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Managing digital competences in public administration

Angelika Wodecka-Hyjek

Cracow University of Economics, Cracow, Poland
ORCID: 0000-0002-6930-4438

Tomasz Kafel

Cracow University of Economics, Cracow, Poland
ORCID: 0000-0003-2931-1921

Rafał Kusa

AGH University of Science and Technology, Cracow, Poland
ORCID: 0000-0002-9819-897X

Summary. Digital solutions are implemented in all types of organizations, including public administration. The implementation of digital solutions requires the development of relevant skills and competences of employees. The aim of this chapter is to assess managerial practices related to the digital competences of employees of public organizations and their association with the efficiency of human resource management (HRM). We based on a literature review that focuses on the area of competences, digitalization, and public administration. Digital competences as a key success factor of the digital economy were described. We survey 142 public organizations regarding the role of digital competences in the HRM process. As a result, this study indicates that the inclusion of digital competences into the process of employees' recruitment, evaluation, and development is significantly correlated with an organization's performance in the area of human resource management (namely, employees' engagement and satisfaction and the efficiency of human resource management). Additionally, this study unveils the differences in terms of HRM practices among different types of public organizations. These findings have managerial implications, specifically, it suggest the directions of development of HRM practices in public administration. With its findings, this study contributes to the literature on public administration and human resource management.

Keywords: public administration, e-governance, digitalization, digital competences, human resource management.

Introduction

Digital competences in the 21st century are a condition for full participation in society and an opportunity to improve the quality of life, as well as to develop an active attitude towards digital technologies. The way of shaping digital competences

is digital education, targeted at the needs of various groups of citizens. Digital education aims to enable citizens to use digital technologies in different areas of life, derive benefits from them, and improve their quality of life. The effects of digital education can be seen in three dimensions: individual, social and civic. In individual terms, the effect of digital education is a better adjustment of competences to the contemporary labour market and preparation for safe, ethical, and skilful use of opportunities offered by digital technologies, as well as e-services and resources of culture, science, and knowledge. In the social dimension, the effect of digital education is to be prepared for participation and communication in the network environment, while in the civic dimension, the effect of digital education is the ability to use information and e-services of the public sector as well as increasing civic awareness and participation (*Program zintegrowanej informatyzacji państwa..,* 2019). The concept of digital transformation is often perceived only through the prism of technology - robots, systems and algorithms. Meanwhile, a digitally mature organization knows how to use digital solutions to achieve its goals and create added value. Digital maturity is the result of the endless improvement of organization in which employee competences are of key importance, while technologies are only an auxiliary, but an essential tool (Nosalska, 2020).

In the era of the digital revolution, the growing expectations of citizens and entrepreneurs towards the state and the services it provides constitute a serious challenge and an additional stimulus for changes in the public sector. At the heart of the digital transformation of the state, and therefore also of public administration, is the citizen whose needs constitute the starting point for the actions taken. The change in the approach to the implementation of processes, implementation of services and communication with the citizen will be based on the possibilities offered by the use of digital technologies (*Program zintegrowanej informatyzacji państwa*..., 2019).

In February 2020, the European Commission set out its vision for the digital transformation in the communication "Shaping Europe's digital future" to deliver an inclusive use of technology that works for people and respects EU fundamental values. The White Paper on Artificial Intelligence and the European data strategy are the first two pillars of the new digital strategy of the Commission. On 10 March, the Commission published its new SME strategy for a sustainable and digital Europe (Digital Economy and Society Index, 2020, p.10).

Despite numerous publications on digital transformation and requirements for individuals' competences, the problem of digital competences of public servants is omitted. Additionally, the challenges and role of the HRM practices in the context of digital competences in public administrations are neglected. This chapter aims to address these problems. In particular, the purpose of this chapter is to assess managerial practices related to the digital competences of employees of public organizations and their association with the efficiency of human resource management (HRM). Additionally, this investigation intends to indicate the areas that require improvement in examined types of public organizations.

This chapter is structured as follows. First, the literature on digital competences and their place in human resource management is reviewed. Second, the variables and the sample are described. Third, the results of the research are presented and discussed. Finally, the limitations and conclusions of the study are presented.

Digital competences as key success factor of Digital Economy

The implementation of digital technologies requires relevant competences of employees. These requirements are reflected in strategies and policies on both organizational and national levels. The basic document regulating the definition of digital competences is the Recommendation of the Council of the European Union of May 22, 2018, on key competences in the lifelong learning process (*Council Recommendation of 22 May 2018*, 2018). The definition contained in the digital competence document involves the confident, critical and responsible use of, and engagement with, digital technologies for learning, at work, and for participation in society. It includes information and data literacy, communication and collaboration, media literacy, digital content creation (including programming), safety (including digital well-being and competences related to cybersecurity), intellectual property related questions, problem solving and critical thinking.

The detailed development of the understanding of digital competences was proposed in the document *The Key Competences for Lifelong Learning - A European Framework* (2007, p. 7) concerning digital competences for knowledge, skills and attitudes.

