

The Paradox of Digitalization of Public Governance: Between Technological Efficiency and Administrative Complexity

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Abstract

The rapid development of digital technology has encouraged governments in various countries to accelerate the transformation of public governance systems through the implementation of digital-based public services. Digitalization has become an important instrument in improving administrative efficiency, strengthening transparency, and increasing the responsiveness of public services in modern governance. However, alongside these developments, the implementation of digital governance has also generated new administrative complexities, including fragmented service systems, overlapping digital procedures, and increasing coordination challenges among government institutions. This study aims to analyze the paradox of digitalization in public governance, particularly the relationship between technological efficiency and the emergence of administrative complexity in bureaucratic systems. This study employs a qualitative approach by utilizing literature studies and various relevant academic sources related to digital governance and public administration transformation. The findings indicate that digitalization has significantly contributed to accelerating public service processes, improving administrative efficiency, and strengthening government responsiveness toward societal needs. Nevertheless, the implementation of digital governance has simultaneously created new bureaucratic complexities through the expansion of digital procedures, institutional fragmentation, and increasing dependence on technological systems. Therefore, the success of digital governance depends not only on technological adoption but also on the government's ability to simplify administrative structures, strengthen institutional integration, and develop adaptive governance systems that remain efficient and sustainable.

Keywords: *Digital Governance, Public Administration, Digital Transformation, Bureaucratic Complexity, Public Service Efficiency.*

A. INTRODUCTION

The development of digital technology over the past two decades has transformed the direction of government administration in various countries. This transformation is no longer viewed as a mere administrative option but has become a strategic necessity to meet the demands of an increasingly dynamic, fast-paced, and digitally connected society. Governments at various levels are competing to modernize public service systems, institutional administration, and decision-making mechanisms by integrating information technology into daily bureaucratic processes. Global pressures for transparency, accountability, service effectiveness, and efficiency in public administration have pushed digitalization to the forefront of modern governance reform. In many cases, digitalization is positioned as an instrument to accelerate service delivery, eliminate bureaucratic obstacles, reduce reliance on manual procedures, and improve connectivity between government institutions (Eom & Lee, 2022).

The push for government digitalization is growing stronger as public expectations for the quality of state services increase. Today, citizens no longer compare public services to conventional bureaucratic standards but rather to the digital experiences they gain from the private sector, which offers fast, flexible, and integrated services. This situation places significant pressure on government institutions to adapt to the rapid pace of social and technological change. The government is required to provide a responsive, easily accessible service system that reaches a wide audience, without being hampered by geographic boundaries or the operational time constraints of traditional bureaucracy. In this context, digitalization is seen as a solution that can address various administrative issues that have traditionally been associated with slow procedures, lengthy bureaucratic chains, and low public service efficiency (Kniazieva et al., 2023).

Major changes in digital governance have become increasingly apparent since the public's increasing reliance on online services. Various services, from population administration, taxation, licensing, procurement of goods and services, to public oversight systems, have begun shifting to integrated digital platforms. This transformation was initially perceived as a progressive step capable of creating a simpler and more efficient bureaucracy. Governments in many countries have allocated significant resources to building digital infrastructure, developing e-service platforms, and establishing a data-driven government ecosystem. Many countries have embraced digital governance as a symbol of public administration progress and an indicator of the success of national bureaucratic reform (Idzi & Gomes, 2022).

However, amid optimism about technological efficiency, new issues have emerged, demonstrating that digitalization in government does not always result in the expected administrative simplification. In various public institutions, digital transformation has instead introduced new layers of procedures that are more complex than previous systems. Many government organizations are experiencing increased administrative burdens due to the need to adapt work procedures to different digital systems. Technological integration, which should simplify inter-agency coordination, in practice often results in system fragmentation, overlapping service platforms, and increased bureaucratic reliance on repetitive digital verification mechanisms (Harb, 2026).

This situation demonstrates a paradox in the digitalization of governance. Technology designed to reduce bureaucratic complexity, in many situations, actually creates new forms of complexity that are more difficult to manage. Public administration employees are not only required to understand conventional bureaucratic procedures but also to adapt to a variety of constantly changing digital systems. These changes create significant administrative pressure, especially when institutional capacity does not develop as quickly as the technological transformation being implemented. Many public institutions ultimately face a situation where procedural efficiency, on the one hand, is accompanied by increased complexity in coordination, oversight, and system management, on the other (Wang et al., 2026).

This phenomenon is increasingly evident in the implementation of various public service platforms that are built sectorally without adequate integration. Many government agencies develop their own digital systems with different standards, mechanisms, and infrastructure. As a result, the public often has to deal with multiple administrative platforms that are disconnected, have different authentication procedures, and require repeated data verification processes. This situation demonstrates that digitalization is not always synonymous with administrative simplification. In many cases, digital transformation actually shifts bureaucratic complexity from the physical space to the digital space without truly eliminating the root of existing administrative problems (Das, 2024).

On the other hand, the acceleration of digitalization has also exposed capacity disparities among government institutions. Not all public organizations have adequate human resources, technological infrastructure, or institutional adaptability to effectively implement digital transformation. Some institutions can integrate services quickly, while others still face fundamental obstacles in managing digital systems. This disparity creates significant variations in the quality of public services across regions and between institutions. In some cases, digitalization actually exacerbates administrative inefficiencies because the systems developed lack adequate operational readiness (Atobishi et al., 2024).

Complexity also arises from the increasing need for oversight and control of digital government systems. As public services become increasingly reliant on technology, governments must face new challenges related to data security, privacy protection, system interoperability, and the sustainability of digital infrastructure. Various new regulations have emerged to govern data governance, cybersecurity, and the mechanisms for using digital platforms in public administration. However, these additional regulations often result in additional administrative procedures that prolong service delivery processes and complicate inter-institutional coordination. Thus, efforts to create secure and accountable digital governance ultimately create new, increasingly complex layers of bureaucracy (Dunleavy & Margetts, 2025).

Changes in bureaucratic work patterns due to digitalization have also impacted the relationship between government officials and the public. Previously, face-to-face administrative interactions were being replaced by system-based service mechanisms. While these changes increase efficiency in many aspects, they also create new distances in public service relations. Many citizens face difficulties interacting with complex digital systems, especially those with low levels of digital literacy. In certain circumstances, digitalization, designed to expand access to services, has instead resulted in new forms of administrative exclusion for certain groups (Newman et al., 2022).

