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The Impact of Digitization on the Development of Local Government in Poland

Abstract: The issue of digitization of local government units is very important, as it enables better communication and cooperation with citizens, which increases the transparency and accessibility of public services. Digitization improves the efficiency of administration, making it easier to manage data and processes. In addition, it contributes to time and cost savings, both for offices and residents. The main purpose of this article is to analyze the impact of digitization on the development of local government in Poland, taking into account the benefits and challenges of implementing modern technologies in public administration.

Key words: digitization, energy efficiency, local governments, sustainable development, smart cities

Introduction

Nowadays, digitization is one of the key factors affecting the functioning of various areas of social life, including local government. Progressive digitization enables the introduction of innovative solutions that can significantly improve the quality of public services and increase the efficiency of local administration management. Modern technologies, such as e-services or information systems, are becoming an indispensable part of local government activities allowing to simplify administrative processes and increase the availability of information for citizens. With the introduction of modern technologies, local governments can better respond to the needs of residents, offering them faster access to information and public services (Kowalski, 2021, pp. 45–47).

It is worth emphasising that digitisation has a significant impact on the functioning of local government administration and on the relation-



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ship between local government and citizens. Thanks to new technologies, residents have easier access to information and services, which in turn fosters greater citizen involvement in the life of local communities. Such an approach can contribute to improving the quality of life of residents and strengthening trust in public institutions (Kowalski, 2020, p. 78).

The main purpose of this article is to analyze the impact of digitization on the development of local government in Poland, taking into account the benefits and challenges of implementing modern technologies in public administration. It is highlighted how digitization contributes to improving the efficiency of management, the quality of services provided in public administration and increasing civic participation. At the time of writing, it was decided to examine the following research hypothesis: Digitization of local government in Poland has a positive impact on improving the efficiency of the management of local administrative units, increases the transparency of decision-making processes, and improves the quality of public services, which contributes to greater citizen satisfaction and public involvement. The topics discussed are of great importance in the context of modern administrative, social and technological challenges. Digitization is changing the way public institutions function, and local governments are playing a key role in providing services to citizens and managing local resources.

This article is theoretical and empirical in nature. On the one hand it illustrates the impact and importance of digitization on the functioning of local government units in Poland. It shows the effectiveness of the functioning of local governments with the use of modern technologies, and on the other hand it shows the risks associated with their use both from the side of local governments and society. The empirical part of the study analyzes the use of reports on digitization of public administration in Poland and Europe, and the report Road to Digital Excellence is also helpful.

1. The importance of digitization and pro-energy solutions in the development of local government units

There is no single, universally accepted definition of digital transformation in the literature, which is due to the fact that each local government entity has different needs and is at a different stage of technology implementation. The concept of digitization, as changes occurring in the

environment as a result of the increasing use of new technologies, was first used by R. Wachal almost 50 years ago, writing about the digitization of society (Brennenn, Kreiss, 2014, p. 14). Digitization in the context of public administration includes the introduction of information and communication technologies (ICT) into various areas of local government operations, aimed at modernizing, streamlining and automating processes that were previously carried out in a traditional, paper-based manner (Schreckling, Steiger, 2017, p. 5; Kergel, Heidkamp-Kergel, 2020, p. 40).

Digitization in local government units (LGUs) means transforming public services, administrative management and interactions with citizens into electronic form, enabling more efficient and accessible management of public affairs. This process includes a wide range of activities, such as implementing e-services, automating administrative processes, digitizing documents or developing information systems to support the operation of local governments. Thus, digitization is not only a tool to increase the efficiency of administration, but also an expression of innovation in local government, a way to improve the transparency of operations and create public value (Gil-Garcia, 2018, pp. 633–646).

With the growing importance of digitization, increasing attention is being paid to pro-energy solutions that can support the development of TSU in the context of sustainability and energy savings. Pro-energy is an approach to energy management that focuses on reducing energy consumption and implementing environmentally friendly solutions. Digital technologies, such as smart energy management systems, can be integrated with digitization solutions, allowing more efficient management of energy resources in local government units.