Digital competence requires a sound understanding and knowledge of the nature, role and opportunities of Information Society Technology (IST) in everyday contexts: in personal and social life as well as at work. This includes main computer applications such as word processing, spreadsheets, databases, information storage and management, and an understanding of the opportunities and potential risks of the Internet and communication via electronic media (email, network tools) for work, leisure, information sharing and collaborative networking, learning and research. Individuals should also understand how IST can support creativity and innovation, and be aware of issues around the validity and reliability of information available and the legal and ethical principles involved in the interactive use of IST.

Skills needed include the ability to search, collect and process information and use it in a critical and systematic way, assessing relevance and distinguishing the real from the virtual while recognising the links. Individuals should have skills to use tools to produce, present and understand complex information and the ability to access, search and use Internet-based services. Individuals should also be able use IST to support critical thinking, creativity, and innovation.

Use of IST requires a critical and reflective attitude towards available information and a responsible use of the interactive media. An interest in engaging in communi-

ties and networks for cultural, social and/or professional purposes also supports this competence.

The analysis of digital competences according to the researchers of the subject is made from the perspective of two approaches: traditional (catalogue) and relational (Buchholtz et al., 2015; Jasiewicz et al., 2015; Babis, 2018).

In terms of catalogues, shaping digital competences can be compared with school education, the aim of which is to equip students with an identical set of messages that they can use depending on their needs. The reference point is a rigid catalogue of competences, additionally focused on competences directly related to the use of information and communication technologies. The differentiating factor is at most demographic criteria (age, educational level) (Babis, 2018). This approach is in line with the definition of digital competences by the European Commission (Babis 2018).

The relational approach, on the other hand, assumes that information technologies constitute not so much an area as the dimension of citizens' functioning. Relational, the starting point for the description of digital competences is the general definition of competences. It has been assumed that the term "competences" is defined as a conscious, learnable, satisfactory level of fitness, conditioning efficient behaviour or action in some field. The problem of competences can be perceived in a narrower and broader sense. In narrower terms, this term is used to describe a given skill or fitness. In a broader sense, knowledge, skills and motivations based on it are taken into account. Therefore, e-competences are a harmonious set of knowledge, skills and attitudes that allow for effective use of digital technologies in various areas of life (Buchholtz et al., 2015, pp. 13-14). Under this approach, the "Internet" and all modern communication technologies are treated not as a separate area of life, but a dimension present in other areas and facilitating functioning in them (e.g. professional development, social relations, health, rest and interests, civic involvement, every day). In relational terms, competent use of the Internet is defined as one that can contribute to the improvement of the quality of life of an individual, and thus improve his functioning in an area important for him. Digital competences should therefore improve all human activities, and their level should be adapted to the individual needs of the user without the need to create generally accepted (identical) standards (Jasiewicz et al., 2015; Buchholtz et al., 2015). This approach was used under the Operational Program Digital Poland 2014–2020 (Jasiewicz et al., 2015; Babis, 2018).

The current Communication of the European Commission on the Digital Education Action Plan for 2021-2027 defines two strategic priorities in this respect: fostering the development of a high-performing digital education ecosystem and enhancing digital skills and competences for the digital transformation. To implement the priority, the following are necessary: infrastructure, connectivity and digital equipment; effective digital capacity planning and development, including up-to-date organisational capabilities; digitally competent and confident teachers and educa-

tion and training staff and high-quality learning content, user-friendly tools and secure platforms which respect privacy and ethical standards. The implementation of the second priority requires the development of both basic skills and advanced digital competences (*Digital Education Action Plan ...*, 2021).

The Polish response to the European Union initiative in the field of development of digital competences is the Operational Program Digital Poland for 2014-2020 (*Szczegółowy opis osi priorytetowych...*, 2021). It was adopted by the Council of Ministers on January 8, 2014, and then approved by the European Commission (EC) by the decision of December 5, 2014. Funds under this program will be spent until the end of 2023. The goal of the program is to strengthen digital foundations for the development of Poland, which are the foundations of broad access to high-speed Internet, effective and user-friendly public e-services and the constantly growing level of digital competences of the society. Support for universal Internet access will be focused on the creation of broadband networks in areas where, without public support, independent investments of telecommunications undertakings would not take place. The development of e-administration and open government will be carried out by expanding the scope of matters that citizens and entrepreneurs can handle electronically. This will be done directly through the digitization of new public services and the improvement of the functionality and e-maturity of existing services. The development of digital competences of society is a series of interventions addressed to groups with different levels of digital competences, with particular emphasis on activities for digital inclusion. The support will be focused on the development of competences of people from the group at risk of digital exclusion and users who want to develop their digital competences.

