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Public Administration in the Field of Sustainable Development: Legal Support and Digitalization

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ABSTRACT

The article is devoted to the analysis of the importance of digital technologies in improving the efficiency of public administration in the field of sustainable development in the context of global challenges of our time. Modern scientific and methodological approaches to the study of public administration, taking into account legal, institutional, and digital aspects. The development of e-governance, big data analytics, artificial intelligence, and digital platforms to improve the quality of management decisions and transparency of the activities of bodies has been studied to improve the power and efficiency of public service delivery. The study is based on a systematic analysis of scientific literature, a comparative study of international and national practice, and a generalization of analytical materials of international organizations. The article considers the essence, principles, and functional features of public administration in the field of sustainable development, analyzes the current regulatory framework, and identifies the problems of its adaptation to the conditions of digitalization. The impact of digital technologies on the efficiency of management processes is assessed, including increasing the availability of public services, optimizing the use of resources, and strengthening interaction between the state and citizens. The results of the study indicate that the holistic implementation of digital technologies in public administration leads to an improvement in the effectiveness of public policy, the quality of political results, and the achievement of sustainable development goals. At the same time, it is concluded that the success of digital transformation depends on the level of regulatory and institutional coordination and the development of digital competence. The need to form an integrated model of digital management, combining legal, organizational, and technological mechanisms, has been proven. From a practical point of view, based on the results of the study, it is possible to outline the main directions for improving digital governance mechanisms, in particular, the development of data management, the integration of information systems, increasing the level of cybersecurity, and the formation of digital competencies in the public sector. The results obtained can be used to develop national digital transformation strategies and sustainable development policies aimed at improving public administration and ensuring the long-term viability of society.

***Keywords*:** public administration, sustainable development, digitalization, digital governance, e-governance, regulatory and legal support, management efficiency, digital technologies, data management.

Introduction

The relevance of the study is due to the systemic transformation of modern public administration under the influence of global challenges, among which climate change, growing socio-economic inequality, depletion of natural resources, and the need to ensure long-term economic stability occupy a key place. Under these conditions, the concept of sustainable development is enshrined at the international level, in particular within the framework of the activities of the United Nations and the implementation of the Sustainable Development Goals until 2030, acts as a strategic basis for the formation of effective state policy. At the same time, its implementation requires a comprehensive combination of legal mechanisms, institutional tools, and modern digital technologies, which necessitates a rethinking of traditional approaches to public administration.

Legal support for sustainable development is of particular importance in the context of harmonization of national legislation with international standards and European legal norms. For Ukraine, this issue is extremely relevant due to the ongoing integration processes with the EU acquis. The development of an effective legal environment for sustainable development involves not only the consolidation of its principles in legislation but also the development and establishment of effective mechanisms for its implementation, supervision, and evaluation. In this vein, the institutional capacity of state bodies, the transparency of administrative processes, and the involvement of the public in the decision-making process are of particular importance.

Along with legal transformations, there is also an accelerated digitalization of public administration, which opens up new ways to increase the efficiency, openness, and accountability of state institutions. The use of digital technologies, primarily e-government, big data, artificial intelligence, and blockchain solutions, allows for improving management processes, improving the quality of public services, and providing more detailed monitoring of the achievement of sustainable development goals. Here, both global technological trends and the activities of leading innovative corporations – Microsoft, Google, and IBM, which determine the standards of digital transformation of the public sector today, are of decisive importance (Bigniak and Mykhalchuk, 2021; Razumai and Razumai, 2020; de Melo Cartaxo and Hossain, 2018).

At the same time, the integration of digital technologies into public administration creates problems related to cybersecurity, personal data protection, legal certainty of digital processes, and reducing the risks of digital inequality. This requires the development of a comprehensive legal instrument that would ensure a balance between innovation and legal stability, as well as comply with the principles of the rule of law.

Thus, the current stage of development of public administration is one where there is a need to combine legal and digital aspects for sustainable development. The object of the study is the legal regulation of public administration within the framework of sustainable development in the digital age. The purpose of the review is to reveal the meaning and principles of public administration in the context of sustainable development, analyze the current legislation, and assess the impact of digitalization on the efficiency of administrative processes.

In this study, public sector innovation is defined as the integration of digital governance mechanisms, including e-governance systems, artificial intelligence, big data analytics, digital platforms, and data governance tools, into public administration processes in order to improve transparency, efficiency, accountability, and sustainable development outcomes.

The scientific contribution of this paper lies in the development of a comprehensive analytical framework explaining how digital transformation and legal governance mechanisms enhance the effectiveness of public administration in the field of sustainable development through improved decision-making, optimization of public services, institutional coordination, and support for the achievement of Sustainable Development Goals (SDGs).

Literature Review

The problems of digitalization of public administration in the context of sustainable development are one of the main ones on the modern research agenda, which is due to the imperative of adapting public institutions to global challenges and technological changes. One of the dominant opinions among scholars is that digital governance is a key tool in achieving the Sustainable Development Goals, as it contributes to increasing the efficiency of administrative processes, transparency of public bodies, and the quality of public services (United Nations, 2024). At the same time, the 2030 Agenda for Sustainable Development emphasizes the need to integrate innovative technologies into public administration as a key factor for achieving long-term economic, social, and environmental sustainability (United Nations General Assembly, 2015).