Furthermore, the dynamics of digital government transformation are inextricably linked to the nature of public bureaucracies, which are inherently hierarchical and procedural, and heavily reliant on administrative certainty. The integration of technology into such bureaucratic structures often creates tension between the need for digital flexibility and a typically rigid administrative culture.

Many digitalization policies are formally implemented without adequate organizational cultural change. As a result, digital systems simply become an additional layer on top of legacy procedures that remain intact. In such circumstances, digitalization does not reduce the administrative burden but instead adds complexity through the coexistence of manual and digital procedures (Patalon, 2026).

The global pandemic that has occurred in recent years has further accelerated the digitalization process of government in various countries. The crisis forced public institutions to rapidly adapt to online-based services to maintain the continuity of government functions. Various services previously performed in person were moved to digital systems in a relatively short time. While this acceleration significantly increased the government's digital capacity, it also exposed various structural weaknesses in digital public administration governance. Many systems were built reactively without long-term integration planning, resulting in coordination issues, data redundancy, and asynchronous administrative procedures (Grinin et al., 2022).

Globally, various countries currently face relatively similar challenges related to digital governance. Even countries with high levels of digitalization continue to face new administrative issues arising from their dependence on technology. This complexity relates not only to technical aspects but also to institutional dynamics, administrative politics, organizational capacity, and the relationship between the state and society. This situation demonstrates that the success of government digitalization cannot be measured solely by the availability of technology or the number of digital services available, but also by the ability of public institutions to manage the administrative consequences arising from this transformation (Umbach & Tkalec, 2022).

In Indonesia, the digital transformation of government has progressed rapidly in recent years through various bureaucratic reform programs and the development of electronic-based government systems. Various ministries, institutions, and regional governments have begun integrating public services into digital platforms as part of the modernization of state administration. However, the implementation of digital governance in Indonesia also presents several complex challenges. System fragmentation between institutions, overlapping public service applications, weak data interoperability, and differences in digital capacity across regions remain persistent issues. Many government institutions have developed their own digital platforms without adequate coordination, resulting in a digital administration ecosystem that is not fully integrated (Danar, 2024).

This situation demonstrates that digital governance is not simply a technological issue but is also closely related to institutional capacity and the ability of public administration to adapt to structural changes. Digital transformation that is not accompanied by bureaucratic simplification has the potential to result in an accumulation of new administrative procedures that further burden public institutions and the public as service users. In such situations, the digitalization paradox becomes increasingly relevant to study, as it highlights the inconsistency

between the goal of technological efficiency and the reality of administrative complexity that arises in daily government practices (Gasco-Hernandez et al., 2022).

Based on these conditions, this study aims to analyze the paradox of digitalization in governance, specifically regarding how technological transformation can improve the efficiency of public services while simultaneously creating new administrative complexities within the bureaucracy. Furthermore, this research aims to understand the dynamics emerging in the implementation of digital governance and contribute to the development of a more adaptive, integrated, and streamlined bureaucratic reform strategy.

B. LITERATURE REVIEW

1. Digitalization

Digitization is the process of converting analog systems to digital systems by utilizing technology and digital data supported by automated operations and computerized systems. The development of digitalization occurs in line with advances in information and communication technology, which enable various activities to be carried out more quickly, efficiently, and in an integrated manner. In practice, digitalization is not only limited to changing the form of data, but also encompasses the transformation of work methods, information management, and data storage and distribution processes across various aspects of life. According to Sukmana, digitalization is the process of converting media from printed, audio, or video to digital form. This process is carried out to create digital archives that are easier to store, access, and distribute compared to conventional forms that still rely on physical media (Stavropoulos, 2022).

The implementation of digitalization requires the support of adequate technological devices and resources to ensure optimal data conversion. In document management, for example, digitalization requires equipment such as computers, scanners, data storage devices, source media operators, and supporting software to process and archive information. According to Lasa, digitalization is the process of converting printed documents into electronic documents that can be stored in a digital system. Through this process, organizations can reduce their reliance on physical archives, which are susceptible to damage, loss, or require large storage spaces. In addition to increasing document storage efficiency, digitalization also facilitates data retrieval, information distribution, and administrative oversight in a more systematic and rapid manner (Telukdarie et al., 2023).

More broadly, digitalization has become a crucial part of social and economic transformation in the modern era. Brennen and Kreiss explain that digitalization relates to the increasing availability of digital data, enabled by technological advances in creating, transferring, storing, and analyzing digital data. This has had a significant impact on various aspects of contemporary life, including communication patterns, business activities, education, government, and public services. The presence of digital technology enables organizations and society to utilize data more effectively to support decision-making and improve service quality. Therefore, digitalization is not

only understood as a technical shift from analog to digital, but also as a transformation process that shapes new ways of managing information and conducting activities in the modern era (Creutzig et al., 2022).

2. Public Governance

Governance generally refers to the system of rules, practices, and processes used to direct and control a company, organization, or government. It encompasses decision-making processes, accountability mechanisms, and the overall framework to ensure that an entity operates effectively, ethically, and in accordance with its objectives (Liu et al., 2022).

Public governance is the concept and practice of how governments and public institutions manage their affairs to meet the needs of society and achieve established goals. It involves regulations, decision-making processes, and control and accountability mechanisms that ensure that governments act efficiently, fairly, transparently, and accountably (Rivera & Knox, 2023).

Several key points in understanding public governance include:

a. **Transparency**

Governments and public institutions must provide clear and easily accessible information to the public about their policies, budgets, decisions, and performance.

b. **Accountability**

Governments and public institutions must be accountable for their actions and decisions to the public and authorized auditing institutions.

c. **Public Participation**

Involving the public in the decision-making process is a key component of good public governance. This includes mechanisms such as public consultation, participatory forums, and public hearings.

d. **Efficiency and Effectiveness**

Governments must manage their resources and services efficiently to deliver maximum results within available costs.

e. **Justice**

The principle of justice must be upheld, meaning that government services and policies must be equitable and fair for all citizens.

f. **Laws and Regulations**

Governments must operate within a strong legal framework and adhere to applicable regulations.

