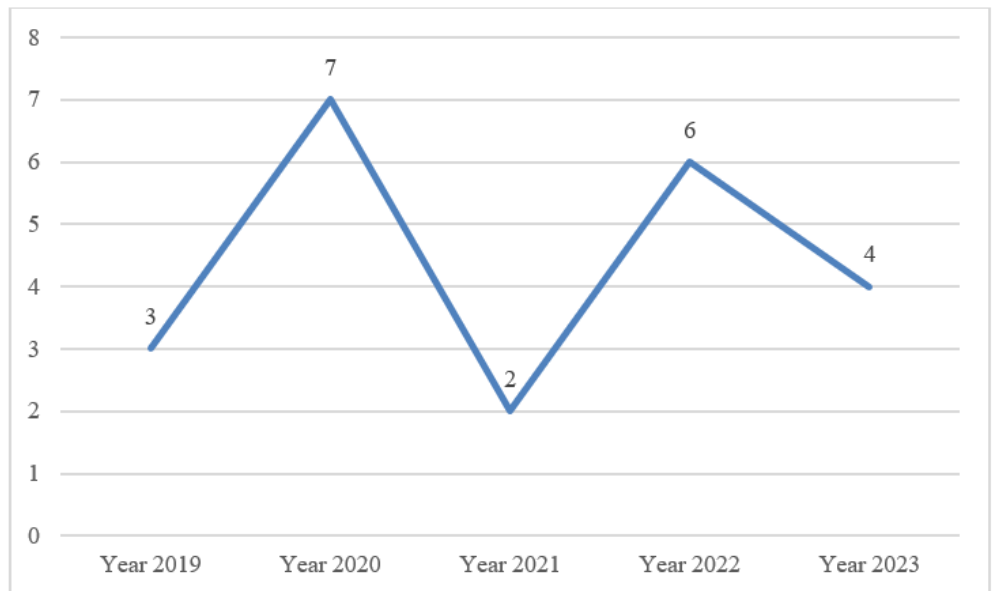


Figure 2. Publication per year.

Source: Article systematization results (2019–2023).

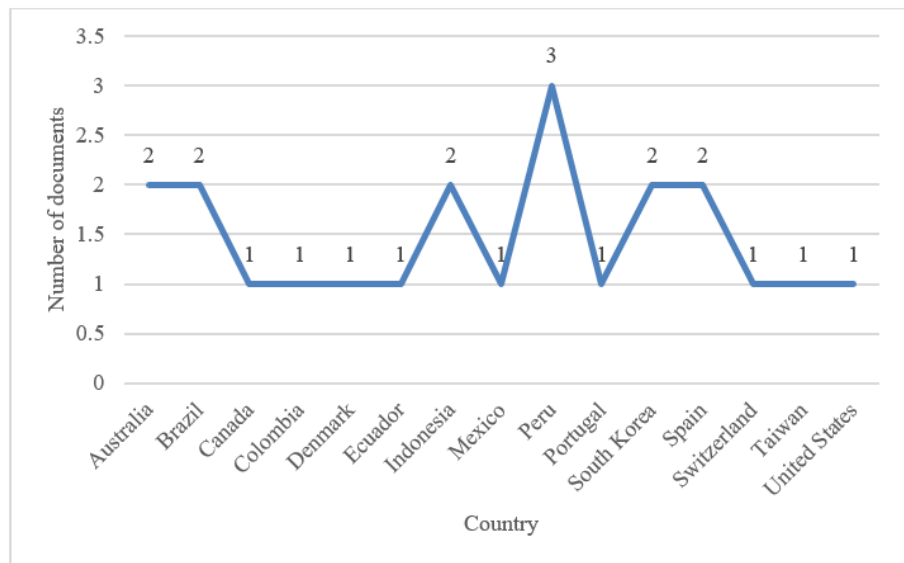


Figure 3. Publication by country.

Source: Article systematization results (2019–2023).