Digitization in local government administration has made public services more accessible, allowing citizens to handle official matters online, without having to appear in person at offices. The introduction of e-services, such as vehicle registration, document requests, local tax payments and access to e-documents, has improved residents' living comfort and simplified administrative processes. Thanks to digitization, these processes have become faster, more transparent and easier to manage. An example of this is the ePUAP system, which allows the submission of documents online, which contributes to simplifying the workflow and increasing the efficiency of administration (Zieliński, 2019, p. 78).

In addition, local governments that have invested in digitization are seeing benefits not only in facilitating access to services, but also in improving the quality of those services. Digitization allows for automated data

processing and faster response to requests from residents (April, 2021). Automation of many routine administrative processes results in savings of time and financial resources. By implementing document management, workflow and integrated information systems, local governments can better manage the work of officials and eliminate unnecessary steps in administrative processes (Maciuk, Piątek, 2020, p. 15). Technologies such as electronic workflow and ERP (Enterprise Resource Planning) systems enable better monitoring of work, and reduce the risk of human error.

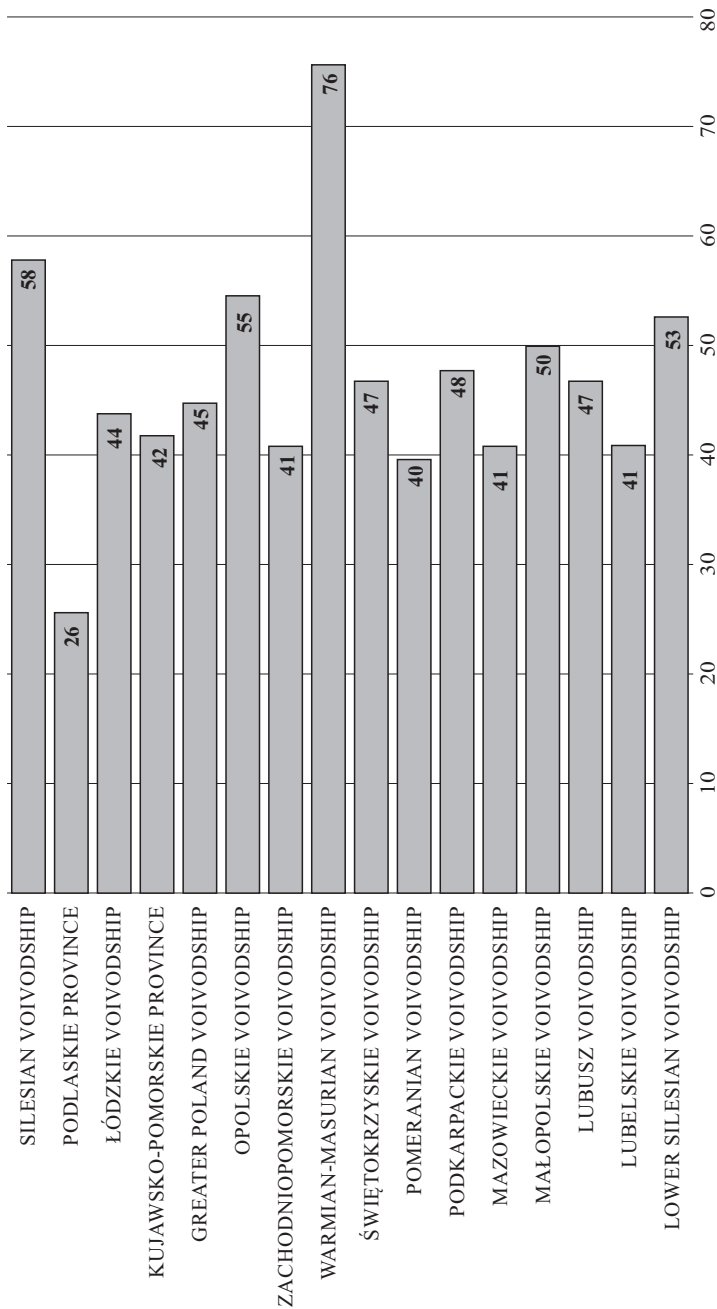
In the context of pro-energy solutions, on the other hand, digitization is a key element supporting the energy transformation of local governments. The implementation of smart energy management systems that use ICT technologies allows real-time monitoring of energy consumption, as well as the implementation of measures to reduce energy consumption in public buildings. With these solutions, local governments can make informed decisions on energy efficiency and conservation, which contributes to sustainable development and the reduction of greenhouse gas emissions.

