DIGITALISATION IN THE MANAGEMENT
OF A PUBLIC ORGANISATION

Karolina SZYMANIEC-MLICKA

University of Economics in Katowice; karolina.szymaniec-mlicka@uekat.pl, ORCID: 0000-0002-7500-4925

Purpose: The purpose of the research conducted was to assess how managers of public organisations perceive the process of digitisation and the benefits it brings to the functioning of public organisations. In addition, using the Unified theory of acceptance and use of technology (UTAUT) concepts proposed by V. Venkatesh et al. variables influencing the intention to use modern technology among managers of public organisations were assessed.

Design/methodology/approach: Quantitative research methods were used. A questionnaire survey was conducted among managers of local government units - mayors, presidents, or their designees with the knowledge and competence to answer questions. The number of respondents 357.

Findings: The results obtained indicate that municipal managers have a positive perception of the digitalisation process in the public sector and see its benefits for relations with residents, cooperation with other public services or third sector organisations.

Research limitations/implications: Future research should focus on a broader identification of factors that favour or limit the use of modern technology in the management of a public organisation, also in other areas of public sector activity than municipal management.

Practical implications: The results obtained from the research indicate that there is potential to intensify the introduction of digital tools into the operation of public organisations due to its positive perception among managers of public organisations.

Originality/value: This article is addressed to researchers, but also to managers of public organisations. Its undoubted value lies in the presentation of research results based on a large group of respondents who are directly responsible for the implementation of modern technologies in the everyday functioning of the organisation.

Keywords: digitalization, public organization, public management.

Category of the paper: research paper.

1. Introduction

Observed social, political, economic and demographic changes are forcing public sector organisations to search for new ways to deliver public services efficiently and effectively (Kitsios et al., 2023; Adreoni, Mambretti, 2021). At the same time, the cultural changes taking place in the last decade of the twentieth century, resulting from the transition from an industrial civilisation to a knowledge civilisation (post-industrial, information or post-digital) and the dominance of *information-communications technologies (*ICTs) have fundamentally affected not only the scope and quality of interactions between people, but also the conditions under which organisations operate. The transformation from an analogue to a digital society has become so intense recently that it has been decided to distinguish it as a new era of socio-economic development and has been given the name of the fourth industrial revolution (Acsente, 2010), interchangeably Industry 4.0 (Industry 4.0). The characteristics of this era are (1) widespread digitalisation and the provision of technical capabilities for the continuous communication of people, people with devices and devices with each other; (2) the increasing implementation of so-called disruptive innovations that allow for leaps in productivity and efficiency of the socio-economic system; and (3) the development of machines in such a way that they acquire the ability to behave autonomously through the use of 'artificial intelligence' (AI) in their control process (Frączkiewicz-Wronka, Ziemba, 2022). Lately, we have seen a dynamic development of digitisation, which has been further accelerated by the global Covid-19 pandemic

The digitisation trend is supported by a number of European Union activities, including, among others, an increase in funds allocated to ICT development and the redefinition of objectives in the EU strategies in force for the Member States. The most recent strategy, Digital Compass 2030. The European Way in the Digital Decade, presented in 2021, focuses activities around creating conditions for achieving four main goals: (1) a digitally skilled society and highly skilled digital professionals; (2) secure, efficient and sustainable digital infrastructure; (3) digital transformation of businesses; and (4) digital transformation of public services. This article presents the results of a study on digitisation in the management of a public organisation. The purpose of the research conducted was to assess how managers of public organisations perceive the process of digitisation and the benefits it brings to the functioning of public organisations. In addition, using the Unified theory of acceptance and use of technology (UTAUT) concepts proposed by V. Venkatesh et al. variables influencing the intention to use modern technology among managers of public organisations were assessed. Quantitative research methods were used. A review of the literature indicates that local authorities' perceptions of the digitisation process have not yet been analysed.