Regarding the application of digital government in government institutions, **Table 3** shows that state institutions are making progress in digitizing and improving citizen experiences through the provision of electronic services and the automation of processes (Joukhadar et al., 2023; Vértiz et al., 2023). However, there are also areas of concern, such as poor resource management, lack of proper functioning of online services, and low scores in the pillars of open government (transparency, effectiveness, and participation) (Flach et al., 2022; Lindquist, 2022). Likewise, security and regulatory information systems are an obstacle to the opening of government data, citizen participation and social control are not yet areas sufficiently addressed by e-government initiatives (Park et al., 2020; Waheduzzaman, 2019).

Despite these challenges, it is encouraging that e-government is improving the delivery of state services, according to 89% of respondents Moon (2020). This suggests that the effort in digitization and the implementation of technologies is having a positive impact on citizen satisfaction (Myeong et al., 2021; Mensah et al., 2022). Therefore, it is necessary for the governments of the three levels to continue working on the maturity of citizen participation, information security, and quality of government data to achieve a complete transformation in the state entities (Barragán, 2022; Huamán, 2019; Melati and Janissek-Muniz, 2023).

In relation to the use of technological tools in PM, the results presented in **Table 3** reveal a mixed picture in terms of the use of digital tools in state management; on the one hand, there is a low use of blockchain technologies (62%) and artificial intelligence (43%), which suggests that these innovations have not been implemented significantly in the governmental sphere (Joukhadar et al., 2023; Vértiz et al., 2023;). However, data analysis is at a high level (47%), indicating that PM actively uses data collection and analysis as part of its operations (García et al., 2022; Lindquist, 2022). In addition, mobile applications have a fairly high adoption, with 73% of use, which demonstrates the presence of mobile technology solutions in the public sector (Thøgersen et al., 2021).

The challenges identified in the implementation of ICT in PM are diverse and

range from lack of digital maturity to lack of collaboration between government agencies (Curto-Rodríguez, 2023). The lack of investment in digital innovation and the lack of training of officials are common problems that limit the adoption of technological tools (Sandoval-Almazán et al., 2021). The gap between the recognition of new technologies by municipal managers (68.1%) and their lack of effective use by state entities (60.4%) is indicative of the disparity in technological adoption within the public sector (Myeong et al., 2021; Thøgersen et al., 2021).

The results obtained in this analysis offer a critical and relevant vision in the context of the modernization of Public Management (Franciskovic et al., 2020); The low adoption of blockchain technologies and artificial intelligence suggests that the Mexican government still has a long way to go in incorporating advanced technological solutions that can optimize efficiency and transparency in its operations (Huamán, 2019). These technologies can be instrumental in areas such as records management and process automation, which could lead to a more agile and efficient government administration (Guenduez et al., 2020).

The use of mobile applications in PM is a positive sign, as it demonstrates the willingness to use technological tools that facilitate interaction with citizens (Myeong et al., 2021). This can play an important role in modernizing customer service and improving the user experience in government procedures and services (Guenduez et al., 2020). However, it is essential that these applications are secure and easy to use to ensure their effectiveness (Curto-Rodríguez, 2023).

Regarding the effectiveness and transparency of PM, the evidence in **Table 3** reveals that the transparency of public management shows a low trend (Vértiz et al., 2023); this indicates that there is a lack of clarity in government information and processes, which can hinder citizens' trust in their institutions (Flach et al., 2022). However, other studies show that the level of overall efficiency and transparency stands at 69%, which suggests that, although transparency is a challenge, there are aspects in which state management proves to be effective and transparent (Guenduez et al., 2020; Waheduzzaman, 2019).

In this sense, the use of information technologies seems to be a key factor in transparency (Curto-Rodríguez, 2023); however, the lack of ICT infrastructure is presented as a barrier to achieving full transparency and efficiency in government services (Myeong et al., 2021). The implementation of transparency efforts is perceived as an effective way to address problems in state management and improve the relationship between government and citizens (Chen and Chang, 2020; Mensah et al., 2022).

The evidence presented is a key factor in strengthening citizen trust in government; that is, the low level of transparency can generate distrust in government institutions and undermine the legitimacy of public decisions and policies. Therefore, improving transparency becomes essential to promote more modern and efficient public management (Huamán, 2019; Tejedo-Romero and Ferraz, 2020).