In conclusion, digitization and pro-energy are closely intertwined, and their integration in local government operations leads to improved public services, optimized resource management and sustainable development. Local governments that invest in digital and pro-energy technologies become more innovative, efficient and environmentally friendly, which benefits both the administration and residents.

2. Benefits of digitization in jsts

Financial management systems in local government units (LGUs) are undergoing constant change due to technological development, digitization and globalization. The modern development of these systems is largely the result of the implementation of advanced computer programs, which allow to expand the scope of analyzed data and manage public finances more efficiently. Digitization in different provinces has taken different shapes, depending on local needs and administrative priorities. In some regions, the focus has been on modernizing IT infrastructure and introducing e-services, while other provinces have focused on automating internal processes and improving information accessibility for citizens. As a result, each province implemented digitization in a manner tailored to the specifics of its region, creating diverse e-government models. The use of technology in each province is presented in the chart below.

Chart 1. Use of new technologies of digital TSU by province (in %)



Źródło: Opracowanie na podstawie raportu: *W drodze ku doskonałości cyfrowej*, Warszawa 2023.

Based on the above chart, it can be seen that the level of digitization is most used in the Warmian-Masurian province (76%), the other provinces remain at a very similar level of 41% to 50%. At the very end remains Podlaskie province (26%). The progress of digitization has a significant impact not only on the functioning of local governments, including the work of all officials whose tasks are related to the creation of information and the functioning and cooperation of various levels (Table 1), but also on the number of complaints and grievances (Opolski, 2008, pp. 19–25).

Table 1

Impact of digitization on local government work

Area	Impact of digitization progress	Tasks of officials
Work organization	Working with IT systems, automating processes	Operation of new computer programs, data management
Creation of information about the unit	Generating reports, e-invoices, e-declarations, electronic applications and decisions	Creation and transmission of electronic documents
Circulation of documents	Improving information flow, faster access to data	Scanning, archiving and transferring digital data
Control and audit	Increasing transparency, better control of data	Conducting audits, digital audits, data analysis
Transparency	Increasing access to public information	Providing information to citizens and control institutions

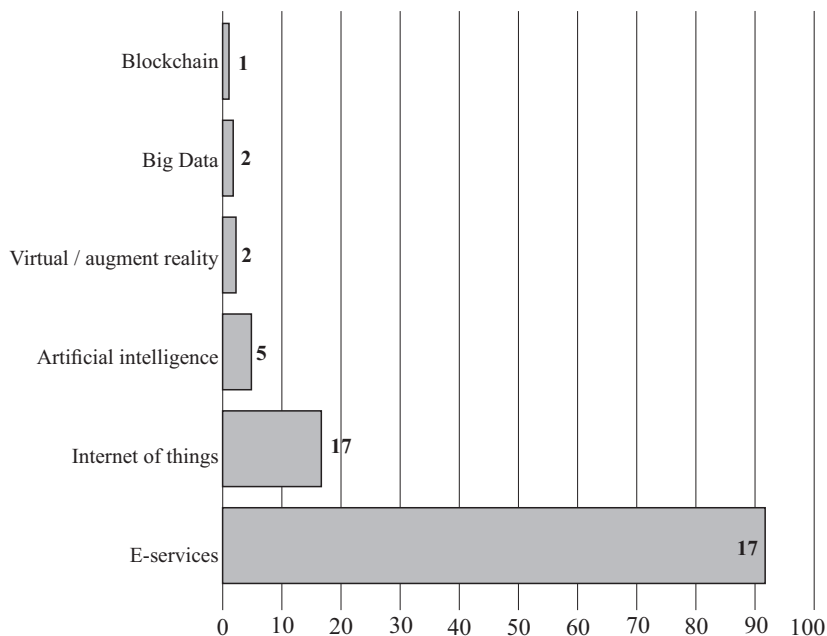
Source: Own elaboration.