2. Digitalisation in public management

The pressure to raise the quality and standard of life and the search for efficient ways of providing services has influenced the expansion of the areas of emanation of the Industry 4.0 concept, and the observed practice reveals many applications outside the context of the manufacturing industry in, for example, urban management, public and social services, and social and healthcare systems (Giulio, Vecchi, 2021; Chute, French, 2019). Regarding the public sector, the drive to improve operational efficiency through the use of modern technologies applies both to the actions of individual organisations that choose to do so, but also to entire areas of public service delivery through the implementation of relevant central or regional level programmes, thereby realising the drive to transform the public sector towards Government 4.0 (Naqvi Al, Munoz, 2020). The transition towards Government 4.0 is not a single and short-term implementation of a specific technology, but rather a long-term evolutionary process of transforming the government/public sector to focus on citizen services (Walencik, 2018). The evolution towards Government 4.0, following Janowski (2015), can be divided into four stages:

1. Digitalisation - implementing ICT to improve its internal processes and structures, e.g. launching websites.
2. Transformation – implementation of ICT with applied organisational and process transformation within the administration itself, without changes in stakeholder relations, e.g. e-government.
3. Engagement – the use of ICT to both support internal processes and to support the communication and relations of the public administration with stakeholders, e.g. e-processes, e-public services, e-governance.
4. Contextualisation - the impact of ICT use in public administration on the whole public sector and its stakeholders.

The use of modern technology in the public sector can help improve the delivery of public services and contribute to the best use of available resources. The benefits of using modern technology in the public sector (Väyrynen, Helander, Jalonen, 2023; Ziemba, Papaj, 2023; Naqvi Al, Munoz, 2020; Stern, Daub et al., 2018; Walencik, 2018) include. Identification of problems in real time and faster response to them; faster and more efficient decision-making and more accurate decisions; access to huge amounts of data, which allows improving the analysis carried out, provides new evidence for the design and adaptation of public policies to the new reality (*evidence-based public policies*); reduction of time in dealing with official matters, bureaucracy, more personalised service for citizens and business; cost reductions; increased efficiency of the administration; improved innovation in public service delivery; ICT enables the introduction of reforms relating to the way in which public organisations operate; increased transparency of public sector activities; increased quality of services; new channels of communication and, as a result, improved information flow and support for active citizen participation.

At the same time, reaping the full benefits of applying the technologies known as Industry 4.0 to the public sector requires overcoming emerging obstacles. Among them, we can point out (Kitsios et al., 2023;Kuhlmann, Heuberger, 2021; Naqvi Al, Munoz, 2020): (1) the often outdated information technology (IT) infrastructure in public organisations; (2) the lack of statistical awareness and the lack of tool experience of staff (especially relevant for Big Data analyses); (3) the problem of data access while protecting sensitive data; (4) the low quality of available data (e.g. incompleteness); (5) problem of bureaucratic internal procedures in the organisation; (6) lack of financial resources; (7) lack of trust of users (citizens) in new technological solutions; (8) resistance of employees of public organisations; (9) lack of specialists; (10) outdated regulations and working procedures; (11) administrative law.

The implementation of modern technology into the functioning of the public sector is a significant change in its operating principles and requires proper management of the change process. Müller and Abildgaard Skau (Muller, Abildgaard Skau, 2015), based on a literature review, identified six areas that need to be examined in the change process to increase the likelihood of success, viz:

- External environment (legislation, political and administrative reforms, socio-economic factors).
- Organisation (financial resources, organisational infrastructure, cooperation, stakeholders, organisational culture).
- Governance (commitment, strategy, project management).
- Employees (human resources, resistance to change, education and training).
- Citizens (digital exclusion, education and training, citizens' needs and trust).
- Technology (infrastructure, security, design, and access).

The areas of digitisation related to public management concern various spheres of socio-economic life. Digitisation, together with the dynamic development of increasingly sophisticated ICT, are becoming alternatives to or replacing existing solutions. The main domain of digitisation expansion in public institutions is the creation of public e-services as *front office* (supporting interaction between the customer and the public institution) and the implementation of IT systems as *back office* (supporting *back office* and internal processes in public institutions.

A discussion of strategic documents and activities relating to digitisation of the public sector can be found in Ziemba and Papaj's (2023) work. Digitisation is coordinated with the goals and tasks set by the eGovernment Action Plan and, above all, the closely related Operational Programme Digital Poland (POPC).

Table 1.
Digitisation of the public sector in operational programmes

Programme	Activities
Operational Programme Digital Poland 2014-2020	Priority axis II. E-government and open government, and within it four measures: Measure 2.1 High accessibility and quality of public e-services; Measure 2.2 Digitisation of *back-office* processes in government administration; Action 2.3 Digital accessibility and usability of public sector information; Measure 2.4 Creation of services and applications using eServices and public sector information.
European Funds for Digital Development 2021-2027	Continuation of projects implemented in POPC 2014-2020. Priority axis II. Advanced digital services activities are planned, such as: 2.1 High quality and accessibility of public e-services with emphasis on the improvement of e-State and e-Health services; 2.2 Strengthening the national cyber security system; 2.3 Digital accessibility and reuse of information; 2.4 Digital cross-sectoral cooperation (cooperation for digital solutions to socio-economic problems) with an emphasis on digitisation areas such as health, energy, environment, entrepreneurship, agriculture, maritime economy; 2.5 Support for digital skills, primarily advanced digital competences in data analytics and machine learning, robotics and sensors, e-commerce, cybersecurity, the Internet of Things, quantum computing or IT management and Industry 4.0.