Research in the field of digital governance shows that implementing e-governance and digital platforms significantly increases the effectiveness of public policies, enabling faster decision-making and better resource management (Estevez and Janowski, 2013; Zheng et al., 2019; Parkhomenko-Kutsevil, 2022). An analysis of the implications for the evaluation of digital strategies indicates that the development of digital infrastructure and data management are factors contributing to effective public administration (Gierten and Lesher, 2022). Similar findings are found in World Bank studies, which argue that the digital transformation of the public sector leads to more efficient management and reduced administrative costs (World Bank, 2023; Bondarchuk and Dubrova, 2023; Bigniak and Mykhalchuk, 2021).

Effective digital governance is particularly dependent on the regulatory and legal environment that sets the rules for the functioning of digital systems and allows their integration into public administration processes. In this regard, the study highlights the importance of legal mechanisms for regulating open data, information management, and the application of artificial intelligence as the basis of the new digital state (European Union, 2019, 2022a, 2022b, 2024).

At the same time, some authors noted that the effectiveness of such mechanisms largely depends on the degree of their implementation and adaptation to national realities (OECD, 2021).

At the same time, along with the positive consequences of digitalization, its implementation in the scientific literature is associated with problems. In particular, research points to digital divides that limit access to digital services for certain populations, as well as threats to personal data protection and cybersecurity (Zuiderwijk et al., 2021). In this context, it is important to develop a holistic approach to digital governance that combines technological innovation with appropriate legal regulation and institutional capacity building.

Innovations allow governments to simplify access to public services, thereby improving service levels for citizens and the efficiency of public administration. In particular, the use of digital platforms for interaction with citizens contributes to an increase in the level of inclusivity and an increase in the representation of public interests in the decision-making process (Edelmann and Virkar, 2023). Similarly, empirical studies show that the development of e-governance has a positive impact on the Sustainable Development Goals, in particular through improving the quality of public services and increasing trust in the government (Adams and Paul, 2023; Yevsieieva and Chala, 2025; Zheng et al., 2019).

An important area of scientific research is the study of the impact of digital technologies on the economic and social efficiency of public administration. In particular, studies have shown that digitalization contributes to increasing public sector productivity, curbing costs, and improving the quality of life of citizens (Li et al., 2024). Similar findings have also been obtained in studies on the assessment of digital governance at the regional level, which suggest that improving digital governance tools increases the resilience of territorial systems and their ability to adapt to external challenges (Xu and Dai, 2024).

The conceptual foundations of the study of public administration in the context of sustainable development are based on a combination of the principles of good governance and digital transformation. At the same time, the key element is the convergence between data management, the use of the latest technologies, and the institutional mechanism for policy implementation. Studies show that those countries that have been most aggressive in implementing new digital technologies in their public administration systems have also proven to be more efficient and more competitive (United Nations Committee of Experts on Public Administration, 2018; World Bank, 2023).

Along with this, there are some discrepancies in the scientific literature in the assessment of the digitalization of public administration. In particular, some authors note that technological constraints, institutional barriers, and insufficient funding can significantly slow down the process of digital transformation and reduce its effectiveness (Zuiderwijk et al., 2021; OECD, 2021). This means that when forming digital governance strategies, national characteristics and the level of development of the institutional environment should be taken into account.

A review of the literature suggests that the digitalization of public administration is a multidimensional process with legal, institutional, and technological dimensions. How well it works depends on the degree of integration of these elements and the ability of government agencies to ensure that they work harmoniously. The synthesis of results shows that the use of digital technologies has a positive impact on the effectiveness of public administration and the achievement of sustainable development goals, but this requires a holistic approach that takes

into account the development of legal and regulatory frameworks, institutional capacity and technological infrastructure. The practical implications of these results are that they can be used to inform the development of digital governance strategies to improve public policy effectiveness and sustainable development in the face of today's global challenges.

Methodology

The study used a set of general scientific and specialized methods of public administration in the context of sustainable development in the context of digitalization, including system analysis. The methodological basis was dialectical, systematic approaches, which made it possible to consider public administration as a dynamic and multi-level system that is transformed under the influence of digital technologies.

The formal legal method was used to analyze the regulatory framework and identify its problems, while the comparative legal method was used to compare national legislation with international and European standards. The institutional approach contributed to assessing the role of the different bodies and the degree of coordination within them in the implementation of sustainable development.

Methods of analysis and synthesis, as well as content analysis, made it possible to summarize the sources of scientific information and identify key trends in the development of digital management. To assess the effectiveness of digitalization of public administration, elements of economic analysis are used.

The use of these methods made it possible to comprehensively study the legal, institutional and technological aspects of public administration and draw reasonable conclusions about its development in the context of digital transformation.