It is worth noting that the current system of communication and transmission of information in TSU is much more complex than it was before digitization. While this complexity may increase the risk of errors in documents (Kaczmarek, 2016, s. 58), however, digitization makes it possible to effectively manage these risks. Thanks to digital financial and accounting systems, information is now available not only to internal audiences, but also to external institutions, such as regulatory bodies, as well as to citizens, through e-government. Through the introduction of e-government, local governments have gained new opportunities for communication and data exchange, which has significantly improved the transparency of public administration activities and improved decision-making processes.

E-government has emerged as a response to the challenges faced by jsts, including de-bureaucratization, transparency, efficiency, friendliness, compatibility. Modern technologies make it easier to meet these chal-

lenges. Therefore, with regard to public services, it is the satisfaction of the recipient that is important, not just the consumption. Citizens pay attention to the effect of the service, the timeliness of its implementation, the system of civil rights. E-services in JST, on the other hand, support the functioning of municipalities and counties primarily in the area of document circulation. A popular solution used in JST in the field of e-services is the Electronic Platform for Administration Services (ePUAP), providing the possibility for the administration to communicate with citizens (Chart 2). Thanks to this solution, residents have access to various offices (e.g., municipal offices, the Registry Office, the Social Insurance Institution, the Labor Office, etc.) in one place.

Chart 2. Types of new digital technologies and solutions based on them used in TSUs



Źródło: Opracowanie na podstawie raportu: *W drodze ku doskonałości cyfrowej*, Warszawa 2023.

For e-Government is not only the provision of information resources, but first and foremost the provision of services over the network, the algorithmization of procedures, the creation of process regulations capable of

meeting new requirements. Following the European Commission's five-stage scale of e-service maturity, the degree of online implementation can be fundamentally different. According to this approach, the range of activities that a citizen can deal with a given service electronically can be: informational, one-way interaction, two-way interaction, transactional level and the highest level – personalization of the service (Raport Capgemini, 2010).

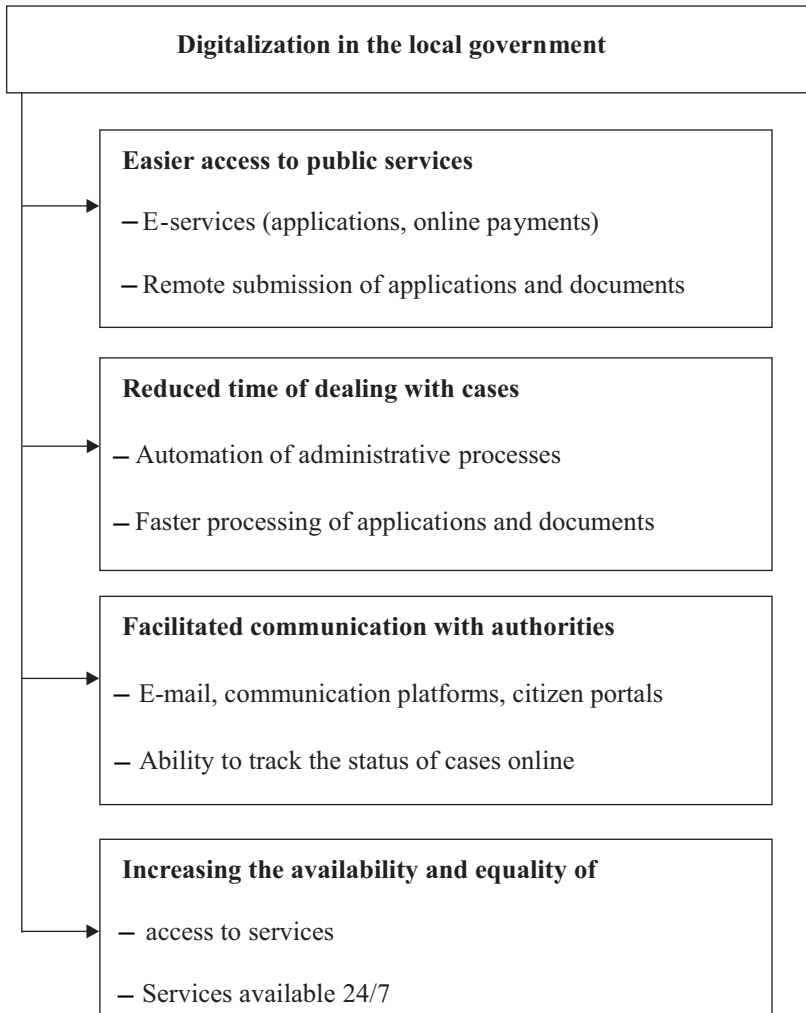
E-government as a new form of public service delivery that provides a higher level of delivery of these services to citizens and businesses. Above all, benefits are claimed in the form of reduced costs, shorter delivery times, savings in service delivery, efficient communication, convenient access to services, an integrated process for dealing with matters, reduced bureaucracy and greater transparency in the operation of offices.