Regarding the opportunities for technological implementation in PM, the relationship with the data presented in **Table 3** highlights the importance of technological implementation in public management as a fundamental means to achieve a more inclusive and advanced society (Joukhadar et al., 2023; Melati and Janissek-Muniz, 2023). It is highlighted that the New Wales government is taking

steps to leverage digital tools with the aim of streamlining management and improving operational effectiveness, communication, data management, and decision-making (Chen and Chang, 2020; Vértiz et al., 2023). In addition, it is pointed out that the adoption of technologies by the state contributes to providing equitable and efficient services to citizens, as well as to improving the satisfaction of officials and citizen participation (García et al., 2022; Tejedo-Romero and Ferraz, 2020).

On the other hand, it is emphasized that the adoption of information and communication technologies (ICT) in public management has a positive impact on the quality of services, efficiency, employee satisfaction, and citizen participation (Franciskovic et al., 2020; Moon, 2020). It is mentioned that the UN seeks to promote the implementation of technology and training in state institutions to improve transparency and citizen participation in public administration. In addition, it is highlighted that open government is perceived as beneficial in terms of information accessibility, citizen participation, and social inclusion, although the need to review and strengthen the policies implemented to achieve significant results is recognized (Lindquist, 2022; Sandoval-Almazán et al., 2021).

It is also underlined that the implementation of digital tools, including artificial intelligence and the use of big data, has the potential to transform public management by improving decision-making, efficiency, decentralization of operations, and the use of government resources (Barragán, 2022; Huamán, 2019; Thøgersen et al., 2021). However, challenges such as policy conflicts, cultural resistance, data security, and lack of human resources skills are mentioned that need to be addressed to achieve an effective digital transformation in public services (Flach et al., 2022; Park et al., 2020; Waheduzzaman, 2019).

Among the technological barriers involved in the transparency and effectiveness of PM, as shown in **Table 3**, the data reveal a significant correlation between the availability of ICTs and the effectiveness of government management, as well as an important link between technological tools and the transparency of public management (Indah and Majid, 2022; Vértiz et al., 2023). In addition, it is emphasized that innovation in ICT infrastructure by governments influences their organizational capacity (Flach et al., 2022; Lindquist, 2022).

Likewise, the results underscore the positive relationship between digital management and information transparency, suggesting that the use of digital media by state entities contributes to greater transparency in government management (Tejedo-Romero and Ferraz, 2020). The concept of smart government is also mentioned, which encompasses various dimensions of digital government and is presented as a valuable strategy to create value for both government and society (Criado and Gil-Garcia, 2019). Therefore, it is highlighted that good governance in government institutions can lead to the formation of a smart city that benefits the community in terms of convenience and well-being (Mensah et al., 2022; Thøgersen et al., 2021).

Under the above, it should be noted that the implementation of Information Technologies is essential to overcome key challenges in state administration, such as the decentralization of services and the improvement of transparency. This means that ICTs can be a powerful tool to address problems that have historically been difficult to solve in the public sector (Curto-Rodríguez, 2023; Myeong et al., 2021).

Table 3. Systematization of articles ($n = 22$).

| Autor-Año | OE1 | OE2 | OE3 | OE4 | OG |
|-------------------------|---|---|----------------------------|--|---|
| Vértiz et al. (2023) | High document management 71%; 78% high online services | Use of blockchain technologies 62% low, data analysis is high 47%, use of artificial intelligence down 43%; mobile apps 73% | Low level transparency 46% | To achieve a more inclusive and advanced society, it is essential to design and implement strategies and policies that allow the majority of the population to access technologies equitably and effectively, ensuring that no one is left behind in this ever-evolving digital age. | The implementation of ICTs in public management contributes positively to governments to overcome challenges such as the decentralization of services and the transparency of state administration. |
| Joukhadar et al. (2023) | The public sector is adopting citizen-centred policies to improve their experience with the services offered. | The challenges encountered were centered on the lack of digital maturity, lack of familiarity with digital technology, lack of rapid innovation, lack of collaboration between government agencies, little investment in digital innovation, lack of integration of state structures. | | The New Wales Government is implementing initiatives (digital tools) to streamline the management process | |
| García et al. (2022) | | 68.1% of municipal managers recognize new technologies, while 60.4% of state entities do not make use of ICTs | | The adoption of technological tools is relevant to improve operational efficiency, improve communication, improve data management, make better decisions and facilitate administrative processes. | |
| Lindquist (2022) | Among the key components of the digitalization process are the delivery of electronic services, automated processes, and open government. | The use of digital tools by government entities is deficient; due to the lack of knowledge and training of officials for its use. | | The adoption of technologies by the state is important to provide equitable and efficient services to citizens; in turn, it improves administrative processes. | The lack of digital innovation affects public organizations with respect to providing effective and transparent services to the population. |