The most famous tools for analysis of E-government development is E-Government Development Index (EGDI) (UN E-Government Survey, 2020) and The Digital Economy and Society Index (DESI). DESI tracks the evaluation of EU Member States, across five main dimensions: Connectivity (fixed broadband take-up, fixed broadband coverage, mobile broadband, broadband price index), Human Capital (internet user skills, advanced skills and development), Use of Internet (internet use, activities online, transactions), Integration of Digital Technology (business digitization, e-commerce) and exactly Digital Public Services (e-government). All the dimensions intertwined and positive changes in the digital economy can only be achieved through coordinated improvements in all areas (Digital Economy and Society Index, 2020).
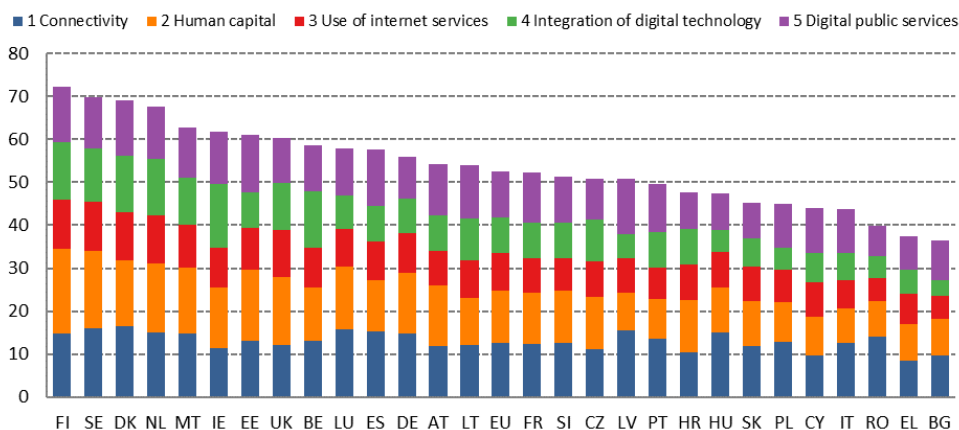
Figure 1. Digital Economy and Society Index, 2020.

Source: Digital Economy and Society Index, 2020, p.14.

Poland ranks 23rd out of 28 EU Member States in the Digital Economy and Society Index (DESI) 2020 (Figure 1), but DESI score has increased significantly over the last five years in our country (Figure 2). Poland's performance is offset by lower scores in integration of digital technology and use of internet services, which are the areas that require particular improvement (nearly half inhabitants of Poland still lack basic digital skills). It is therefore understandable Poland finalised a new strategy, the Digital Competence Development Programme (*Program Rozwoju Kompetencji Cyfrowych*), which targets development of digital skills. The new programme will focus on digital skills needed by citizens, ICT specialists and for employees of SMEs and public administration. The new Operational Programme Digital Poland for 2021-2027, co-funded by European Regional Development Fund, is also being prepared. The strategy will include among others support for broadband infrastructure, e-services (e- government and e-health), basic and advanced digital skills, upskilling and re-skilling and skills needed for the future (Digital Economy and Society Index 2020, p.3-4).
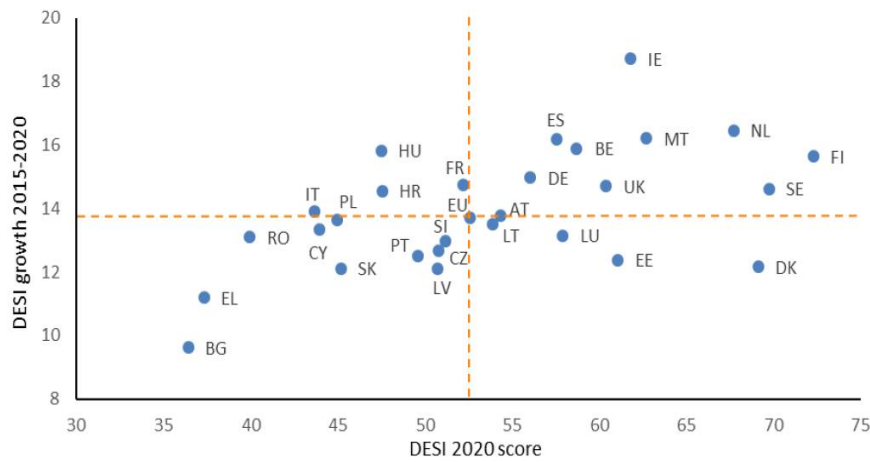
Figure 2. Digital Economy and Society Index – Member States' progress, 2015-2020
Source: Digital Economy and Society Index, 2020, p.13.