The phenomenon of digitization in local governments has not been limited to facilitating the implementation of administrative processes, but has led to significant changes in these processes. The transition to electronic administration has improved the quality of public services, increased the efficiency of work and improved communication with citizens, who have gained easier access to information and the ability to handle matters online.

Digitization in local governments thus contributes to greater transparency, saving time and resources, and improving the quality of services provided. Digitization in the context of public finance sector units (PSUs) is a key transformation factor that affects changes in the organization and conduct of accounting in these entities. The introduction of digital technologies, such as online accounting, cloud accounting and electronic accounting, has enabled TSUs to effectively manage financial data. As a result of these changes, new opportunities have emerged, such as issuing e-invoices, making e-transfers, filing e-declarations, creating virtual accounts and using electronic signatures. It has also had a very positive impact on citizens forming communities in their municipalities as shown in the diagram 1.

An important aspect in the context of TSUs is the role of accountants as well, who increasingly support the creation and implementation of IT systems. With their help, these systems are better adapted to the specifics of public units, which translates into more efficient operation. Accountants also play a key role in analyzing financial data, supporting managers in making appropriate decisions, which is essential for the proper management of public funds.

Diagram 1. advantages of introducing digitization in local government units



Source: Own elaboration.

Changes related to the introduction of computerized accounting systems at the TSU also include adjusting the rules for bookkeeping to new technologies. In accordance with Article 20 of the Accounting Law, the rules for automatic entry of accounting records using communication de-

vices and computerized data carriers have been updated. When entering data into a computer system, TSUs must meet certain conditions, such as ensuring an adequate level of security and compliance with regulations, in order to protect the integrity of public entities' financial data.

The digitization of public sector units (PSUs) has contributed to significant changes in the functioning of public administration. The introduction of information systems, such as the Uniform Control File (JPK), has significantly improved the efficiency, transparency and control of processes taking place in public units. Thanks to digitization, these units have gained a tool for automatic data transfer, which significantly speeds up administrative processes, eliminating the need for manual entry of information and reducing the risk of errors (Zatorski, 2019, p. 45).

First of all, the digitization system in the TSU has made it possible to introduce uniform reporting standards, which has made it easier to compare and analyze data between different units. The use of JPK standards allows for easier detection of irregularities and inconsistencies, which in turn has helped improve the efficiency of controlling public spending and financial management. In addition, the introduction of electronic data transfer systems has facilitated communication between public units and supervisory authorities, which has contributed to reducing bureaucracy and waiting times for administrative decisions (Oleśniewicz, 2016, p. 18).

It is also worth noting that the digitization of TSU has had an impact on increasing the availability and transparency of public data. Citizens have gained easier access to information about the activities of public entities, which builds trust in the administration and allows for greater public control. Digitization has also enabled the implementation of e-government tools that allow applications, declarations or payments to be made online, which significantly increases the comfort of citizens and eliminates the need to appear in person at offices (Voss, 2013, p. 36).