Good public governance is a crucial foundation for social stability, sustainable development, and public well-being. These principles help prevent corruption, ensure public involvement in decision-making processes, and achieve government-defined goals. These principles are a crucial foundation for maintaining government integrity, preventing corruption, and ensuring government works in the public interest. Therefore, good public governance supports sustainable development and public well-being (Deshmukh et al., 2025).

3. Technological Efficiency

The increasing integration of technology into organizational activities has made technological efficiency an important factor in improving productivity and operational performance. Technological efficiency refers to a technology's ability to produce greater output with fewer resources, whether in the form of time, labor, energy, or operational costs. In the modern context, technological efficiency is a key indicator in assessing the success of innovation implementation in various sectors, including industry, government, education, healthcare, and public services. The development of digital technology, automation, and artificial intelligence-based systems has enabled many organizations to significantly increase work productivity by accelerating processes, reducing human error, and optimizing data management. Various studies have shown that the application of information technology can help organizations reduce repetitive manual activities, allowing human resources to focus on more strategic and high-value tasks (Chatha et al., 2024).

Beyond improving productivity, technological efficiency also contributes significantly to enhancing service quality and supporting faster decision-making processes. In the business sector, the use of Enterprise Resource Planning (ERP) systems, cloud computing, and data analytics allows companies to integrate various operational processes more quickly and accurately. In the government sector, the digitization of public services has been proven to reduce administrative time, increase transparency, and expand public access to services. Furthermore, developments in communication technologies such as high-speed internet and digital platforms have transformed patterns of social and economic interaction, making them faster and more flexible. Organizations that utilize technology efficiently tend to be more competitive because they can respond more adaptively to market changes and societal needs (Virmani et al., 2024).

Despite its many advantages, the achievement of technological efficiency depends not only on the sophistication of the technology itself but also on the effectiveness of its implementation and management. Numerous cases demonstrate that substantial technology investments do not always result in increased efficiency without adequate human resource training, infrastructure readiness, and a clear implementation strategy. Furthermore, excessive use of technology without proper management can lead to energy waste, system dependency, and even data security risks. Therefore, technological efficiency must be understood as a combination of technical innovation, organizational management, and user adaptability to ensure technology delivers optimal benefits on a sustainable basis (Bera et al., 2025).

4. Administrative Complexity

In any organization, whether in the government or private sector, administrative processes often become increasingly complex as the need for data management, supervision, coordination, and compliance with work regulations increases. This condition is known as administrative complexity, which is the level of

complexity that arises from the numerous procedures, documents, work stages, and parties involved in carrying out organizational activities. Administrative complexity is commonly found in government institutions, large corporations, educational institutions, and other public organizations that have structured work systems and long hierarchies. The larger the scope of the organization, the greater the need for administrative control to maintain order and accountability in every operational process (Grassi & Lanfranchi, 2022).

In practice, administrative complexity can have both positive and negative impacts on organizational effectiveness. On the one hand, complex administrative systems are often established to maintain accountability, transparency, and organizational control so that every process runs according to regulations and can be accounted for. For example, in public financial management, various stages of verification and documentation are necessary to reduce the risk of budget misuse. However, on the other hand, excessive administrative complexity can lead to slow service delivery, increased operational costs, a buildup of documents, and decreased work efficiency. Various public administration studies show that overly complex bureaucracy is often a major obstacle to improving the quality of public services and accelerating decision-making (Jalonen, 2025).

Advances in information technology in recent decades have encouraged many organizations to reduce administrative complexity through system digitization and work process automation. The use of electronic data management systems, online services, and database integration has simplified previously manual and time-consuming administrative procedures. However, administrative complexity cannot be completely eliminated, as organizations still require oversight mechanisms, division of authority, and formal documentation to maintain operational stability. Therefore, the primary challenge for modern organizations is not simply to eliminate administrative complexity but to create an administrative system that remains accountable while being simpler, more flexible, and more accessible to users and the public (Arantes et al., 2023).

C. METHOD

This research was conducted using a qualitative approach to gain a deeper understanding of the dynamics of the digitalization paradox in governance, particularly regarding the relationship between increased technological efficiency and the emergence of new administrative complexities within the public bureaucracy. This approach was chosen because it provides a more comprehensive analysis of the various digital governance phenomena developing in modern government administration. Through a qualitative approach, the research aims to explore various administrative issues arising from digital transformation, while simultaneously understanding how public institutions adapt to changes in technology-based service and governance systems. The research data were obtained from various relevant sources, such as previous research results, scientific articles, academic books, policy documents, and various publications related to the digitalization of governance and

bureaucratic reform. All collected data were then systematically processed and analyzed to identify patterns, relationships, and dynamics related to the digitalization paradox of government. Through this process, this research is expected to yield a deeper understanding of the challenges of digital governance implementation and contribute to the development of more adaptive, effective, and integrated governance (Ardyan et al., 2023).

D. RESULT AND DISCUSSION

1. Digitalization and the Transformation of Public Service Efficiency

The development of digitalization in governance has brought about significant changes in public service delivery patterns in various countries. This transformation not only impacts the technical aspects of administrative services but also alters bureaucratic work structures, institutional communication patterns, and decision-making mechanisms within government organizations. In recent years, the acceleration of digital transformation has become increasingly evident through the increasing use of electronic platforms in various public administration activities, from population services, tax systems, licensing services, social assistance management, to internal government administrative processes. The presence of digital systems encourages bureaucracies to move toward a service model that is faster, more connected, and more responsive to the evolving needs of the public.

One of the most significant changes in the digitalization process of government is seen in the acceleration of administrative processes in public services. Before the widespread implementation of digital systems, many administrative procedures were carried out manually and took a relatively long time (Latupeirissa et al., 2024). Public service processes often involve complex bureaucratic stages, the use of physical documents, and slow inter-agency coordination due to limitations in administrative communication systems. These conditions resulted in citizens facing long queues, repeated verification processes, and uncertain service completion times. In such situations, digitalization emerged as an instrument capable of accelerating administrative flows through procedural automation and electronic data integration.

These changes have had a significant impact on the effectiveness of public services. Various services that previously required the physical presence of the public can now be accessed through online platforms with significantly shorter service times. Digital systems enable document submission, verification processes, and the issuance of administrative services to be carried out electronically without the need for lengthy manual procedures. In addition to improving time efficiency, this also helps reduce the administrative burden previously borne by public service institutions. The government can process large amounts of data more quickly and accurately than with conventional administrative methods that rely heavily on manual labor from bureaucratic officials.