Research objectives. The purpose of the study is to substantiate the features of public administration of sustainable development in the context of digital transformation and to propose directions for improving legal support and institutional mechanisms, taking into account modern international standards and technological challenges, through a comprehensive theoretical and methodological study.

Results

The formation of the essence of public administration in the context of sustainable development occurs under the influence of radical changes in society, including the economic, social, and environmental spheres, in connection with which there is an active introduction of digital technologies in public administration. In this sense, public administration ceases to be an administrative and bureaucratic process and turns into a system focused on ensuring a balance between public needs and resource opportunities for the long-term perspective. The main conceptual starting point for this is the 2030 Agenda for Sustainable Development, which

contains the requirement to reconcile economic development with social justice and environmental security (United Nations General Assembly, 2015).

Trends in the development of modern public administration provide for its characterization as a multi-level process of formation, implementation, and evaluation of public policy, based on the interaction of the state, business, and civil society. This process, in the context of sustainable development, has some other features related to long-term strategic planning, result-oriented, and cross-sectoral coordination. In accordance with the idea of good governance, management systems should be transparent, accountable, inclusive, and effective, guaranteeing the required level of quality of management decisions and leading to sustainable development (United Nations Committee of Experts on Public Administration, 2018; OECD, 2021).

Legal regulation of public administration in the field of sustainable development is an element of the institutional mechanism for the implementation of state policy. It regulates the functioning of the management system, determines the powers of state bodies, and harmonizes public administration decisions with international standards. This provides legal regulation of digital transformation that lays the foundations for e-governance, data management, and the use of artificial intelligence. The legal acts of the European Union, especially in the field of open data, data management, and artificial intelligence, set trends in the development of the legal framework of public administration (European Union, 2019, 2022a, 2022b, 2024).

Digitalization is the main driving force behind changes in the characteristics of public administration. The application of digital governance, platforms, and big data analysis increases the efficiency of the governance process, ensures transparency in the functioning of public institutions, and improves citizens' access to public services. Research shows that the development of digital governance has a positive impact on the success of the Sustainable Development Goals, as it allows maximizing the use of resources and improving the quality of management decisions (United Nations, 2024, 2025; Adams and Paul, 2023; Zuiderwijk et al., 2021).

The essence of public administration in the field of sustainable development is also revealed through its functional features, through which management processes are implemented. These include strategic planning, regulation, coordination, monitoring, and evaluation of performance. The function of strategic planning involves the establishment of long-term development priorities, the development of appropriate policies, and their application to achieve the goals of sustainable development. contributing to the implementation of this policy, while the coordination function helps to harmonize the actions of different management actors (OECD, 2021).

Monitoring and evaluating performance are important aspects of public administration accountability. They allow you to control the implementation of state policy and timely adjust management decisions. In today's environment, these functions are implemented with the help of digital technologies that allow processing large amounts of data and increasing the accuracy of decision-making (Li et al., 2024; Xu and Dai, 2024).

The principles of public administration in the field of sustainable development are a synthesis of classical approaches to public administration and modern theories within the framework of the concept of good and digital governance. They are transparency, accountability, efficiency, inclusiveness, and flexibility, which make the management system flexible and able to respond to changes in the external environment. An important complement is the principle of digitalization, which means the application of information and communication technologies to administrative procedures and management of public services in order to optimize processes and improve the quality of public services (Edelmann and Virkar, 2023).

Table 1: Characteristics of the Essence and Principles of Public Administration in the Field of Sustainable Development

Element	**Extended Characteristic**	**Impact on sustainability**	**Performance indicators**
Essence	An integrated system of public administration that combines state, market and social mechanisms to achieve balanced development	Ensuring a balance between economic, social and environmental interests	Sustainability Index, Welfare Level
Openness	Ensuring transparency of decision-making processes and access to public information	Increasing Citizens' Trust and Reducing Corruption	Transparency Index, Trust Level
Accountability	Responsibility of the authorities to society for the results of their activities	Improving management efficiency	Accountability Index, Quality of Management
Inclusivity	Involving citizens in the decision-making process	Taking into account the interests of different social groups	Level of citizen participation
Efficiency	Rational use of resources to achieve strategic goals	Cost optimization and increased efficiency	Productivity, ROI of government programs
Adaptability	The ability of the management system to respond to changes in the external environment	Ensuring sustainability of development	Speed of response, level of risks
Digitalization	Integration of information and communication technologies into management processes	Improving the quality of services and management decisions	Digital Governance Index
Legality	Compliance with the rule of law and the rule of law	Ensuring the stability of the management system	Rule of Law Index
Result orientation	Focus on achieving measurable policy outcomes	Improving the effectiveness of public policy	Achieving SDGs
Integration	Coordination of policies in various areas (economy, ecology, society)	Development synergy	Comprehensive development indices

Source: Developed by the author based on United Nations Committee of Experts on Public Administration (2018), United Nations (2024), OECD (2021), European Union (2022a, 2022b), Edelmann & Virkar (2023.