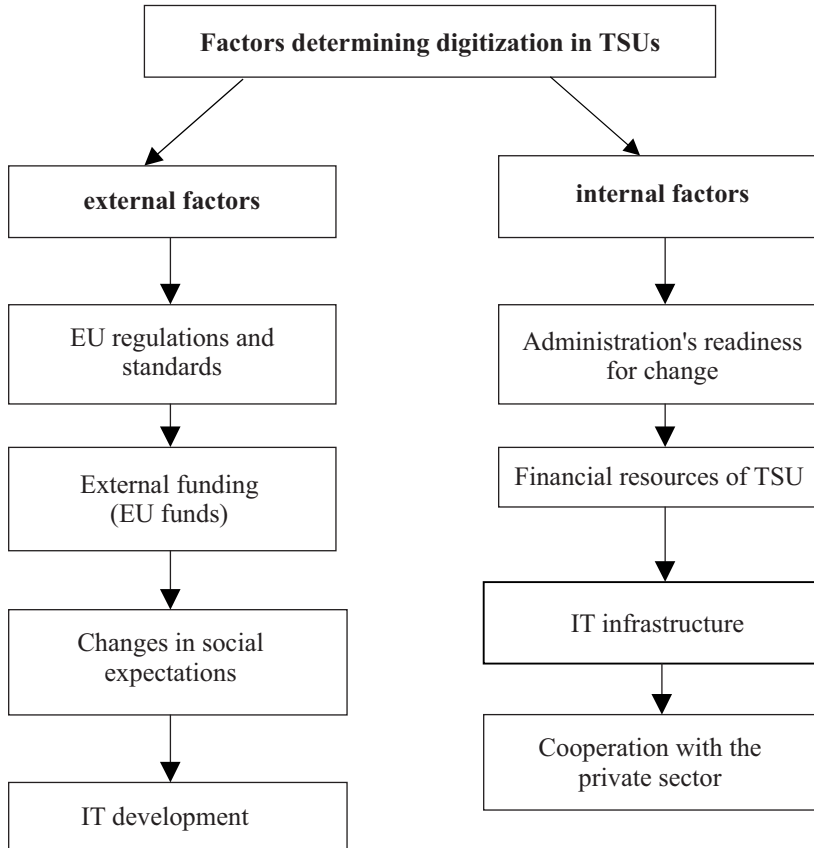
Na podsatwie

3. Factors determining the introduction of digitization in TSUs

The dynamic development of digital technologies and the need to implement technological innovations in local governments and public administration also faces barriers and challenges that undermine the pace of change. Digital transformation is associated with high investment costs, which are allocated both to the purchase of equipment and services nec-

essary for the implementation of new solutions, as well as to the hiring of new employees or upgrading the professional skills of those currently employed. The success of the digitization process in offices depends on a great many factors, both internal and external, which define the activities of individual offices as presented in the diagram below.

Fig. 1. Factors determining digitization of TSUs



Source: Own elaboration.

When analyzing external factors, special attention should be paid to their legal form which has been a strong foundation in the construction and operation of digitization in the local government. Legal factors have not only played a fundamental role and made digitization effective, com-

pliant with applicable data protection standards, EU regulations and national regulations.

The first and basic legal act that regulates the digitization of public administration is the Act on Informatization of Activities of Entities Performing Public Tasks of February 17, 2005. This law defines the rules for implementing IT solutions in TSUs and other public sector units. It points to the need to automate administrative processes and enable citizens to use public services electronically. With these regulations, local governments can develop e-government and adapt to the public's growing expectations regarding the accessibility and convenience of dealing with official matters online.

Another important piece of legislation that affects digitization in the TSU is the Regulation on Personal Data Protection (RODO). Introduced at the European Union level, it is a mandatory regulation that sets out the rules for processing personal data. In the context of digitization of TSU, this is crucial, as local governments process citizens' data in many administrative processes, and these must be properly secured. The RODO imposes a number of obligations on TSUs, such as ensuring adequate data protection measures, keeping records of processing, or informing citizens about the purposes and legal grounds for processing their data. In addition, the regulations impose an obligation to report any breaches of personal data protection in order to protect citizens' privacy

The Local Government Act of March 8, 1990 is also important in the context of digitization. Although it does not directly regulate computerization, it provides the foundation for implementing digital solutions in local government administration. Based on it, TSUs are obliged to carry out public tasks as efficiently as possible, which includes the use of modern digital tools. The law emphasizes the responsibility of local governments for the quality of public services, including their digitization

Another key piece of legislation in the context of digitization in TSU is the Law on Electronic Signature of September 5, 2016. This regulation provides the legal basis for the use of electronic signatures in the circulation of documents in public administration. The law allows local government units to use electronic signatures to implement many administrative procedures, such as submitting applications, declarations or other official documents in digital form. This, in turn, makes it possible to streamline administrative processes, as well as make them more legal and reliable.