Table 3. (Continued).

| Autor-Año | OE1 | OE2 | OE3 | OE4 | OG |
|--------------------------------|---|--|---|---|---|
| Flach et al. (2022) | Regular fiscal management of 35% and likewise, the management of resources was regular of 57%. | | The level of efficiency and transparency was a regular 69% | The availability of ICTs facilitates internet access for the population; therefore, it contributes to the development of citizens. | There is a significant impact between the availability of ICTs and the effectiveness of government management ($p = .000$). |
| Thøgersen et al. (2021) | | Deficient use of ICT and innovation in the public sector in 86%. | | The adoption of ICT in public management improves the quality of services by 73%, increases efficiency by 45%, employee satisfaction by 46% and citizen participation by 35%. | Technological tools have a significant influence on the effectiveness and transparency of state management ($p = .000$). |
| Waheduzzaman (2019) | Online services provided by local government are not functioning properly. | | The level of efficiency in state management has low rates. | Digital mechanisms need to be introduced to improve public services and accountability in a transparent and timely manner. | |
| Curto-Rodríguez (2023) | | The use of technological tools on open data was 35% and official websites 4%. | The use of ICTs has a 61% interference in the transparency of the PG. | | The use of digital media by state entities has a significant impact on the transparency of government management. |
| Park et al. (2020) | Among the pillars of open government are transparency, participation and collaboration; which have low levels. | | | The UN, through volunteering, seeks to implement technology and training to state institutions; in order to improve transparency and citizen participation in public administration. | |
| Sandoval-Almazán et al. (2021) | | The use of ICTs in Mexican governments is regular at 86% (access to information and new technologies). | | 31% of citizens surveyed said that the benefits of open government focus on information accessibility and transparency, 27 said that citizen participation and 16% social inclusion. | |
| Moon (2020) | The challenges presented by E-government initiatives focus on the maturity of citizen participation, quality of open information and governmental capacity. | | | It is necessary to review the policies implemented in open government to achieve significant results in actions, especially in the equitable accessibility of information to the entire population. | |

Table 3. (Continued).

| Autor-Año | OE1 | OE2 | OE3 | OE4 | OG |
|----------------------------------|--|---|---|---|---|
| Myeong et al. (2021) | The opening of government data was low by 33.17%; especially because of the lack of security and regulatory information systems. | Governments that developed ICT infrastructure had better governance by 68.83%. | The lack of ICT infrastructure does not allow governments to be fully transparent and efficient in the services they provide to citizens. | | Innovation in ICT infrastructure by governments significantly influences the organizational capacity of the state ($p = .001$). |
| Chen and Chang (2020) | | | The implementation of transparency efforts allows the population and the government to address situations presented in state management. | The adoption of digital platforms in the state administration has a significant impact on the level of transparency of the actions carried out by government officials. | |
| Tejedo-Romero and Ferraz (2020) | | | The level of transparency was medium at 21.5%. | The introduction of ICTs and e-government increases access to online information for citizens in general, generating a positive effect on municipal transparency. | There is a positive relationship between digital management and information transparency ($p = .000$). |
| Franciskovic et al. (2020) | | The e-government channels are made up of: email, social networks, WhatsApp and mobile applications. | | The development of ICTs contributes to a culture of service, transparency, participation and collaboration, to its efficient public management. | |
| Melati and Janissek-Muniz (2023) | The process of innovation in public management involves the use of artificial intelligence in its administrative operations. | | | The adoption of artificial intelligence in the management of state entities improves and supports decision-making, planning of activities, establishment of formal structures, participation of public servants and managers, social commitment and timely data management. | |