Source: Own study based on Ziemba, Papaj, 2023.

As Ziemba and Papaj (2023) point out – the main objective of the planned programme for the following years *is to support the digital transformation of public management through the implementation of projects that will ensure efficient and user-friendly advanced public e-services, the effective operation of the national cyber security system, access to public information with significant potential for further use and support for the development of digital competences, as well as to develop, through digitisation, cross-sectoral cooperation for the solution of socio-economic problems.*

Digitisation serves various purposes and, above all, as indicated earlier, it is intended to improve the delivery of public services to citizens, better interactions of public institutions with business and citizens, empowerment of citizens through access to information or more efficient government management. Well-implemented digitisation enables citizens, businesses, and organisations to interact with public institutions more easily, quickly and cheaply (Loberg, 2023). Ziemba and Papaj (2023) identified four pillars of digitisation:

- *E-processes*, i.e. the use of ICT to improve and enhance internal processes in public entities.
- *e-public services*, i.e. the use of ICT for public services and the provision of public e-services to citizens, businesses and public institutions.
- *E-democracy*, or the use of ICT to enhance transparency, public participation and democratic decision-making in public institutions and public governance.
- *E-governance*, or the use of ICT for networking, establishing partnerships between public institutions and citizens, businesses and NGOs.

The use of ICT for service delivery by the public sector results in public e-services delivered to citizens and businesses, as well as for internal services within or between public institutions.

3. Research methodology

The analysis of the literature on the subject allowed the research team to prepare a questionnaire survey addressed to the managers of local government units at the commune level, i.e. to mayors and presidents. At the same time, it was allowed for the mayor to delegate the completion of the questionnaire to an appropriate office employee who is competent to answer the questions contained in the survey questionnaire. 357 units were surveyed. The territorial distribution of the respondent group is shown in Table 2.

Table 2.
Sample structure by province (percentage (%) and number (n))

Province	%	n
Lower Silesia	9.52%	34
kujawsko-pomorskie	5.60%	20
Lublin	7.28%	26
Lubuskie	3.08%	11
Lodz	7.84%	28
Małopolskie	7.28%	26
mazowieckie	12.32%	44
Opolskie	3.64%	13
Podkarpackie	5.32%	19
Podlaskie	3.92%	14
Pomeranian	4.76%	17
Silesia	6.44%	23
Świętokrzyskie	4.76%	17
Warminsko-Mazurskie	4.48%	16
Wielkopolskie	8.12%	29
zachodniopomorskie	5.60%	20
Total	100.00%	357

Source: Own study.

The largest percentage of municipalities were in the Mazowieckie voivodeship, followed by Dolnośląskie and Wielkopolskie. In terms of the type of municipality represented by the respondent, 21% (76 municipalities) were urban municipalities, 50% (177 municipalities) were rural municipalities and 29% (104) were rural-urban municipalities. By job position, among the 357 respondents – 79 (22%) held the position of mayor, 93 (26%) the position of mayor and 185 (52%) others. There were no mayors among the respondents. The vast majority of respondents (68%) were over 46 years of age. The gender structure of respondents was as follows – 53% of respondents were female, 47% male. The predominant education among respondents was tertiary education (99.4%). Respondents were asked to rate how much they agreed with the statements in the questionnaire. Ratings were made on a 5-point Likert scale: 5 – agree; 4 – rather agree, 3 – neither agree nor disagree, 2 – rather disagree, 1 – disagree.