Also worth noting is the Law on Digital Accessibility of Public Entities' Websites and Mobile Applications, dated April 4, 2019. The purpose

of this law is to ensure equal access to online public services, including for people with various types of disabilities. The law requires TSOs to adapt their websites and mobile applications to the needs of people with limited access to information, with the aim of eliminating barriers that prevent the use of public e-services. Compliance with the Act's requirements is essential for local governments to effectively implement inclusion and accessibility policies.

External funding (EU funds) is one of the key mechanisms supporting digitization in local governments. These funds are often a source of significant financial resources that enable local governments to implement IT, infrastructure or e-service projects. EU programs, such as the Digital Poland Operational Program or the European Funds Operational Programs, offer grants that support both the development of ICT infrastructure and the implementation of modern digital tools in administration. These funds allow local governments to implement ambitious projects that, without external support, might not be feasible from local budgets. With these funds, local governments can not only modernize their structures, but also accelerate the process of digitization of public services, which become more accessible to citizens.

Another important factor is changing social expectations. With the increasing availability of technology in everyday life, society is becoming more demanding of public administration. Citizens expect easy, quick access to online public services, such as filing applications, paying taxes or reporting various matters to government offices. The modern user demands simple and intuitive tools that will enable him or her to handle official matters without having to leave home. These expectations are changing the way administration is perceived – not only as an institution that provides order, but also as an entity that should use modern technologies to improve the quality of life of citizens. These changes provide a strong impetus for digitization, as local governments that fail to respond to these demands risk losing the trust of citizens.

The final factor influencing the digitization of local governments is the development of IT technology. As information technologies become more advanced, cheaper and more readily available, local governments are gaining new opportunities. The development of cloud computing, artificial intelligence, big data, and the growing availability of high-speed Internet are enabling innovative e-services that would have been unattainable just a few years ago. Thanks to these technologies, local government administrations can offer citizens new, more efficient forms

of contact with offices, as well as streamline internal administrative processes. IT technologies are changing the way local governments organize their operations, enabling, among other things, the automation of many activities, which translates into savings and improved management efficiency.

Summarizing the above-described factors, it should be emphasized that external funding, changes in social expectations and the development of IT technology are three key factors accelerating the digitization process in local government units. Thanks to EU support, changes in citizens' demands and technological advances, local governments can effectively implement digital solutions that improve the quality of public services, increase accessibility and efficiency of administration, and contribute to building a modern information society

Internal factors affecting the ability of local government units (LGUs) to successfully implement and manage digitization processes include a number of aspects related to organization, human resources, digital competencies and management processes. Effective use of these elements can accelerate digital transformation, improving the quality of public services and increasing citizen satisfaction.

The administration's readiness for change is one of the key elements determining the success of digitization. In the process of digital transformation, openness to new technologies, organizational flexibility and willingness to adapt to changing conditions are important. A local government administration that demonstrates readiness for change is able to effectively implement innovative solutions, reorganize traditional administrative processes and introduce digital tools, which improves the quality of services provided. Examples of such changes include digitization of documents, automation of administrative processes and development of e-services. In contrast, an administration that is not ready for change may encounter resistance, which delays the introduction of new solutions and reduces their effectiveness.

Financial resources are another key factor in the implementation of digitization projects. Digitization involves costs for the purchase of modern technologies, employee training, upgrading IT infrastructure and implementing e-government systems. The amount of available funds determines the scope and pace of project implementation. Local governments with adequate financial resources can carry out digitization faster and more efficiently, which translates into higher quality services for citizens. In units with limited budgets, the implementation of digitization may be

difficult, but they can take advantage of external funding sources, such as EU funds or national support programs.

IT infrastructure is the foundation for the effective implementation of digitization in TSU. It includes servers, computers and mobile devices, as well as software, telecommunications networks and security systems. High-quality IT infrastructure enables efficient data management, streamlines administrative processes and supports the provision of e-services. An example of such infrastructure is cloud systems, which provide secure data storage and easy access from various locations, and offer scalability of services as needs grow. In local governments that do not have an adequate IT infrastructure, the digitization process can encounter difficulties, such as overloaded systems or problems with service availability.