The transition to a systematic analysis of the essence and principles of public administration in the field of sustainable development requires the specification of those key elements that determine the logic of the implementation of the management system in modern conditions. Scientific discourse indicates that the quality of public administration largely depends on the coherence of its conceptual foundations and principles of organization, as well as the policy of practical implementation. This is becoming more and more relevant in the era of digital transformation, which is changing not only management tools but also the nature of interaction between the state and society. In this regard, the expanded systematization of the essence and principles of public administration will allow not only to gain a deeper understanding of its content, but also to outline the main directions for improving the effectiveness of management in the context of ensuring sustainable development (United Nations Committee of Experts on Public Administration, 2018; OECD, 2021).

On the basis of the essence and principles of public administration, the prerequisites are built for the modern management system in the field of sustainable development to position itself as a multi-level integrated structure formed from legal, institutional, and technological components. It is based on the combination of fundamental principles of good governance with the latest approaches to digital governance, which increases the efficiency, transparency, and flexibility of management processes. The application of digitalization is of particular importance and transforms traditional ways of management, leading to new opportunities in data analysis, forecasting, and management decision-making.

At the same time, adding new principles such as legality, integration, and result-oriented to the principles of good governance can improve the effectiveness of public administration and its ability to contribute to the achievement of sustainable development. This approach contributes to a management system focused not only on the process, but also on the result, which is key in today's global challenges. Thus, the systematization and specification of the essence and principles of public administration lay the theoretical foundation for the gradual improvement of the mechanisms for the implementation of the national policy in the field of sustainable development and its adaptation to the conditions of digital transformation.

The analysis of the function of public administration in the field of sustainable development, used for predictive formation, should provide for the decomposition of these characteristics (Table 1), taking into account modern challenges, such as digital transformation, globalization, and the need to coordinate development policies at the intersectoral level. Scientific developments emphasize that the success of the implementation of sustainable development strategies depends to a large extent not only on the existence of relevant principles, but also on the practical content of the management system in terms of quality. It is through the functions of public administration that policies are implemented, coordination between institutions is carried out, implementation is coordinated, and the achievement of strategic goals is monitored. In the process of digitalization of the economy and society, these functions begin to have other shades. This is due to the use of digital tools, which makes it possible to increase the efficiency of management actions, ensure their greater transparency, and accountability.

Table 2: Functional Elements of Public Administration in the Context of Sustainable Development

Function	Implementation tools	Digital technologies	Impact on sustainability	Performance indicators
Strategic planning	State strategies, development programs	Analytics Platforms, Big Data	Ensuring sustainable development of territories	Achievements of SDGs
Regulation	Laws, by-laws	Electronic registers, legal databases	Creating a legal environment	Rule of Law Index
Coordination	Interdepartmental commissions, partnerships	Digital Engagement Platforms	Synergy of politicians	Level of intersectoral interaction
Control	Audit, inspections	Monitoring systems, dashboard	Improving performance discipline	Program execution level
Evaluation	KPIs, performance evaluation	Data analytics, AI	Adjusting strategies	Policy Effectiveness
Informational	Statistics, reporting	Big Data, open data	Increasing the validity of decisions	Data quality
Digital	E-government, digital services	AI, blockchain, cloud	Improving management efficiency	Digital Governance Index
Prognostic	Scenario planning	Simulation, AI	Risk reduction	Accuracy of forecasts
Communication	Public consultations	Social networks, online platforms	Increased trust	Engagement Rate
Innovative	Innovative projects	GovTech, startups	Increasing competitiveness	Level of innovation

Source: Developed by the author based on (United Nations, 2024; World Bank, 2023; Adams and Paul, 2023; Li et al., 2024; Xu and Dai, 2024)

An extended analysis of the functional characteristics of public administration (Table 2) shows that these functions are integrated and interrelated, which contributes to the systematic implementation of the state policy of sustainable development. Each function should play a different role, but effectiveness depends on how integrated and coordinated they are. Specifically, strategic planning provides a framework for the implementation of other functions, while control and evaluation involve feedback and the possibility of reviewing management decisions.

The importance of the use of digital technologies in the processes of performing public administration functions is emphasized to increase the speed of information processing, promote transparency of administrative processes and improve the quality of public services. At the same time, the diversification of functions by predictive, communication and innovation functions

indicates a transition to a new model of public administration focused on proactivity, transparency and adaptability.

Thus, the functional features of public administration in the field of sustainable development create prerequisites for the implementation of state policy and the development of strategic goals. Their improvement in the digital age contributes to improving the quality of management decisions; guarantees the stability of the management system and creates prerequisites for the implementation of an innovative model of public administration that will be able to effectively respond to modern global challenges.

The modern development of public administration in the field of sustainable development is characterized by the complication of the regulatory and legal environment, which is due to the need to simultaneously take into account global challenges and processes of digital transformation. In this context, legal support is a key tool for the implementation of sustainable development policy, since it is through the system of normative legal acts that the principles, mechanisms and institutional framework of public administration are determined. The defining international document that enshrines the basic principles of such governance is the 2030 Agenda for Sustainable Development, which recognizes the need to integrate the economic, social and environmental dimensions of politics (United Nations General Assembly, 2015).