Table 3. (Continued).

| Autor-Año | OE1 | OE2 | OE3 | OE4 | OG |
|------------------------|--|---|---|---|--|
| Huamán (2019) | E-government serves to provide online service, transparency and accountability, citizen participation, training, and distance education. | There is a low percentage of the use of digital tools by citizens to carry out their procedures online; that is, 2 out of 3 citizens prefer to do it in person. | The implementation of the single platform for citizen service is not meeting the required effectiveness and transparency. | For an efficient management of electronic government, it is essential that the population perceives the use of digital tools brings with it benefits linked to quick responses, greater dynamism in procedures, saving time and money, and preventing corruption. | |
| Barragán (2022) | 73% of the technologies are applied to executive actions, 13% to legislative actions, and 7% to electoral judicial levels, respectively; while 0% are destined for citizen participation and social control. | | | State administration based on the use of ICTs contributes to the process of transformation in the actions of officials, reduces costs, increases the production process, decentralization of operations and timely use of government resources. | |
| Mensah et al. (2022) | E-government improves the delivery of state services, according to 89% of respondents. | | The level of transparency of government officials' actions with the use of digital tools was high, according to the perception of 87% of the citizens surveyed. | | The quality of information, citizen orientation, openness and responsiveness are related to e-government ($p = .000$). |
| Guenduez et al. (2020) | | Big data facilitates accurate decision-making and efficiency in government administration. It also allows for the transparent use of public resources. | The lack of technical knowledge for the analysis of the growing volume of data prevents the state administration from using big data efficiently. | The introduction of big data represents an opportunity for democratization and administrative capacity in state administration. | |

Table 3. (Continued).

| Autor-Año | OE1 | OE2 | OE3 | OE4 | OG |
|------------------------------|-----|-----|-----|--|---|
| Criado and Gil-Garcia (2019) | | | | A changing future is envisioned in the use of technologies and smart strategies in government; as increasingly sophisticated tools emerge in all spheres and areas of policy and PG. Future development may be supported by computational models, including government analytics, big data, policy modeling, and the use of artificial intelligence. | Smart government is a concept that encompasses different dimensions related to digital government, both traditional and emerging trends, which converge to create value for government and society. |
| Indah and Majid (2022) | | | | The challenges that the digital transformation in public services must face focus on the existing conflicts between policies, rejection of administrative culture, poor data security and lack of human resources skills. | One of the benefits of implementing good governance of government institutions is the formation of a smart city that results in the convenience and well-being of the community. |

4. Discussion

Public management is constantly evolving, and one of the main challenges it faces is overcoming technological barriers. These technological barriers can manifest themselves in various ways and affect both efficiency and transparency in government administration (Guenduez et al., 2020; Waheduzzaman, 2019). First, technological barriers can hinder efficiency in public management (Flach et al., 2022). This is because the adoption of new technologies often requires significant investment in financial resources and staff training. In addition, resistance to change on the part of public employees can be a major barrier. When these barriers are not overcome, the implementation of technological systems can be slow and costly, which in turn can affect efficiency in public service delivery and government decision-making (Joukhadar et al., 2023; Vértiz et al., 2023).

On the other hand, technological barriers can also impact transparency in public management. Lack of access to up-to-date information systems and the inability to share data effectively can limit the ability of citizens and stakeholders to monitor government activities. This can lead to a lack of transparency and trust in government institutions, which in turn can undermine accountability and citizen participation (Park et al., 2020; Waheduzzaman, 2019). However, it is important to highlight that overcoming these technological barriers can have significant benefits. The proper implementation of information and communication technologies (ICTs) can improve the efficiency of government processes, reduce bureaucracy, facilitate access to information, and promote transparency. In addition, ICTs can enable citizen participation and social control, which contributes to more open and democratic governance (Barragán, 2022; Huamán, 2019; Melati and Janissek-Muniz, 2023).