From the point of view of the objectives of this study, the human capital dimension of the DESI is particularly important. The Human Capital dimension measures the skills needed to take advantage of the possibilities offered by a digital society. It includes sub-dimensions as follow: digital skills, software skills, ICT specialists and EU Code Week. Digital skills are key here as they enable people to use digital services and perform basic online activities. There are two sub-dimensions covering 'internet user skills' so called basic usage skills that enable individuals to take part in the digital society, and 'advanced skills and development' that empower the workforce to develop new digital goods and services (Ibidem, p.52). The next sub-dimension of the human capital, i.e. software skills, is nowadays becoming a pre-requisite for taking up many professions (Ibidem, p.53) and in turn ICT specialists is a sub-dimension, that takes into account the percentage of people in the work-force with ICT specialist skills and it looks at the share of ICT graduates (Ibidem, p.54). EU Code Week, the last sub-dimension, is a grassroots movement run by volunteers, ambassadors, leading teachers and coding enthusiasts around the world (Ibidem, p.56). In terms of the total score in the dimension human capital, Poland ranks 22nd out of 28 EU Member States (Figure 3).
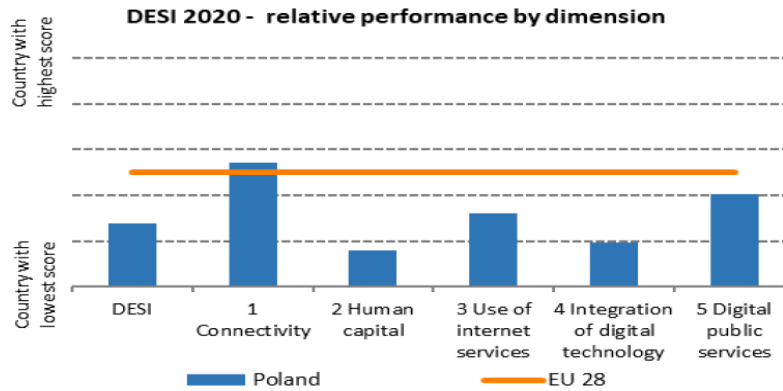
Figure 3. Human capital: Poland vs EU average.
Source: Digital Economy and Society Index 2020 – Poland, p.4.

In Poland, both basic and advanced digital skills remain below the EU average. Only 44% of people aged 16 to 74 have at least basic digital skills (compared to the EU average of 58). It is also alarming that only 3 percent of the population has written any computer program (Figure 4).
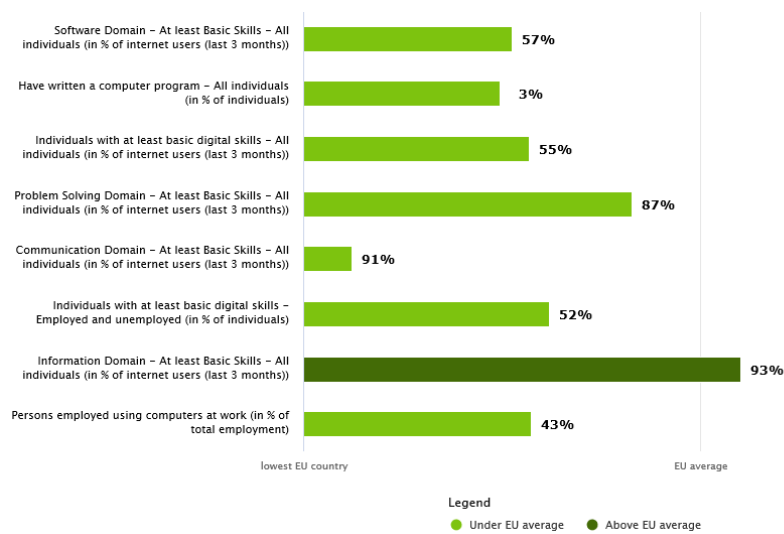

Figure 4. Country profile for Poland, Digital skills indicators.
Source: European Commission. Digital Scoreboard, 2019.
https://digital-agenda-data.eu/charts/country-profiles-the-relative-position-against-all-other-european-countries#chart={%22indicator-group%22:%22ict-skills%22,%22ref-area%22:%22PL%22,%22time-period%22:%222019%22}

A positive signal is the growing supply of ICT specialists in Poland (although it is still below the EU average). Unfortunately, almost half of the enterprises still reporting hard-to-fill vacancies for ICT specialist (Figure 5).
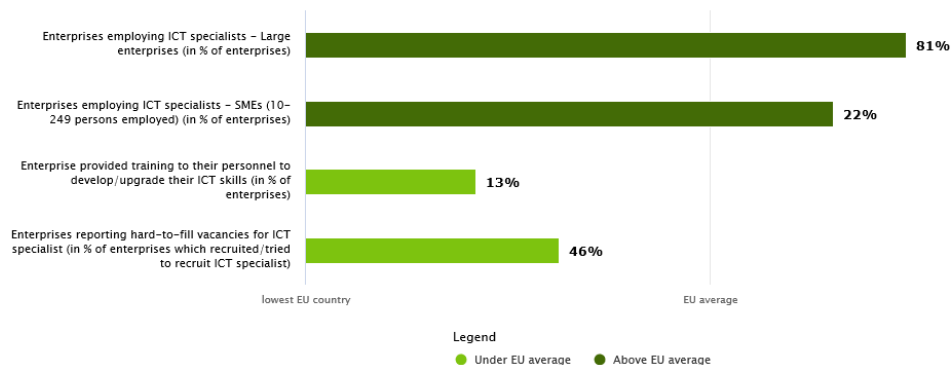