The aim of the research conducted was to assess how managers of public organisations perceive the digitalisation process and the benefits it brings to the functioning of public organisations. Additionally, using the Unified theory of acceptance and use of technology (UTAUT) concepts proposed by Venkatesh et al. (2003, 2022), variables influencing the

intention to use modern technology among managers of public organisations were assessed. The unified theory of acceptance and use of technology (UTAUT) used in the study assumes the existence of four determinants influencing the intention to use a given technology. These are: performance expectancy, effort expectancy, social influence and facilitating conditions (Soltysik-Piorunkiewicz, Zdonek, 2015; Venkatesh et al., 2003). Performance expectancy is the belief that the use of a given technology will help to achieve benefits/higher performance in accomplishing important tasks. Effort expectancy is the degree of difficulty in using a given technology. Social influence is the degree of a person's belief that people important to them would also use the technology. facilitating conditions means the degree to which a person is convinced that the appropriate technical and organisational infrastructure exists to provide support during the difficulty of using the technology. These determinants influence users' intentions to use modern technology.

Research questions: (1) how managers of public organisations perceive the digitalisation process and the benefits it brings to the organisation, (2) how managers of public organisation perceive the factors that may influence their intentions to use modern technology.

4. Digitalization in local government units in Poland – research results

Table 3 shows the results regarding the evaluation of the digitisation process. The results indicate that managers have a positive perception of the digitisation process. The vast majority of the answers given were either agreed or rather agreed. Importantly, in practical terms, respondents agree that digitisation has an impact on improving the results of their work. What is particularly important is that the vast majority agree with statements that digitisation has improved the ability to consider the needs of residents, has tightened the relationship with them, and has made it easier to work with other public services/companies or third sector organisations. It is important to note that around 95% of respondents agree that digitisation has had an impact on improving working conditions in the public sector, but only around 70% agree with the statement that digitisation has had an impact on increasing wages in the public sector. At the same time, around 75% of respondents agreed with the statement that the new skills required by digitisation reduce job security, while opening up other employment opportunities (around 85%)

Table 3.
Structure of responses regarding digitization in public organizations (percentage, %)

Statement/Question	Answer				
	1	2	3	4	5
The digitalisation of work is having an impact on improving the results of your work.	0,0%	2,0%	5,3%	42,9%	49,9%
The digitalisation of work is having an impact on the functioning of society.	0,0%	1,1%	4,5%	44,0%	50,4%
The digitalisation of work has an impact on the quality of services provided by the public sector.	0,6%	0,6%	3,4%	46,5%	49,0%
The digitalisation of work has an impact on reducing inequality and discrimination.	1,1%	6,4%	16,0%	47,9%	28,6%
The digitalisation of work has an impact on improving social wellbeing.	1,1%	5,6%	8,7%	51,8%	32,8%
The digitalisation of work is having an impact on improving working conditions in the public sector.	0,8%	0,8%	3,1%	48,5%	46,8%
The digitalisation of work is having an impact on wage growth in the public sector.	5,0%	11,2%	12,9%	45,4%	25,5%
The digitalisation of work has implications for a better balance between personal/family life and civil servants' work.	5,3%	6,4%	9,8%	48,2%	30,3%
The new skills required by digitalisation are sufficiently considered when assessing your skills and career development.	0,8%	6,7%	7,0%	55,5%	30,0%
The new skills required by digitisation enrich your personal skills.	0,6%	4,2%	3,9%	49,9%	41,5%
The new skills required by digitisation open up other employment or career opportunities for you .	1,1%	7,0%	6,7%	52,9%	32,2%
The new skills required by digitalisation reduce future job security.	2,0%	8,4%	14,3%	51,5%	23,8%
The introduction of digital tools and working methods has contributed to you feeling more useful to residents because you now provide them with a better opportunity to take their needs into account.	0,6%	7,3%	6,4%	56,3%	29,4%
The introduction of digital tools and working methods has led to a closer relationship with your residents than before.	1,4%	7,8%	7,3%	56,3%	27,2%
The introduction of digital tools and working methods has led to you working better with other public services/businesses and third sector organisations.	0,3%	4,5%	5,9%	59,4%	30,0%
The introduction of digital tools and working methods has intensified performance monitoring in the office where I work.	0,3%	1,4%	2,5%	55,7%	40,1%

Source: Own study.

The results obtained in Table 4 show that the respondents are relatively positive about the indicated determinants. In terms of questions relating to performance expectancy, there is a clear predominance of "tend to agree" and "agree" ratings, also respondents feel that digitisation tools have a positive impact on the results of their work. Considering the seniority of the respondents in the public organisation, more than 80% of the respondents have more than 10 years of work experience, which allows them to assess their expected performance in the long term. The vast majority of respondents declare that, as supervisors, they support the introduction of a digitalisation tool in their office. The high rating for questions in effort expectancy indicates that the respondents have a high opinion of their digital competence and that they do not perceive the introduction of a digitalisation tool in their organisation as

a burden. The vast majority of respondents confirmed a facilitating conditions in terms of supporting the implementation and use of digitalisation tools.