This administrative acceleration has also influenced public expectations regarding the quality of public services. The public is beginning to demand services that are not only fast but also easily accessible, flexible, and capable of providing

administrative certainty in a short time. In this context, digitalization has become part of the government's efforts to adapt to changing social behaviors that are increasingly dependent on technology. The use of digital-based services is no longer seen as an additional innovation, but has become a primary requirement for maintaining the effectiveness of modern bureaucracy. Governments that are slow to implement digital transformation are often deemed incapable of meeting the needs of the public, who demand more practical and efficient public services.

On the other hand, digital transformation has also changed patterns of interaction between the government and the public. Whereas previously administrative relations were dominated by face-to-face interactions through conventional service mechanisms, digitalization has introduced a new, more flexible communication model that is not limited by space or time (Faro et al., 2022). The public can now access various government services through digital applications, online portals, and electronic service systems that are available 24/7. This change has expanded public access to public services, especially for groups that previously faced geographical limitations in reaching government institutions directly.

This change in interaction patterns has also indirectly affected power relations within public administration. Digitalization provides greater opportunity for the public to monitor the performance of government services through more open access to information. Complaints, aspirations, and evaluations of public services can be submitted more quickly through an integrated digital system. This encourages government institutions to improve service quality because administrative processes become more easily monitored by the public. In certain situations, digitalization even strengthens the public's position as service users, who have a greater ability to directly assess the effectiveness of the bureaucracy.

This transformation in communication patterns has also impacted the culture of service within government institutions. Bureaucratic apparatus no longer merely function as implementers of administrative procedures, but are also required to be able to manage public communication in a more open and dynamic digital space. Government responsiveness is becoming increasingly important because the public can easily compare the quality of services between institutions and regions. Pressure to accelerate administrative responses increases with the growing use of digital media, which allows the public to convey criticism and evaluation in real time. Thus, digitalization is not only changing service mechanisms but also shifting social expectations regarding how the government interacts with the public.

In addition to changing service and communication patterns, digitalization is also encouraging the integration of digital-based services within modern bureaucratic structures. This integration is evident in the government's efforts to connect various administrative systems into a more coordinated platform. The primary goal of this service integration is to reduce duplication in administrative procedures, accelerate data exchange between institutions, and improve the effectiveness of bureaucratic coordination. In many cases, digital integration allows the public to access various

services through a single integrated system without having to switch from one institution to another.

The existence of an integrated system has a significant impact on the efficiency of government administration. Data exchange between institutions can be conducted more quickly, reducing the need for manual verification, which previously took considerable time. Service integration also helps the government manage public data more systematically and accurately. This strengthens the bureaucracy's capacity to deliver more organized and data-driven public services. In the context of modern administration, the government's ability to integrate digital systems is a crucial factor in improving the effectiveness of governance.

Digital transformation also demonstrates significant changes in decision-making mechanisms within government. The use of electronic systems allows for faster data collection, processing, and analysis compared to conventional administrative methods. The government can utilize digital data to monitor program implementation, evaluate policy effectiveness, and identify various administrative issues more accurately. In certain situations, the use of electronic systems even enables faster decision-making because the necessary information is available in real time.

The effective use of electronic systems in decision-making is increasingly crucial in the context of modern government, which faces rapidly changing social and economic dynamics. The government is required to respond to various public issues appropriately and efficiently. In these circumstances, digital systems help the bureaucracy obtain more comprehensive information to support administrative processes and policy formulation. The use of technology in decision-making also helps reduce reliance on manual procedures that often slow down bureaucratic processes.

In addition to increasing administrative effectiveness, digitalization also impacts the level of transparency in governance. Digital systems enable more open public access to various administrative information, from service procedures and public budgets to progress on government program implementation. This openness of information strengthens public oversight of bureaucratic performance and encourages government institutions to operate more accountably. Increased transparency through digital systems ultimately helps strengthen public trust in public services.

Digitalization also strengthens government responsiveness in meeting the evolving needs of the public. With the support of technology, the government can provide faster administrative responses to various service requests and public complaints. Electronic systems enable more efficient internal coordination processes, accelerating the resolution of various administrative issues. This increased responsiveness is a key indicator in assessing the effectiveness of digital transformation in the public sector.

The significant changes brought about by digitalization have also impacted the working mechanisms of government officials. Service automation has resulted in the replacement of many previously manual administrative processes by electronic systems. Bureaucratic officials now play a more active role as system managers,

supervisors of digital administrative processes, and facilitators of technology-based services. This change creates new demands on human resource competencies within the public bureaucracy. Government officials no longer require only conventional administrative skills, but also technical skills in operating and managing the ever-evolving digital systems.

2. The Emergence of Administrative Complexity in Digital Governance

Digital transformation in governance was initially viewed as a strategic step to simplify bureaucratic procedures and improve public administration efficiency. Various government institutions began integrating digital technology into their service systems in the hope of reducing the administrative barriers inherent in conventional bureaucracy. Digitalization was believed to accelerate service processes, improve data management accuracy, and create more effective institutional coordination. However, over time, the implementation of digital governance has not always resulted in the expected administrative simplification. In many public institutions, digital transformation has instead introduced new forms of complexity, further expanding the layers of bureaucracy inherent in modern government administration.

One of the most visible forms of complexity emerged through the increase in digital-based administrative procedures in various government services. Before widespread digitalization, administrative processes were often perceived as slow and cumbersome, but their mechanisms tended to be centralized around a relatively clear service pathway (Vigoda-Gadot & Mizrahi, 2024). With the introduction of digital systems, many new procedures emerged, including account authentication, electronic identity verification, digital document validation, data synchronization, and system-based administrative confirmation processes. Although these procedures were designed to improve the security and accuracy of services, in practice, citizens often had to go through more administrative steps than before.

This situation demonstrates that digitalization has not eliminated bureaucracy, but rather transformed it into more complex electronic mechanisms. In various public services, processes that previously required only direct interaction with officers have now evolved into a series of digital procedures that require specific technical understanding. The public is not only required to complete administrative documents but also to understand the use of service platforms, data upload processes, digital authentication systems, and electronic validation mechanisms that vary across institutions. As a result, digitalization, in some situations, actually increases the administrative burden by adding technological procedures.