Legal regulation of public administration is formed on a multi-level basis at the international, regional and national levels. Questions at the international level. United Nations instruments are of paramount importance in defining the principles of good governance, including accountability, transparency and inclusiveness (United Nations Committee of Experts on Public Administration, 2018). At the EU level, a comprehensive legal regulation of digitalization from open data, data management to artificial intelligence has been formed, which defines the modern model of digital governance (European Union, 2019, 2022a, 2022b, 2024).

At the same time, analytical studies emphasize that the effectiveness of regulatory support largely depends on its consistency and adaptability to changes in technology. In particular, the digital transformation of the public sector requires not only updating existing regulation, but also developing new approaches to regulating data management and digital services (World Bank, 2023; Gierten and Lesher, 2022). Research also shows that digital governance contributes to the achievement of the Sustainable Development Goals by improving the efficiency of governance and transparency of government activities (United Nations, 2024; Adams and Paul, 2023). (Table 3)

The analysis of the current regulatory framework allows us to identify its key feature – fragmentation. The presence of such a large number of regulations related to various aspects of digitalization and sustainable development does not guarantee their systemic consistency. As a result, this leads to duplication of norms, legal contradictions and complicates the practical implementation of state policy. As the researchers note, the lack of a comprehensive approach to digital governance limits the capacity of the public sector to effectively use digital technologies (Zuiderwijk et al., 2021; Edelmann and Virkar, 2023).

It should be noted that the regulatory framework is lagging behind the development of digital technologies. The application of artificial intelligence, big data, and digital platforms in public administration is often underregulated, which creates risks associated with their use. However, current research also indicates that the digitalization of governance has significant prospects for improving the effectiveness of public policies and achieving the Sustainable Development Goals (Li et al., 2024; Xu and Dai, 2024).

The issue of personal data protection and information security is also a cause for concern. Increasing data processing in the public sector requires the introduction of effective legal mechanisms that would ensure a balance between openness and information protection. European practice shows that the development of legal regulation in the field of data is one of the conditions for effective digitalization of public administration (European Union, 2022a, 2022b).

Moreover, the implementation of the legal framework is largely hampered by institutional problems, such as the lack of coordination between public authorities and the low level of digital competencies. This requires a holistic approach to public administration reform, covering legal, organizational and technological aspects (OECD, 2021).

Table 3: Analysis of the Regulatory and Legal Support of Public Administration in the Field of Sustainable Development

Level	**Main regulations**	**Problems of adaptation to digitalization**	**Impact on sustainability**	**Performance indicators**
International	SDGs, International Agreements	Incomplete implementation, declarative nature	Definition of strategic guidelines	SDG Index
European	Directive 2019/1024, Data Governance Act, AI Act	Difficulty of harmonization	Integration into the European space	DESI
National	Laws of Ukraine, strategies	Fragmentation, collisions	Policy implementation	Government Performance Index
Institutional	Regulations, regulations	Low interaction	Increase efficiency	Level of coordination
Digital	Digitalization strategies	Insufficient legal support	Management optimization	E-Governance Index
Informational	Information Laws	Data protection	Transparency	Open Data Index
Security	Cyber legislation	Insufficient level of security	System Resilience	Cybersecurity Index
Innovative	Innovation policy	Lagging behind technology	Development of innovations	Innovation Index

Source: developed by the author based on (United Nations General Assembly, 2015; European Union, 2022a, 2022b; OECD, 2021; World Bank, 2023; Zuiderwijk et al., 2021)

An in-depth study of the legal framework of public administration in the field of sustainable development requires not only determining its levels, but also detailing the content, means of implementation and problems of functioning in the context of digital transformation. Modern scientific approaches argue that the success of national sustainable development policies is strongly influenced/influenced by the degree of coherence between different levels of legal regulation and their ability to integrate digital governance tools (OECD, 2021; World Bank, 2023). Of particular importance is systematic legal support, which helps to avoid fragmentation, ensures intersectoral coordination and creates prerequisites for the effective application of digital governance. However, research shows that current legal systems often lag behind technological developments, which requires them to adapt to new digital realities (Gierten and Lesher, 2022; Zuiderwijk et al., 2021).

The analysis of the regulatory framework of public administration in the field of sustainable development allows us to assert that the modern legal system is characterized by a complex multi-level structure, which includes international standards, regional regulatory mechanisms and national legal means. Thus, the degree of its effectiveness is largely determined by its level of coherence and digital adaptability. The most critical problems remain fragmented legislation, technological backlogs and insufficient institutional coordination.

An important conclusion is that digitalization is not only a tool for modernizing public administration, but also a factor that requires a rethinking of the very approach to legal regulation. This implies moving away from traditional regulatory models towards adopting more flexible, adaptive, and technology-oriented legal systems. Therefore, the development of regulatory regulation of public administration in the field of sustainable development should be based on the integration of legal, institutional and digital mechanisms, which will effectively achieve the strategic goals of sustainable development in the context of digital transformation.