Cooperation with the private sector is an important element in supporting digitization at TSU. Technology companies and IT service providers not only provide technology solutions, but also offer substantive support, consulting and training for government employees. Cooperation with the private sector provides access to innovative tools and technologies that can be tailored to the specific needs of local governments. An example of such cooperation is the outsourcing of IT projects to external companies that implement e-government systems or implement cloud solutions. In addition, public-private partnerships (PPPs) allow sharing the risks and costs associated with large digitization projects, making them easier to implement.

With the right organization, flexibility in management, availability of funds, modern infrastructure and cooperation with external partners, local governments can effectively implement innovative digital solutions, improving the efficiency of administration and the quality of public services.

Summary

Summarizing the above considerations, the research hypothesis was fully confirmed. A factor that has shown the importance of developing new digital technologies in municipalities and counties in recent years was the COVID-19 pandemic. It has forced public administrations to implement activities, such as accepting applications and handling official matters, without the need for employees to be physically present in the offices. It also showed how many areas of functioning of territorial self-government units need to be improved and the quality of e-services en-

hanced, and how many areas the administration should implement digital solutions in its daily activities, which enabled easier and faster contact with the local administration, solving the problem of difficult access to offices, especially in rural areas, where residents may have difficulties in reaching offices due to distance or lack of transport. Digitisation makes it possible to deal with official matters without having to leave home, which saves time, eliminates queues and facilitates access to services for people working or caring for family members. In addition, it enables the administration to process documents more efficiently, which increases the efficiency of its functioning.

Undoubtedly, one of the greatest challenges in the context of the dynamic changes in digital development is to prepare society for the current reality and the associated risks. This can contribute to the exclusion of older people, the less educated, people with disabilities and those living in rural areas who may have limited access to technology. Transmitting sensitive data over the internet carries the risk of data leakage or cyber attacks, which may compromise the security of citizens. In addition, those who prefer personal contact may feel excluded, and system failures or lack of internet access may make it difficult to deal with administrative matters, affecting the quality of services.

Bearing in mind the above considerations, the author of the above article recommends that further digital transformation of territorial self-government units should be aimed primarily at increasing the availability and quality of public services, streamlining the work of the office, or increasing the transparency of territorial self-government units' operations and involving residents in the life of the community. Moreover, such activities of the self-government will also significantly improve the efficiency of management of self-government administration units. The implementation of electronic systems, such as ePUAP, electronic services platforms or ERP systems, allows for faster and more precise management of resources and administrative processes. Thanks to these tools, local governments can efficiently perform tasks such as civic affairs, budget management or records management. Examples from various cities show how the implementation of modern technology not only improves the functioning of public administration, but also leads to greater involvement of citizens and an improvement in their quality of life.

The considerations contained in this article do not exhaust the issue of CT from the perspective of the jsts. In order to conclude that a jst is undergoing such a transformation, it is necessary to look at it holisti-

cally, as changes in the organisation take place at various levels, from the way it functions within the entity (in offices, organisational units, local government legal entities), the management of its affairs to the cooperation with suppliers and residents using existing and emerging technological innovations from time to time. This creates a wide field for literature and empirical research. The starting point for further research should be to diagnose the barriers faced by local governments on the path of digital transformation. An interesting issue is the impact of our country's digital transformation from the perspective of local government.

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Autor oświadczył, że nie istnieje konflikt interesów.

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Wpływ cyfryzacji na rozwój samorządu terytorialnego w Polsce

Streszczenie

Kwestia cyfryzacji jednostek samorządu terytorialnego jest bardzo ważna, ponieważ umożliwia lepszą komunikację i współpracę z obywatelami, co zwiększa przejrzystość i dostępność usług publicznych. Cyfryzacja poprawia efektywność administracji, ułatwiając zarządzanie danymi i procesami. Ponadto przyczynia się do oszczędności czasu i kosztów, zarówno dla urzędów, jak i mieszkańców. Głównym celem niniejszego artykułu jest analiza wpływu cyfryzacji na rozwój samorządu terytorialnego w Polsce, z uwzględnieniem korzyści i wyzwań związanych z wdrażaniem nowoczesnych technologii w administracji publicznej.

Słowa kluczowe: cyfryzacja, efektywność energetyczna, samorządy, zrównoważony rozwój, inteligentne miasta