Increasing administrative complexity is increasingly evident through the fragmentation of service platforms across government agencies. Many public institutions develop their own digital systems without adequate integration across service sectors. Each agency builds applications, portals, and administrative systems with different operational standards and usage mechanisms. This situation leaves the public faced with numerous, disconnected service platforms, even though the data

and administrative needs they serve are often interconnected. In practice, public service users must create multiple administrative accounts, undergo repeated registrations, and input the same data into different systems.

This fragmentation demonstrates that government digitalization often develops sectorally without long-term integrated coordination. Many institutions focus more on building internal systems than on developing an interconnected service ecosystem. As a result, the digital transformation that should create efficiency has instead resulted in an increasingly dispersed administrative structure that is difficult to manage centrally. This disconnect between platforms leads to inconsistent service processes, lengthens administrative time, and increases the risk of data errors due to a lack of synchronization between systems across government agencies.

The transformation from conventional bureaucracy to digital governance has significantly altered the structure and mechanisms of public administration. Although digitalization has contributed to improving service efficiency and administrative accessibility, the implementation of digital systems has simultaneously generated new layers of complexity within governance processes. The comparison presented in Table 1 illustrates several administrative shifts that demonstrate how digital governance not only changes service mechanisms but also creates emerging challenges related to fragmentation, redundancy, and procedural expansion in public administration.

Table 1. Administrative Transformation and Emerging Complexity in Digital Governance

Conventional Administrative System	Digital Administrative System	Emerging Administrative Complexity
Service procedures were conducted through direct physical interaction within a single administrative unit.	Services are accessed through multiple digital platforms and online systems.	Citizens must adapt to different interfaces, authentication systems, and administrative procedures across institutions.
Administrative verification was manually processed by public officers.	Verification processes rely on electronic validation and digital authentication systems.	Additional layers of digital verification increase procedural complexity and processing requirements.
Data submission was generally conducted once within a specific institution.	Citizens are often required to repeatedly upload and validate similar documents across different systems.	Administrative redundancy emerges due to limited interoperability between government platforms.
Coordination among institutions was conducted through conventional	Inter-institutional coordination depends on digital integration and data synchronization.	Fragmented systems and incompatible databases complicate administrative coordination.

bureaucratic communication.		
Public services relied on paper-based documentation and localized records.	Governance systems utilize centralized digital databases and electronic records.	Data inconsistency and synchronization problems increase institutional workload.
Administrative procedures followed relatively stable bureaucratic mechanisms.	Digital systems continuously evolve through software updates and platform adjustments.	Frequent technological changes create adaptation difficulties for both citizens and public officials.
Service access depended on office hours and physical presence.	Public services are accessible through online platforms and mobile applications.	Increased dependence on digital infrastructure creates vulnerability to technical disruptions and system failures.
Bureaucratic oversight was performed through manual supervision and reporting.	Monitoring processes are integrated into automated digital governance systems.	Expanded digital monitoring requires additional compliance and administrative reporting mechanisms.
Administrative records were stored separately within institutional archives.	Government agencies attempt to integrate data through interconnected digital systems.	Weak interoperability causes overlapping administrative functions and fragmented governance structures.
Public interaction with government occurred primarily through face-to-face communication.	Communication increasingly occurs through digital channels and electronic platforms.	Reduced direct interaction may create communication gaps and difficulties for digitally vulnerable groups.

In addition to system fragmentation, the complexity of digital governance also arises from overlapping electronic administration mechanisms that develop simultaneously across various government sectors. Many public service systems are built with relatively similar functions but operate separately without clear coordination. This situation creates administrative redundancy that increases the bureaucratic burden on both the public and government officials. In some cases, citizens must submit the same documents to multiple systems due to a lack of data integration between institutions. This repetitive verification process creates new inefficiencies that were previously hoped to be eliminated through digitalization.

Digital administrative redundancy also demonstrates that technological transformation is often carried out without substantive simplification of bureaucratic

procedures. Many institutions simply transfer legacy procedures to a digital format without evaluating the effectiveness of existing administrative mechanisms. As a result, digital systems become an additional layer on top of the conventional bureaucracy that remains intact. In certain situations, service processes even operate using both digital and manual mechanisms, because institutions lack full confidence in the effectiveness of the electronic systems used. This situation demonstrates that digitalization does not always equate to efficiency if it is not accompanied by structural reforms in bureaucratic governance.

The administrative complexity of digital governance is increasing along with the growing need for data verification and validation in various government services. The use of digital systems is encouraging public institutions to strengthen administrative oversight mechanisms through stricter electronic validation. Various service processes now require cross-agency data synchronization, digital identity verification, electronic document verification, and automated system-based administrative confirmation. While these measures aim to improve service security and accuracy, in practice, overly layered verification processes often extend administrative time and complicate public service procedures.

The increasing need for data validation is also related to the bureaucracy's growing dependence on digital information management. In modern government systems, data is a key component in various public administration activities. The government requires accurate data to support services, oversight, decision-making, and policy evaluation. However, the greater the volume of data managed, the greater the need for administrative coordination to ensure the consistency and validity of information between institutions. This situation creates new administrative pressures that were previously less prevalent in conventional bureaucratic systems.

On the other hand, coordination between government institutions in digital governance also faces increasingly complex challenges. The integration of digital-based public services requires synchronization of policies, operational standards, technological infrastructure, and data exchange mechanisms between institutions. However, in practice, each institution often has different priorities, interests, and technological capacities. These differences make administrative coordination more complex because each system must adapt to the organizational structure and technical needs of each institution.

The complexity of coordination is even more apparent when public services involve multiple institutions simultaneously. Administrative processes that require data exchange between ministries, regional governments, and sectoral institutions often face barriers to system interoperability. Incompatible data formats, differing technology standards, and weak platform integration slow down coordination processes, even though the entire system is digital. In certain situations, government officials must resort to manual coordination to address the disconnect between the electronic systems used by each institution (Ansell et al., 2023).

These issues demonstrate that digital governance is not solely related to the use of technology, but also concerns the bureaucracy's ability to manage increasingly

complex institutional relationships. The more digital systems used in public administration, the greater the need for coordination to ensure all service mechanisms operate in an integrated manner. If institutional coordination does not evolve in line with the acceleration of digitalization, the public administration system is at risk of bureaucratic disorganization, which in turn reduces the effectiveness of government services.