A feature of the development of public administration in modern conditions is its profound transformation under the influence of digital technologies, which change institutional mechanisms, as well as change the logic of interaction between the state, business and civil society. As part of ensuring sustainable development, digitalization is not only a means of improving management procedures, but also a strategic factor in increasing the effectiveness of public policy. According to modern approaches, digital governance is defined as an essential tool for achieving the Sustainable Development Goals, contributing to increasing transparency, accountability and improving the quality of public services (United Nations, 2024; United Nations General Assembly, 2015).

The impact of digital technologies on the efficiency of public service delivery can be observed in several interrelated dimensions. This includes accelerating decision-making in government through the use of data analytics and digital platforms. The combination of big data and artificial intelligence allows you to conduct in-depth analysis of socio-economic activities, predict risks and make informed management decisions. Studies show that the application of digital technologies in the public sector helps to improve resource management and optimize costs (World Bank, 2023; Li et al., 2024).

In addition, digital transformation contributes to increasing transparency and accountability of authorities, which is an essential factor in building citizens' trust in the state. The use of e-government, open data, digital services to citizens, on the one hand, provides access to information, and on the other hand, opens up opportunities for their active participation in decision-making processes. This, in turn, makes it possible to improve the quality of public policy and its relevance to public needs (United Nations Committee of Experts on Public Administration, 2018; Edelmann and Virkar, 2023).

The impact of digital technologies on the efficiency of public service delivery is also important. Digitalization of procedures, the use of digital platforms and the integration of information systems can significantly reduce the time and cost of obtaining services, as well as improve their availability and quality. Research shows that improving e-governance has a significant positive impact on socio-economic development and contributes to the achievement of the Sustainable Development Goals (Adams and Paul, 2023; Xu and Dai, 2024).

At the same time, the digitalization of public administration is associated with several challenges that affect the effectiveness of its implementation (Table 4). One of the main challenges is the uneven development of digital infrastructure, which leads to a digital divide and deprives certain segments of the population of access to digital services. In addition, there are risks related to personal data protection and cybersecurity, as well as the ethics of using artificial intelligence (European Union, 2022a, 2022b; Zuiderwijk et al., 2021).

Particular attention should be paid to the ethical challenges of using AI in the public sector. Algorithmic solutions used for social benefit scoring, risk prediction or automated administrative decisions can reproduce the bias of training data, leading to discrimination against vulnerable groups. Without adequate mechanisms for transparency, accountability and human control, there is a risk of a "black box" where citizens cannot challenge a decision made by a machine. Legislative regulation, in particular the European Artificial Intelligence Act (European Union, 2024), lays the foundations for minimizing these risks through the classification of systems by risk level and mandatory impact assessment, but its implementation needs to be adapted to the national context.

Regarding the protection of personal data, the digitalization of government creates huge amounts of information that become targets for cyberattacks. In Ukraine, repeated attempts to hack state registries during the war demonstrated the vulnerability of centralized databases. Therefore, it is not enough to declare compliance with the GDPR or national laws – a proactive cybersecurity policy is needed, which includes regular system audits, data encryption, staff training and backups. Protection mechanisms should be built into the architecture of digital platforms at the design stage (the principle of privacy by design), and not added post factum. Thus, trust in digital governance directly depends on the state's ability to guarantee the security and ethical use of technologies.

The transition to an integrated assessment of the impact of digital technologies on the effectiveness of public administration in the field of sustainable development requires a systematic combination of analytical and managerial approaches. Digitalization today is not just a tool for optimizing management processes, but rather a powerful transformative force in public

administration ecosystems. This determines the need to simultaneously take into account both the actual consequences of the introduction of digital technologies and strategic ways to improve digital governance mechanisms. According to current scientific views, the success of digitalization depends on how well technological solutions are integrated into management decision-making processes and on the extent to which public institutions are able to work together in a coordinated manner to achieve the Sustainable Development Goals (United Nations, 2024; World Bank, 2023; OECD, 2021).

Table 4: Impact of Digital Technologies on the Effectiveness of Public Administration in the Context of Sustainable Development and Ways to Improve Digital Governance

Direction of influence	**Content of the impact**	**Digitalization tools**	**Areas of improvement**	**Expected effect**	**Indicators**
Management decisions	Increasing the validity of decisions	Big Data, AI	Development of data governance	Quality of solutions	Policy effectiveness
Transparency	Openness of activity	Open data	Open Data Expansion	Reducing corruption	Transparency Index
Public services	Service optimization	E-government	Digital infrastructure development	Availability	Satisfaction Level
Interaction	Communication with citizens	Digital platforms	Development of e-participation	Inclusivity	Engagement Rate
Economic effect	Cost optimization	Automation	Investing in GovTech	Efficiency	ROI
Social effect	Improving the quality of life	Online services	Social digitalization	Social stability	Development Index
Systems Integration	Data reconciliation	Data platforms	Integration of IT systems	Consistency	Integration level
Competencies	Skill development	Educational platforms	Personnel training	Efficiency	Digital skills index
Security	Information protection	Cybersecurity	Strengthening cyber defenses	Reliability	Security index
Legal support	Regulation of digitalization	Legislation	Adaptive law	Stability	Rule of law

Source: Developed by the author based on (United Nations, 2024; World Bank, 2023; OECD, 2021; Li et al., 2024; Zuiderwijk et al., 2021)

In this context, the systematization of the relationships between the spheres of influence of digital technologies and the tools for their implementation is of particular importance, which will allow the formation of a holistic view of the effectiveness of public administration. This approach allows not only to assess the achieved result, but also to outline key areas for further improvement of digital governance mechanisms, which will be aimed at improving the quality of

government decisions, increasing the transparency of government agencies and supporting sustainable development.