Table 4.
Determinants of the use of modern technology in a public organisation (percentage, %)

Determinant	Statement/Question	Answer				
		1	2	3	4	5
Performance expectancy	The use of digitalisation tools at work has increased your productivity, i.e. the goods/services produced have more value than the inputs used to produce them.	0,6%	4,5%	6,2%	53,2%	35,6%
	By using digitalisation tools at work, you perform your tasks faster.	0,3%	1,7%	3,1%	45,1%	49,9%
	You believe that the use of digitalisation tools is essential for the effective resolution of residents' issues.	0,3%	4,2%	5,3%	55,5%	34,7%
	The use of digitalisation tools increases residents' satisfaction with your work.	0,8%	5,6%	5,6%	53,5%	34,5%
Social influence	Influencers at work think you should intensify your use of digitalisation tools in your work.	0,3%	9,8%	5,3%	56,6%	28,0%
	As a supervisor, you support the introduction of digitalisation tools in the office.	0,0%	1,1%	4,5%	58,8%	35,6%
	In your office, a large proportion of employees use digitalisation tools in their daily work.	0,0%	1,1%	2,2%	53,2%	43,4%
Effort expectancy	The digitalisation tools being introduced in the office are clear and understandable to you.	0,3%	0,8%	3,9%	54,1%	40,9%
	You assimilate new developments in the use of digitalisation tools at work with ease and without difficulty.	0,0%	2,2%	3,1%	57,7%	37,0%
	You find it easy and effortless to use digitalisation tools at work.	0,0%	2,0%	3,1%	50,1%	44,8%
	You are quick to learn and become proficient in the use of digitalisation tools.	0,0%	1,4%	3,4%	56,3%	38,9%
Facilitating conditions	You have been given the opportunity to gain knowledge and skills in using digitalisation tools in your office.	0,0%	0,3%	2,0%	61,9%	35,9%
	You have been provided with the resources necessary to use digitalisation tools (software and hardware).	0,3%	1,1%	4,8%	50,4%	43,4%
	There is an organisational unit/person in your office who can be contacted in case of problems with the use of digitalisation tools.	0,3%	0,6%	3,9%	53,2%	42,0%
	Your office supports (e.g. through training) the use of digitalisation tools by staff in their dealings with residents.	0,3%	0,6%	4,2%	61,1%	33,9%
Intentions to use modern technology	Given your current level of access to digitisation tools, you anticipate using them at your current level.	0,3%	1,7%	4,5%	61,6%	31,9%
	Assuming your current level of access to digitalisation tools, you intend to expand your competence in using such solutions.	0,3%	0,6%	2,8%	59,1%	37,3%
	In your work, it is important to expand your competence to use digitalisation tools.	0,3%	0,3%	1,4%	54,1%	44,0%

Source: Own study.

5. Discussion

It should also be pointed out that in a digital transformation environment, public organisations must fulfil three basic roles – facilitator, user, and regulator (Naqvi Al, Munoz, 2019). As a facilitator, public organisations should support the development and adaptation of modern technologies through, among other things, financial support and the creation of new entities. At the same time, public organisations must become active users of modern technologies (artificial intelligence, Big Data) in their daily activities to create new public policies more in line with the changing reality. As a regulator, public organisations or the public sector more broadly are responsible for the legislative process focusing on the ethical issues of using modern technologies and data security. As a limitation of the presented research results, it can be pointed out that only percentage results are presented for the evaluation of individual statements without testing hypotheses in which a relationship can be presumed between a given determinant and the intention to use modern technology.

6. Conclusion

The presented research results indicate that the digitisation process in public organisations is relatively well perceived by managers. At the same time, however, it notes that some digital tools are introduced into a public organisation in an obligatory manner, which necessitates further expansion of competences by managers and the development of conditions favourable for the users of new solutions. The process of digital transformation in the public sector is not a mission to be pursued only by managers because by providing better opportunities to consider the needs of residents or by building closer relationships with residents, it allows a shift from viewing the resident as a customer towards building partnerships and active participation in the delivery of public services (Kitsios et al., 2023; Bason, 2018). The active participation of residents in the provision or, more broadly, in the co-creation of public services using the tools of digitisation seems to be an interesting direction for future research.

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