Figure 5. Country profile for Poland, ICT Specialist indicators.
Source: European Commission. Digital Scoreboard, 2019.
https://digital-agenda-data.eu/charts/country-profiles-the-relative-position-against-all-other-european-countries#chart={%22indicator-group%22:%22ict-specialist%22,%22ref-area%22:%22PL%22,%22time-period%22:%222019%22}

The IT Talent Development Program for 2019-2029, initiated in 2019, will certainly reduce the digital competency gap in Poland. By acquiring new skills, raising qualifications or retraining to the path of study called the "technician / IT specialist" path, participants of this program will contribute to reducing the staffing gap in the IT industry. It is undoubtedly noteworthy that in EU Code Week, Poland was one of the most active countries worldwide. It tripled the number of activities to 15,438 and increased the number of people participating to 489,639, of which one third were women (Digital Economy and Society Index 2020 – Poland, p.6).

According to the report prepared annually by the Central Statistical Office in Poland (*Społeczeństwo informacyjne w Polsce..*, 2018, 2019, 2010), the number of people using public administration services via the Internet has been growing intensively in recent years (Figure 6).
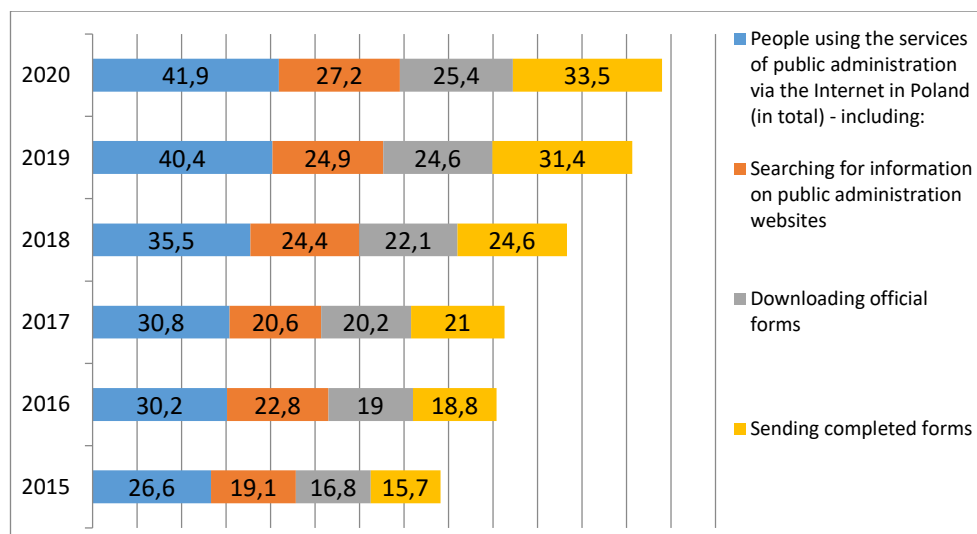
Figure 6. Increase of people using public administration services via the Internet in Poland in 2015-2020

Source: own study based on (*Społeczeństwo informacyjne w Polsce...*, 2018, 2019, 2020)

While in 2015 they accounted for only 26.6% of the population aged 16-74, and in 2020 they accounted for almost 42% of the population. Compared to 2015, in 2020 the percentage of people: searching for information on public administration websites increased by 8.1 percentage points; collecting official forms by 8.6 percentage points and sending completed forms by 17.8 percentage points (*Społeczeństwo informacyjne w Polsce...*, 2018, 2019, 2020).

Digital competences and the process of human resource management

Digital technologies are revolutionizing the way we do business. Their implementation allows companies to expand the scope of their operations, enables better management of relations inside and outside the company, facilitates access to information and data processing, and helps to use resources more efficiently. Importantly, in countries that are relatively less developed in terms of traditional communication infrastructure, broadly understood digital technologies are an opportunity for rapid development. The ability to use the potential of digital technologies – digital competences of enterprises and people – thus becomes a source of competitive advantage for companies and economies (Śledziewska, Włoch 2015, p. 4). Research shows that the source of problems with the implementation of digital solutions in enterprises is primarily the fact that Polish entrepreneurs do not perceive their usefulness and the deficit of digital skills of employees. The development of digital competences is very important in the perspective of the continuous devel-

opment of new technologies because the basic barriers to the use of digital technologies are not only the lack of motivation but also the lack of appropriate skills (Gudawnowska, Kononiuk, 2020, p. 29). It is also worth emphasizing that the dynamic development of technology will result in a new division of labour between people and machines and the replacement of many current professions with robots or digital objects. Research shows that internal competences in the ICT area are important for the development and building a competitive advantage by the SME sector, while creating competency models required in the ICT area for them, one should take into account the differences between the specificity of large and small and medium-sized enterprises (Cragg et al., 2011, quotes after Śledziewska et al., 2015, p. 5).