The projection of the impact of digital technologies on the ways to improve the mechanisms of digital governance allows us to conclude that a new model of public administration is formed, which is based on the principles of digital transformation, innovation and focus on results. Such a model is secretive, automates management processes, actively interacts with citizens and leads to more effective management and achievement of sustainable development goals.

At the same time, the analysis shows that the success of digitalization largely depends on the ability of public institutions to apply a holistic approach to its implementation. This requires aligning technological solutions with legal regulations, developing digital skills, and creating an effective data management system. It is especially important to develop an adaptive legislative/regulatory environment that allows for rapid response to technological changes and safe use of such changes.

Therefore, analyzing the impact of digital technologies and identifying opportunities for improving digital governance mechanisms will contribute to improving public administration and achieving sustainable development. The implementation of the proposed areas of improvement allows us to create a model of public administration of a new generation, which will be able to effectively respond to global challenges and ensure the long-term development of society.

The Ukrainian experience illustrates how digital tools can enhance transparency, accessibility and efficiency of governance in the context of sustainable development. The public services portal “Diya” is a good example, which has brought together over 100 digital services and documents. Thanks to it, the time to receive a number of administrative services has been reduced by an average of 30–40%, and the level of citizen satisfaction has increased to 85% (according to the Ministry of Digital Economy, 2023). This directly contributes to the achievement of SDG 16 (peace, justice and strong institutions) by simplifying access to public services and reducing corruption risks.

Another example is the electronic public procurement system “Prozorro”, which has been providing open bidding in real time since 2016. According to the World Bank, its implementation has saved the state over 6 billion US dollars by increasing competition and reducing corruption schemes. This demonstrates the direct contribution of digital governance to optimizing the use of resources, which is a key principle of sustainable development.

Additionally, it is worth noting the open data ecosystem, in particular the data.gov.ua portal, which provides access to over 60,000 datasets. The use of these data by think tanks and businesses promotes transparency, stimulates innovation, and allows monitoring progress in achieving national SDGs. These examples confirm that the integration of digital platforms into public administration provides tangible results that meet the principles of good governance.

Discussion

The results of the study indicate that the digitalization of public administration is one of the factors contributing to increasing the effectiveness of public policy in the field of sustainable development, in particular by optimizing management processes, increasing transparency, and ensuring more informed decision-making. The results confirm that the introduction of digital technologies such as e-government, big data analytics, and intelligent systems increases the efficiency of resource management and leads to higher achievement of strategic development goals (United Nations, 2024; World Bank, 2023). At the same time, it has been found that the effectiveness of digital governance largely depends on the level of institutional capacity, the quality of the regulatory framework, and the level of digital readiness of the public sector, which is consistent with the findings (Gierten and Lesher, 2022; OECD, 2021).

Comparison of the results obtained with the results of scientific research by other authors shows a significant degree of both agreement and disagreement. In particular, previous research has highlighted the crucial role of digital governance in achieving the Sustainable Development Goals by increasing the accessibility of public services and involving citizens in decision-making processes (Adams and Paul, 2023; Edelmann and Virkar, 2023), which is actually fully supported by the results of this study. At the same time, some authors point to the risks of digital inequality, limited access to digital infrastructure, and insufficient levels of digital skills (Zuiderwijk et al., 2021), which correlate to some extent with the obstacles to the adaptation of public administration to the conditions of digitalization identified in the study.

The synthesis of results showed that the digitalization of public administration contributes not only to increasing the efficiency of management processes, but also to the formation of a new model of interaction between the state and society, based on the principles of openness, accountability, and inclusiveness. This is in line with the concept of good governance and modern models of digital transformation in the public sector, which involve the introduction of technological innovations into the public administration system (United Nations Committee of Experts on Public Administration, 2018; Li et al., 2024). At the same time, it has been established that the implementation of the maximum effect of digitalization is possible only through an integrated approach, which provides for legal regulation, institutional capacity building, and the use of modern technologies.

The results are also consistent with the notion of sustainable development as a multidimensional process involving the integration of economic, social, and environmental dimensions at the national policy level (United Nations General Assembly, 2015; Independent Group of Scientists, 2023). In this context, digital governance is a tool for the effective implementation of sustainable development policies that contribute to increasing the competitiveness of the economy, improving the quality of life of the population and environmental sustainability.