The bureaucracy's dependence on ever-evolving technology further exacerbates the complexity of digital governance in modern public administration. Government institutions now rely heavily on electronic systems to carry out various service and administrative functions. When systems experience technical disruptions, software updates, or changes to digital infrastructure, bureaucratic activities can be significantly disrupted. In certain circumstances, public services can even be halted due to technical issues with the electronic systems used.

This dependency creates new challenges for government institutions, as the bureaucracy must continually adapt to rapid technological developments. Government officials are required to continually update their technical capabilities, understand system changes, and adapt to the ever-evolving digital administration mechanisms. This situation requires not only significant infrastructure investment but also organizational capacity capable of sustainably adapting to the dynamics of technological transformation.

Furthermore, rapid technological change often leads to long-term instability in digital administration systems. Many government platforms undergo repeated updates that alter service procedures and bureaucratic operational mechanisms. While updates are intended to improve system quality, too frequent changes can create administrative confusion for both the public and government officials. In certain situations, the bureaucracy becomes more focused on technical adjustments to the system than on substantially improving the quality of public services.

3. Institutional Challenges in the Implementation of Digital Governance

Digital transformation in governance has become a key agenda for public administration reform in various countries. Governments strive to build faster, more integrated, and more responsive service systems through the use of digital technology in various bureaucratic activities. However, the implementation of digital governance does not take place in an administrative space fully prepared for these changes. Despite various efforts to modernize public services, government institutions face complex structural challenges in adapting to the acceleration of technological transformation. These challenges relate not only to technical aspects but also to institutional capacity, organizational culture, human resource readiness, and the bureaucracy's ability to build integrated administrative coordination.

One of the most fundamental issues in the implementation of digital governance is evident in the digital capacity gap between government institutions. Not all public organizations have the same capabilities to develop and manage digital systems effectively. Some institutions can transform their services with the support of

adequate infrastructure, adaptive human resources, and organizational policies that support digital innovation (Xu & Dai, 2024). However, many government institutions still face limited technical and administrative capacity, resulting in slow and suboptimal digitalization processes. This imbalance leads to uneven development of the quality of digital governance implementation across sectors and regions.

These differences in digital capacity ultimately create significant variations in the quality of public services. Institutions with greater resources tend to be able to build more modern and integrated service systems, while those with limited capacity often still rely on conventional, manual administrative procedures. In many cases, this situation has led to the development of digital-based public services in a fragmented manner without adequate institutional integration. As a result, citizens face varying service experiences depending on the institution they access, even though all institutions are within the same government system.

The digital capacity gap also highlights the imbalance in organizations' ability to adapt to rapid technological change. Many government institutions lack the strategic readiness to design long-term digital transformation. System development is often carried out reactively in response to demands for administrative modernization without accompanying comprehensive organizational capacity strengthening. This situation results in digitalization being more oriented towards building service platforms rather than establishing an institutional ecosystem truly ready to implement sustainable digital governance.

Obstacles to bureaucratic adaptation to technological transformation are the next significant challenge in the implementation of digital governance. Public bureaucratic structures are essentially built through administrative mechanisms that tend to be hierarchical and procedural, and highly dependent on the stability of work systems. Meanwhile, digital transformation demands that organizations be more flexible, agile, and open to change. The mismatch between the characteristics of conventional bureaucracy and the dynamics of digital technology often creates adaptation difficulties in various government institutions.

In practice, many public organizations struggle to adapt administrative procedures to the ever-evolving digital system. Changes in service mechanisms require adjustments to work structures, task allocations, coordination patterns, and even the overall organizational culture. However, government bureaucracies tend to move more slowly than the highly dynamic technological developments. This condition often causes the implementation of digital governance to face a lack of synchronization between changes in technological systems and the organization's ability to manage the accompanying administrative changes.

These adaptation difficulties become increasingly apparent when digital transformation is implemented rapidly without adequate organizational preparation. Many government institutions are forced to digitize their services quickly due to the pressures of modernization and the ever-increasing demand for public services. However, this acceleration is often not accompanied by substantive changes to

bureaucratic mechanisms. As a result, digital systems are merely implemented as additional instruments on top of legacy administrative procedures, which remain intact. In such situations, bureaucratic officials must operate both manual and digital service mechanisms simultaneously, ultimately increasing the organization's administrative burden.

On the other hand, organizational resistance to changes in administrative systems also poses a significant challenge in implementing digital governance. Technological change is often viewed as a threat to long-standing bureaucratic work patterns. Many government officials feel that digital transformation disrupts the stability of previously well-understood administrative procedures. This resistance does not always manifest itself in open rejection, but is often evident in slow adaptation, low participation in system development, and minimal organizational initiatives to actively support digital change.

Organizational resistance is also influenced by concerns about changes in the distribution of authority within the bureaucracy. A more transparent and integrated digital system has the potential to reduce certain administrative dominance previously established through conventional bureaucratic mechanisms. In some situations, digitalization has even changed organizational oversight and control patterns, creating discomfort for some bureaucratic actors. This situation makes digital governance implementation not only a technical issue but also related to the dynamics of power and interests within government institutions (Zolak Poljašević et al., 2025).

In addition to organizational factors, a major challenge also arises from the unpreparedness of human resources in managing digital services. The digitalization of government requires public officials to possess far more complex technical capabilities than before. Officials no longer simply carry out conventional administrative procedures, but must also be able to operate electronic systems, manage digital data, understand information security mechanisms, and adapt to ongoing technological changes. However, in practice, not all officials possess sufficient digital competency to effectively implement this transformation.

This unpreparedness of human resources is evident in various operational obstacles in digital-based public services. Many officials still experience difficulties in using electronic systems, especially when technology updates occur or digital administrative procedures change. This situation results in the implementation of technology-based services not running optimally, even though digital infrastructure is in place. In some cases, limited official competency even hinders the effectiveness of public services because administrative processes continue to rely on manual mechanisms to address emerging technical challenges.

The problem of human resource capacity is further complicated when digital transformation progresses faster than bureaucratic competency development. Available administrative training is often unable to keep pace with constantly changing technological developments. As a result, government officials must independently adapt to new digital systems without adequate capacity support. This

situation demonstrates that the success of digital governance is not solely determined by the availability of technology but also depends heavily on the readiness of the people who operate the systems in their daily administrative practices.