An exemplary catalogue of digital competences of small companies was based on the relational model of digital competences, according to which the scope of the use of the Web is shaped according to the individual needs and interests of users. This allows the owner to independently shape the path of digitization of the company, who chooses what is tailored to the company's profile, offer and motivation. An important dimension of the company's digitization is the attitude of entrepreneurs to the Internet. The relational approach assumes that functional competences are based on IT and information competences. Basic IT competences are the ability to use ICT devices (both stationary and mobile), including the installation of appropriate applications and software, as well as creating content and organizing or organizing them. Information competences, on the other hand, include the basic ability to search for relevant information on the Web (Jasiewicz et al.,2015). The catalogue of digital competences of small businesses covers six areas: Sales, Communication and Promotion, Product or Service, Customer, Market and Competition, and Running a Business. In each of these areas, you can achieve benefits grouped into three categories: saving time, saving money and generating profits by having specific digital competences. An exemplary catalogue of digital competences for the area of sales covers a specific, gradable set of digital competences (Table 1).

Table 1

A sample catalogue of digital competences of small companies

1. Sales
1.1. Benefit: presenting a product or service for sale
Digital competences:
1.1.1. understands the need to have a digital version of the offer of products or services (for example, photos of products or services performed in social profiles, catalogues for download on the website)
1.1.2. can create and use high-quality descriptive and graphic materials to present its offer, for example by using graphic processing programs
1.1.3. can choose the right websites and tools and use them to present promotional of-

	fers
	1.1.4. can use digital tools in building and presenting a pricing strategy (e.g. online price list, order cost calculator)
	1.1.5. can modify the way of presenting and organizing the offer based on data obtained from website traffic tracking tools and product interest measurement
	1.1.6. can use the available templates to create high-quality sales documents (for example, forms of offer documents, ready-made templates from websites and e-shops)

Source: Buchner, Zaniewska 2016, p. 17-18.

The key moment in the company's digitization process is the entrepreneur determining the model in which his company will operate and to what extent it will depend on digitization. The basic aspect here is shaping the attitude towards information and communication technologies and equipping employees of enterprises with digital competences. The digitization of the company, apart from the development of digital competences, may also involve assigning certain tasks and outsourcing them to external entities (Buchner, Zaniewska 2016).

The digital transformation has also radically changed the way universities operate, communicate with the environment, and organize the classes. Universities must make the best of the opportunities offered by digital transformation and treat digital technologies as a key factor in development. This is of great importance given the current changes in the labor market; in its structure, existing forms of employment and ways of performing work. Digital competences are becoming not only an educational requirement, but a basic condition for gaining knowledge and employment in the labor market. In the concept of an entrepreneurial university, the dimension of "digital transformation and technological potential" is an important criterion for shaping the entrepreneurial micro-ecosystem (Czaja, Kafel, 2019). According to HEInnovate questionnaire (a tool for assessing the entrepreneurship of higher education units), universities should integrate, optimise and transform digital technologies to support innovation and entrepreneurship. The inspiring actions for development of digital competences at the university and also other public organisations are described in Table 2.

Table 2

Managing digital transformation towards building an innovative and entrepreneurial organization

Digital Transformation Actions	Examples of activities leading to the development of digital competences
Foster a digital culture and implements and monitors a digital strategy.	• Build commitment and vision from the leadership for a digital culture that fosters the digital transformation on the basis of shared values, and enables active participation of staff, customers, and the wider stakeholder community.

	• Develop a strategy that sets out the goals of how the organization will seek to innovate and improve through digital transformation.
	• Have an action plan based on sufficient resources and support to implement the various aspects of that strategy.
	• Monitor and assess the implementation of the strategy on the basis of a clear set of objectives and performance metrics.
	• Communicate broadly the benefits and added value of the digital transformation across all activities of organization.
Invests in, manage and continuously improve a fit-for-purpose digital infrastructure.	• Plan, manage and improve the digital infrastructure in consultation with, and informed by the needs of all users, including staff, customers, and its wider stakeholder community.
	• Ensure that there is an operational plan with clear objectives and performance metrics in place for the management, integration, optimisation and adaptation of organization's digital systems and services.
	• Ensure interoperability with other national systems and relevant EU initiatives.
	• Ensure that appropriate legal and ethical standards - specifically related to digital aspects - are in place and widely understood. These should also cover data security and privacy, as well as intellectual property rights.
Actively support the use of digital technologies to enhance quality and equity of all processes in organization.	• Provide coaching and regular training, including peer learning, for all staff on the use of digital technologies.
	• Make digital technologies a viable, resourced and supported part of the learning design process to ensure quality and equity in all processes in organization.
	• Embed digital competences and skills in the curriculum and its intended learning outcomes across all trainings.
	• Support innovation and entrepreneurship through a wide range of training approaches that are implemented at scale, including those based on the use of digital technologies.
	• Monitor, evaluate and improve the use of digital technologies for all trainings, and ensure that good practices are shared throughout the organization and beyond.
Actively use digital capacity to promote sustainable and inclusive innovation and entrepreneurship.	• Provide digital leadership as well as advanced and tailored digital services to foster seamless and integrated knowledge and information exchange, both with internal and external stakeholders.
	• Invest in and incentivise human resources to foster innova-