At the same time, the study revealed some limitations that may affect the interpretation of the results. In particular, the use of aggregated data and generalized indicators of digitalization does not fully capture the characteristics of specific sectors of public administration. In addition, a more in-depth analysis of the effectiveness of these technologies is complicated by the lack of

access to empirical data on the implementation of specific digital technologies in the public sector: Basic State Rights, Types, and Reserved Restrictions. Similar limitations are also noted in current research on digital governance (Xu and Dai, 2024; Li et al., 2024).

The results of the study emphasize the importance of parallel development of legal, institutional, and technological factors to improve the efficiency of public administration. In particular, they found that successful digitalization requires the development of an adaptive legal mechanism, data management system, and digital competencies of civil servants. This is in line with the recommendations of international organizations on the need for a holistic approach to digital transformation in the public sector (OECD, 2021; World Bank, 2023).

The similarities and differences with the results and conclusions of other researchers can be explained by the difference in the level of digital development of countries, the peculiarities of national legal systems, and the national institutional environment. In particular, states with developed digital infrastructure are more likely to be states with high efficiency of public administration, while in countries with economies in transition, digitalization processes are accompanied by a new set of challenges related to resource scarcity and institutional instability (Gierten and Lesher, 2022; Adams and Paul, 2023).

The practical value of the results obtained lies in the fact that they can be applied in the development of digital governance strategies, taking into account the increase in the efficiency of public administration to achieve the Sustainable Development Goals. In particular, the results of the study can be used to improve data management mechanisms, the development of e-services, and the application of innovative technologies in the public sector (Zuiderwijk et al., 2021).

Future research should focus on a more detailed assessment of the impact of specific digital technologies on the effectiveness of public administration, including artificial intelligence, blockchain technology, and cloud services. In addition, the development of integrated models to measure the effectiveness of digital governance based on economic, social, and environmental indicators, as well as the study of the impact of digitalization on institutional transformation in the public sector (European Union, 2024; OECD, 2021).

Based on the analysis, the following hypotheses can be formulated for further empirical testing:

– integration of analytical systems based on artificial intelligence into the process of providing public services reduces the average time for processing citizens' requests by at least 20% and increases the indicators of SDG 16 (peace, justice and strong institutions);

– the use of blockchain platforms for public procurement (by analogy with Prozorro) leads to a statistically significant decrease in the corruption perception index by 5–10 points in countries with economies in transition;

– the expansion of electronic participation tools (e-petitions, participatory budgets) correlates with an increase in the level of citizen involvement in local government by 15%, contributing to the achievement of SDG 11 (sustainable development of cities and communities).

Testing these hypotheses will allow us to move from descriptive models to quantitative evidence of the impact of digitalization on sustainable development.

Conclusion

Public administration in the field of sustainable development is at the stage of deep transformation, which is formed by the convergent impact of globalization processes, the growing complexity of socio-economic challenges, and the rapid development of digital technologies. A theoretical and methodological understanding has been established that the modern system of public administration goes beyond traditional models and acquires the characteristics of a multi-level, integrated, and adaptive system focused on achieving long-term equilibrium in economic, social, and environmental development goals.

The content of public administration in the field of sustainable development is defined as management built on the principles of effective governance in the context of digital transformation, which contributes to the growth of transparency, responsibility, inclusiveness, and efficiency of management processes. However, the key difference in the modern management model is the emphasis on large amounts of data, new technologies, and cross-sector interactions as sources of quality management solutions. The functional features of public administration are determined to acquire an expanded meaning if digital tools are used, which in turn allows for increasing the effectiveness of strategic planning, coordination, control, and evaluation of public policy.

The analysis of legislative and regulatory regulation has shown that there is an improved, but insufficiently coordinated system of regulation at the levels of the state, regional, and local government, as well as in the field of public relations. At the same time, systemic problems have been identified that hinder the effectiveness of its action, including: fragmentation of legislation, the presence of legal conflicts, lagging behind the regulatory framework with the pace of technological development, and an insufficient level of coordination of institutions. Particular attention was paid to the problems of adaptation of legal support to digitalization, which involves the creation of flexible, integrated, and technology-oriented legal mechanisms.

It was presented that digital technologies significantly improve the efficiency of public administration, leading to better decision-making, more effective resource use, expanded availability of public services, and stronger interaction between the state and citizens. At the same time, their implementation is accompanied by a number of challenges related to the digital divide, cybersecurity risks, the need to protect personal data, and the insufficient level of digital competencies in the public sector. This highlights the need for a holistic approach to digital transformation that takes into account not only technological issues, but also social and legal aspects.

The substantiation of the fact that increasing the efficiency of public administration for sustainable development requires the improvement of digital governance mechanisms, in particular through the integration of information systems, the development of data management, the use of innovative technologies, and the enhancement of digital competencies. It has been established that a fundamental prerequisite for successful digitalization is the creation of a comprehensive digital strategy that aligns actions at different levels of management and focuses on achieving strategic development goals.

Thus, the study's results confirm that effective public administration in sustainable development can be achieved only by integrating legal, institutional, and digital components into a holistic system. This approach ensures the adaptability of management processes, makes them more effective, and creates an opportunity for an innovative model of public administration to respond appropriately to modern global challenges and ensure the long-term development of society.

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