The implementation of digital governance involves not only technological transformation but also significant institutional adjustments within public administration systems. Various challenges emerging in governance digitalization demonstrate that the effectiveness of digital transformation is strongly influenced by organizational readiness, human resource capacity, infrastructure conditions, and institutional coordination. Table 2 summarizes several major institutional challenges and their implications for public service delivery in contemporary digital governance.

Table 2. Major Institutional Barriers in the Development of Digital Public Governance

Institutional Challenges	Administrative Implications in Digital Governance	Impact on Public Service Delivery
Unequal digital capacity among government institutions	Differences in technological readiness create inconsistencies in administrative performance and system implementation.	Public service quality becomes uneven across institutions and regions.
Limited organizational adaptation to technological transformation	Bureaucratic structures often struggle to adjust to rapidly changing digital systems and workflows.	Administrative processes remain slow despite technological modernization efforts.
Organizational resistance to administrative reform	Public institutions tend to maintain conventional procedures alongside digital systems.	Dual administrative mechanisms increase bureaucratic inefficiency and workload.
Inadequate digital competencies among public officials	Many civil servants experience difficulties in operating and managing digital platforms effectively.	Service delivery becomes less optimal and heavily dependent on manual intervention.
Weak interoperability between government platforms	Institutional systems are developed independently without sufficient integration standards.	Data exchange and inter-agency coordination become fragmented and inefficient.
Infrastructure disparities across government sectors and regions	Variations in technological infrastructure limit the effectiveness of governance digitalization.	Digital services cannot be implemented uniformly in all administrative areas.

Frequent technological changes and system updates	Institutions continuously adjust procedures due to evolving digital platforms and software modifications.	Administrative instability and procedural confusion increase within public services.
Limited coordination among government institutions	Differences in priorities, regulations, and operational systems complicate collaborative governance.	Public services involving multiple institutions become slower and more complex.
Regulatory inconsistency in digital governance policies	Overlapping regulations and sectoral policies create uncertainty in administrative implementation.	Governance systems become difficult to standardize and integrate effectively.
Increasing dependence on digital infrastructure	Government administration becomes highly reliant on electronic systems and technological stability.	Technical disruptions may significantly interrupt public service operations.

The challenges of implementing digital governance are also closely related to infrastructure issues and the interoperability of government systems. Many public institutions face limited technological infrastructure, which impacts the effectiveness of digital services. Network quality, server capacity, system security, and the availability of technological devices remain major issues in various government sectors. Infrastructure disparities between regions cause the implementation of digital governance to develop unevenly, particularly between regions with high technological capacity and those still facing limited digital access.

In addition to infrastructure issues, system interoperability is a major challenge in building integrated digital governance. Many government platforms are developed sectorally with varying technological standards, making them difficult to connect within a single integrated administrative system. As a result, data exchange between institutions is often ineffective because each institution uses different system formats and mechanisms. This disconnection increases the risk of administrative redundancy, slows service coordination, and creates inefficiencies in government data management.

Interoperability issues also demonstrate that the digital transformation of government still faces significant institutional coordination challenges. Each institution has its own interests, priorities, and technological approaches, making comprehensive system integration often difficult. In many cases, digital platform development is more oriented toward internal organizational needs than toward the development of a nationally coordinated governance ecosystem. This situation has led to fragmented digitalization development that does not fully support the overall effectiveness of public services.

Amidst these challenges, regulatory dynamics are also a crucial factor in the implementation of digital governance. Rapid technological developments require the government to continually adapt administrative policies and regulations to effectively support digital transformation. However, the process of developing regulations within the public bureaucracy often lags behind the technological changes occurring on the ground. As a result, many digital systems develop without a regulatory framework that truly accommodates the needs of modern public service integration.

Regulatory issues become increasingly complex when various digital policies are formulated sectorally by individual institutions without adequate synchronization. This situation leads to overlapping regulations, differing digital administration standards, and inconsistent service mechanisms between government agencies. In certain situations, excessive regulation actually increases the complexity of digital governance, as institutions must adapt to rapidly changing administrative rules that are not always integrated with each other.

Furthermore, digital governance regulations must also address new issues related to data security, privacy protection, the use of artificial intelligence, and technology-based public information management. The government is required to create a regulatory system capable of maintaining the security of digital administration without hindering the flexibility of public services. However, in practice, efforts to strengthen administrative oversight often result in additional bureaucratic procedures that actually slow down the effectiveness of digital transformation.

4. Balancing Technological Efficiency and Administrative Simplicity in Public Governance

The acceleration of digitalization in governance has created significant changes in modern public administration patterns. Various government institutions have begun integrating digital technology into their service systems to improve bureaucratic effectiveness, expedite administrative processes, and expand public access to public services. This transformation was initially viewed as a strategic step to address the various problems of conventional bureaucracy, which for years has been synonymous with slow procedures, multi-layered administration, and low service efficiency. However, as it has developed, digitalization has not always resulted in the expected simplification of governance. In many public institutions, the implementation of technology has actually given rise to new administrative complexities, demonstrating an imbalance between technological efficiency and bureaucratic simplicity. This situation makes balancing digital modernization with administrative simplification a key challenge in contemporary public governance.

In this context, bureaucratic simplification has become a crucial agenda item inseparable from the government's digital transformation process. Digitalization, fundamentally, goes beyond simply transferring administrative procedures to electronic formats; it also demands changes to bureaucratic structures that have historically developed in complex and hierarchical ways. Many government

institutions face a situation where technology is implemented without evaluating the effectiveness of existing administrative procedures. As a result, digital systems simply become an additional layer on top of the legacy bureaucracy that remains intact. This situation demonstrates that optimal technological efficiency will not be achieved if administrative reform does not proceed in tandem with digital transformation.

Efforts to simplify bureaucracy in the era of digital governance require fundamental changes to overly procedural public administration patterns. Various redundant service stages need to be simplified so that digitalization can truly reduce the administrative burden on both the public and government officials. In many cases, citizens still have to go through repeated verification processes, upload the same documents to different platforms, and undergo lengthy administrative steps even though services are digitally based. This situation demonstrates that digitalization has not been entirely directed at simplifying service processes, but rather focuses more on shifting administrative media from manual to electronic.