	tion and entrepreneurship through digital communication, collaboration and networking across the organization and with its ecosystem.
	• Take actions to ensure the continued usefulness and relevance of the organization's digital presence for the society and citizens in its regional, national and international outreach.
Actively use open educational resources, open science and open data practices to improve the performance of the organization and increase its impact on its ecosystem.	• Develop and implement a comprehensive open education, open science and open data strategy and action plan, supported by a range of assessment and reward mechanisms.
	• Promote the principles and practice of open education, open science and open data across the HEI and its partnerships.
	• Provide training and support at all education and career levels to create an open and FAIR (Findable, Accessible, Interoperable and Reusable) data and research culture.
	• Implement the principle 'as open as possible, as closed as necessary' to protect the privacy, confidentiality, safety and well-being of staff and customers, and to promote their innovative and creative efforts.

Source: own study on the base: HEInnovate, 2021.

The above indicates that digitalization requires a wide range of competences of employees. The digital transformation of an organization needs analysis on how to leverage people in this new technological environment (Daugherty, Wilson, 2018). In this context, the reskilling of employees will be a major challenge in the next years (Goldman, 2017). Digitalization affects the way of working as well as the HRM process and its elements (namely, hiring, selecting, developing, assessing, and rewarding). These digital challenges are reflected in the concept of HRM 4.0. In particular, digitalization influences teamwork and communication, along with leadership. As a consequence, new models of selection, recruitment, as well as employee performance are needed (Liboni et al., 2019). An analysis of selected HRM processes associated with digitalization in public institutions is the aim of this chapter.

Methodology

Sample and data collection

The specific characteristic of public organizations results in specific competence requirements within particular types of organizations. In our study, we analyse eight types of public organizations, namely, local government units (LGU; municipality and community level), Labour Office (LO; called sometimes "unemployment office"), National Revenue Administration, Social Insurance Institution (SII), So-

cial Welfare Centers (SWC), Sanitary-Epidemiological Stations (SES), Police (P), and Municipal Police (MP). Our sample consists of 142 public organizations operating in Lesser Poland. In total, 21270 people are employed in organizations in our sample. The characteristic of the sample is presented in Table 3.

Table 3

Sample characteristics

Sub-sample	number of units	numbers of units at province and district level	numbers of units at community level	number of employees	average number of employees
Local government units (LGU)	54	12	42	7117	131.80
Labour Office (LO)	15	15	0	1277	85.13
National Revenue Administration (NRA)	34	29	5	8205	241.32
Social Insurance Institution (SII)	5	2	3	942	188.40
Social Welfare Centres (SWC)	13	3	10	1280	98.46
Sanitary-Epidemiological Stations (SES)	7	7	0	187	26.71
Police (P)	8	8	0	2162	270.25
Municipal Police (MP)	5	1	4	100	20.00
The entire sample	**141**	**77**	**64**	**21270**	**150.85**

Source: own study

Variables

The aim of this chapter is to identify the relationships between managerial practices related to the digital competences of employees and the efficiency of human resource management (HRM) in public organizations. Thus, we have proposed eight items that refer to employees' digital competences. Two items pertain to the intensity of using digital solutions that requires relevant competences (V1. All employees of the office use digital solutions in information and communication processes; and V2. Employees can perform many tasks in remote work mode). Four items apply to an organization's (employer's) approach to employees' digital competences (V3. The system for recruiting and retaining employees with a high level of digital competences ["digital talents"] has been implemented; V4. Digital competences are an

important criterion for employee evaluation; V5. Employees' digital competences are systematically developed; V6. Employees have unlimited access to IT support). Finally, two items reflect employees' attitude towards digitalization (V7. The employees are positive about the digitization of processes; V8. Employees are open to changes and often initiate innovative solutions). Respondents were asked to access in 7-degree Likert's scale to what degree do they agree with each statement.

Additionally, we proposed two variables reflecting organizations' performance in the area of human resource management, namely, employees' engagement and satisfaction (EES) and the efficiency of human resource management (EHRM). The respondents were asked to what degree (assessed in 7-degree Likert's scale) digitalization resulted in an increase in EES and EHRM.

Results and discussion

At the first stage of the examination, we have measured the correlation between our competences-related variables and performance variables in the entire sample (for all types of examined public organizations). Table 4 presents values of correlation coefficients.

Table 4

Correlations coefficients

Variables	av-arage	st. dev.	correlation coeff.	
			EES	EHRM
V1. All employees of the office use digital solutions in information and communication processes.	**4.52**	1.70	0.33	0.30
V2. Employees can perform many tasks in remote work mode.	**3.42**	1.79	0.25	0.28
V3. The system for recruiting and retaining employees with a high level of digital competences ("digital talents") has been implemented.	**2.50**	1.51	0.53	0.48
V4. Digital competences are an important criterion for employee evaluation.	**3.91**	1.60	0.50	0.50
V5. Employees' digital competences are systematically developed.	**3.87**	1.55	0.59	0.55
V6. Employees have unlimited access to IT support.	**4.93**	1.72	0.31	0.24
V7. The employees are positive about the digitization of processes.	**4.37**	1.46	0.59	0.51

V8. Employees are open to changes and often initiate innovative solutions.	**3.70**	1.52	0.57	0.50

All correlations are significant at p < 0.005 level

st. dev – standard deviation.