Regarding the second objective, the challenges identified, focused on the lack of investment in digital innovation and the lack of training of officials, are critical obstacles on the road to modernized Public Management (Joukhadar et al., 2023; Vértiz et al., 2023;). These results are similar to what was stated by Myeong et al. (2021), who argued that modernization not only implies the adoption of advanced technologies, but also a cultural transformation and an adequate investment in human and financial resources. Also, collaboration between government agencies for effective coordination in the use of shared technologies and in the standardization of processes (Curto-Rodríguez, 2023).

With regard to the third objective, the need to promote the modernisation of public management through improved transparency and the effective adoption of ICTs is underlined (Guenduez et al., 2020; Waheduzzaman, 2019). Where Indah and Majid (2022) postulate that modernization is not only about adopting new technologies, but also about ensuring that these are used effectively to serve citizens and promote open and efficient governance. At the same time, Mensah et al. (2022) stated that addressing the challenges identified in these results is essential to move towards a more modern government, capable of meeting the changing demands of society and improving the quality of life of citizens.

Regarding the analysis of technological implementation in state management, it was highlighted that it is essential to adapt to a changing environment and to meet the demands of citizens in the digital age. At the same time, Myeong et al. (2021); stated that, by improving efficiency, transparency, and citizen participation, but requires a strategic approach and the overcoming of important obstacles (García et al., 2022; Tejedo-Romero and Ferraz, 2020). The importance of this process lies in its ability to strengthen governance, drive innovation, and provide more effective and accessible government services for all citizens (Chen and Chang, 2020; Mensah et al., 2022).

Limitations, policy implications and further research

The study presented certain limitations, such as the use of only four databases, which suggests the importance of expanding the search to other databases such as Medline and EMBase; Similarly, the selection of articles was limited to those of open access, which could have excluded a considerable amount of relevant research. Some selection bias and low quality were also identified in some of the included studies, which could have had an impact on the results of the study. On the other hand, most of the included studies were in English, which is a limitation by omitting research in other languages. To overcome these limitations, it is suggested that studies be carried out to expand the database and consider other languages.

Despite these restrictions, it is important to note that this study makes a significant contribution to the scientific literature, especially in the field of process management and budget execution. In addition, it was possible to establish a significant relationship between the topics studied, which can promote future research and the implementation of tools that improve budget execution in government entities.

This study highlights the urgent need for governments to address technological barriers in order to improve efficiency and transparency in public management (PM). Public institutions should prioritize investments in advanced technologies such as

blockchain and artificial intelligence to promote more agile and transparent governance. Additionally, policymakers must push for digital training programs for public officials so they can effectively adopt and utilize these technologies. Public policy should focus on the digital modernization of institutions, ensuring the effective implementation of electronic services that enhance the citizen experience while promoting inclusivity and equitable access to government services. Moreover, strategies must be developed to foster system interoperability and encourage citizen participation through digital platforms, thereby strengthening trust in public administration.

Future studies should expand the review to a broader timeframe and explore a wider variety of sources, such as case studies, government reports, and gray literature, to gain a more comprehensive view of how technological barriers affect public management. Additional research should focus on the impact of specific technologies, such as blockchain and artificial intelligence, in particular government sectors, and evaluate the policies implemented to overcome these barriers. Moreover, it would be valuable to investigate the role of digital skills training for public officials as a key factor in the adoption of advanced technologies. Empirical studies that quantify the impact of technological barriers on the efficiency and transparency of public administration are also recommended, using comparative metrics between different countries or regions to provide a deeper, more contextualized analysis.

5. Conclusion

The study notes that government institutions are making progress in digitizing and improving the citizen experience through e-services, but they face challenges in areas such as resource management, low adoption of advanced technologies such as blockchain and artificial intelligence, as well as a lack of transparency in public management. Despite this, it is highlighted that e-government improves citizen satisfaction, and the need to invest in digital innovation, training and overcoming technological barriers to achieve an effective transformation in state administration and promote a more inclusive and advanced society is emphasized.

Acknowledgments: To the researchers for the time granted for the development of the study.

Conflict of interest: The authors declare no conflict of interest.

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