Bureaucratic simplification is also closely related to the government's ability to build a more integrated service system. Integrating digital-based public service systems is a key strategy for reducing the administrative fragmentation that has developed within modern bureaucracies. Many government institutions still operate sectoral service platforms without adequate interconnectedness between institutions. As a result, the public must navigate various systems with varying procedures, authentication mechanisms, and administrative standards. This situation not only reduces service effectiveness but also increases administrative complexity in digital governance.

Developing an integrated service system enables simpler and more efficient administrative processes. Data exchange between institutions can be automated, reducing the need for manual verification and repetitive administrative processes. Service integration also helps create a more consistent public service experience because the public no longer needs to switch from one platform to another to access interrelated services. In this context, digital integration serves not only as a technological instrument but also as part of a bureaucratic reform strategy to create more coordinated and community-oriented governance.

However, the integration of public service systems cannot be effective without strengthening institutional coordination in modern governance. Government digitalization involves numerous institutions with varying organizational structures, administrative interests, and technological capacities. Therefore, the success of digital governance depends heavily on the government's ability to build more integrated inter-institutional coordination. Without strong coordination, digitalization has the potential to exacerbate bureaucratic fragmentation, as each institution develops its own systems without a clear direction for integration.

Strengthening institutional coordination becomes increasingly crucial when public services require data exchange and cross-sectoral administrative synchronization. In many cases, obstacles to digital services are not caused by technological limitations, but by weak coordination between government institutions.

Differences in operational standards, data management mechanisms, and organizational priorities often slow down service integration. As a result, the public continues to face complex administrative procedures despite the widespread use of digital technology. This situation demonstrates that digital governance transformation is fundamentally an institutional issue that requires strengthening coordinative relationships between public organizations (Wu et al., 2025).

In addition to institutional coordination, developing more adaptive and flexible digital governance is also a crucial factor in balancing technological efficiency and administrative simplicity. Technological developments are occurring rapidly and continuously changing public service needs across various government sectors. Therefore, a digital governance system cannot be built through an overly rigid and procedural bureaucratic approach. The government needs to create a governance model that can adapt to technological changes without creating new layers of administration that actually complicate public services.

An adaptive approach allows government institutions to adapt their systems more quickly to the evolving needs of the public. In modern digital governance, administrative flexibility is crucial because public services no longer operate within the static framework of conventional bureaucracy. The public expects services to be fast, simple, and easily accessible through various digital devices. If bureaucracies maintain overly rigid administrative structures, digital transformation will only result in symbolic modernization without substantive improvements in service effectiveness.

Developing flexible digital governance also requires changes in the management patterns of public organizations. Government institutions must be able to build a bureaucratic culture that is more open to innovation and technological change. In many cases, the failure of digital governance implementation is not due to limitations in technological systems, but rather to the organization's inability to adapt to the dynamics of digital transformation. Therefore, bureaucratic reform needs to be directed not only at developing technological infrastructure but also at strengthening organizational capacity to manage administrative change sustainably.

Furthermore, optimizing public services in the digital era must be done without increasing new administrative burdens for both the public and government officials. One of the main problems with digital transformation is the tendency of bureaucracies to add various monitoring and validation procedures to electronic systems. Although this step aims to improve the security and accountability of services, in practice, administrative processes often become increasingly lengthy and complex. The public must go through numerous digital verification stages, while government officials face an increased administrative coordination burden due to the multitude of systems that must be managed simultaneously.

Optimizing public services should be directed at creating simpler, more efficient, and more accessible administrative mechanisms. Digitalization should focus on reducing irrelevant bureaucratic stages and strengthening data integration between institutions to ensure faster and more effective service delivery. In this context, technology should not be understood as the ultimate goal of bureaucratic

reform, but rather as an instrument for creating public governance that is simpler and more responsive to the needs of the community.

Digital governance transformation also demands a shift in the direction of bureaucratic reform in modern public administration. Bureaucratic reform has often focused on modernizing service systems through the use of technology without accompanying structural changes within government organizations. However, the success of digital governance is determined not only by the existence of electronic platforms but also by the bureaucracy's ability to substantively simplify administrative processes. Bureaucratic reform needs to be directed at establishing a more integrated, coordinated, and effective public service system.

The direction of bureaucratic reform in the digital era must also consider the balance between administrative control and service flexibility. The government certainly needs strong oversight mechanisms to maintain data security and accountability in digital systems. However, strengthening administrative control must not result in a digital bureaucracy that is overly complex and difficult for the public to access. Therefore, digital governance reform requires an approach that balances technological efficiency with the principle of administrative simplification.

E. CONCLUSION

Digital transformation in governance has brought significant changes to the modern public administration system, particularly in improving service efficiency, accelerating bureaucratic processes, and expanding public access to government services. Digitalization encourages governments to build more responsive, integrated, and technology-based service systems to adapt to evolving social dynamics. The presence of digital platforms also strengthens administrative transparency, accelerates decision-making, and creates new, more open and flexible patterns of interaction between government and society. In this context, digital governance is a crucial part of bureaucratic reform efforts to address the demands of modernizing public services. However, this study shows that government digitalization also introduces new administrative complexities that develop alongside increased technological efficiency. The increase in digital-based administrative procedures, fragmentation of service systems between institutions, weak interoperability of government platforms, and the increasing need for administrative verification and coordination demonstrate that digital transformation does not always automatically result in bureaucratic simplification. Furthermore, digital capacity gaps between institutions, barriers to organizational adaptation, limited human resources, and regulatory dynamics exacerbate the challenges of implementing digital governance in modern public administration. This situation demonstrates a paradox in government digitalization, where technology designed to simplify bureaucracy actually, in many situations, generates new and increasingly widespread forms of complexity. The success of digital governance cannot be measured solely by the level of technology adoption in public services, but also by the government's ability to strike a balance between technological efficiency and administrative simplicity. Bureaucratic reform in the

digital era needs to be directed at strengthening service system integration, simplifying administrative procedures, improving institutional coordination, and developing governance that is more adaptive and flexible to technological change. Thus, digitalization will not only be a symbol of government modernization but will truly create an effective, integrated, and sustainable public administration system that is oriented toward the needs of the community.

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