EES – employees' engagement and satisfaction

EHRM – efficiency of human resource management

Source: own study

The values of correlation coefficients indicate that all surveyed dimensions of digital competences are significantly correlated with the results of digitalization that refers to human resources in public organizations. In the case of three dimensions that reflect the organization's (employer's) attitude towards digital competences value of the coefficient of correlation is above 0,5. These items refer to the role of digital competences in the process of recruiting and retaining employees (with a high level of digital competences; V3), an employee's evaluation (V4), and the development of employee's digital competences (V5). This suggests that employers' efforts in the area of digital competences of employees are associated with employees' engagement and satisfaction (EES) and the efficiency of human resource management (EHRM). This is an important managerial implication.

Based on the results of the first stage of analysis, the question arises about the level and need for improvement of examined variables arises. Table 5 presents the average values in each examined group of public organizations.

Table 5

Average values of variables in examined types of public organizations

Varia-bles	LGU	LO	NRA	SII	SWC	SES	P	MP	Total sam-ple
EES	3.72	4.47	4.00	4.80	3.77	3.43	4.13	3.20	**3.90**
EHRM	4.19	4.60	4.21	5.00	3.69	4.29	3.88	3.20	**4.17**
V1	4.81	4.87	4.09	6.20	3.85	4.57	4.00	4.00	**4.52**
V2	3.74	3.20	3.65	4.60	2.85	4.14	1.38	1.60	**3.42**
V3	2.20	2.53	2.65	4.80	2.92	2.71	2.00	1.80	**2.50**
V4	4.26	4.07	3.44	5.60	3.31	3.71	3.50	3.60	**3.91**
V5	3.91	4.53	3.41	6.00	3.54	4.14	4.00	2.60	**3.87**
V6	5.31	5.33	4.47	5.80	5.15	3.29	4.25	4.60	**4.93**
V7	4.11	5.33	4.44	4.80	3.92	3.86	5.25	3.80	**4.37**
V8	3.61	4.20	3.68	4.80	3.23	3.14	4.63	2.80	**3.70**

V1-V8 Average	4.00	4.26	3.73	5.33	3.60	3.70	3.63	3.10	**3.90**

The results presented in Table 5 unveil the differentiation in terms of our variables among examined types of public organizations. In particular, the highest level of employees' engagement and satisfaction is observed in the SII, Labour Office, Police, and NRA, which are among the biggest public institutions and employers. The SII represents the highest degree in terms of all competence-related variables, as well as performance variables. In local government units and Labour Office these degrees are also higher. However, our results indicate that in some types of public organizations the role of digital competences is significantly lower in the management process. The results indicate that digital competences are taken into account to the lowest degree in the case of recruiting and retaining employees with a high level of digital competences. Thus, developing and managing "digital talents" is a challenge for many public organizations. The results show that employees have access to IT support, however, in Sanitary-Epidemiological Stations access to IT support is much below the average in the entire sample. This suggests a need for improvement in organizations of this type (especially, in the context of challenges sourced in the pandemic).

Conclusions

This study confirms that employees and their competences are important determinants of the digital transformation of the organisation. In particular, this study's results show the correlation between an organization's approach to digital competences and both employees' engagement and satisfaction, and the efficiency of human resource management. Additionally, the results of the survey indicate that different types of public organizations differ in terms of their approach to the digital competences of their employees. This suggests the need of improving the digital competences of employees of public organizations. Moreover, this study indicates the areas that need to be developed in each type of examined public organization.

However, this study has some limitations which need to be considered when applying the study results into practice. These limitations are sourced in the selection of investigated dimensions of digital competences, the sample, and the method. This study focuses only on selected manifestations of digitalization and digital competences. Thus, some other aspects (like particular digital skills) are worth considering to be surveyed in future research. The sample consists of different, however not all types of public organizations. The unveiled differences suggest that the examinations in other types may indicate the degrees different than in our sample. Moreo-

ver, this sample does not meet the statistical requirements of representativeness. The sample comprises public organizations from one country and reflects the development and deficits specific to this country. Due to different levels of digital development within public administration, as well as digital education and digital infrastructure in other countries, this study's findings may be not relevant in other location contexts. Finally, we use the simply statistic method (namely, correlation analysis) which prevents a deep examination of relationships among the variables. These limitations indicate the direction of future studies, namely, examination of other manifestations of digitalization, with more advanced methodology, and within other socio-economic contexts.

This study corresponds with the literature on public administration and e-governance, employee competences, and digitalization. This study contributes to these fields with its findings describing selected problems associated with developing digital competences in Polish public administration. This study offers managerial implications, in particular, indicates the direction of improvement of digital competences in different types of public organizations at their current stage of development.

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