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DEVELOPMENT OF DIGITAL COMPETENCIES IN MANAGEMENT DECISION-MAKING IN PUBLIC ADMINISTRATION

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INTRODUCTION

At the beginning of the third decade of the 21st century, the global world is characterized by an unprecedented level of penetration of digital technologies in all spheres of human activity. This era, rightly called the era of digital transformation, is fundamentally changing social structures, economic business models, and, inevitably, the paradigm of public governance. Information and communication technologies (ICTs) have transformed from an auxiliary tool into a strategic basis for the functioning of modern state institutions, determining their ability to respond effectively to public demands, provide quality services and make informed management decisions[1,2]. In this context, the issue of developing digital competencies of civil servants, especially those directly involved in the processes of formulating and implementing public policy and making management decisions at all levels, is of strategic importance[3,4]. The insufficient level of digital capability of public sector personnel is becoming a critical barrier to modernization and efficiency of public administration due to the synergy of several powerful factors. First, it is the rapid growth of expectations of civil society and business regarding the quality, accessibility, speed and transparency of public services. Meeting these expectations is directly correlated with the level of digitalization of administrative processes and the ability of officials to use digital tools for interaction and service1. Second, there is an urgent need to improve the efficiency and validity of management

[1] Хаустова М. Г. Державна політика в умовах цифровізації суспільства. міжнародний досвід реалізації програм та стратегії цифровізації. Аналітично-порівняльне правознавство / голов. ред.: Ю. М. Бисага; ДВНЗ «УжНУ» Ужгород, 2022. № 2. С. 209–216. URL http://journal-app.uzhnu.edu.ua/ article/view/261881/258267.

[2] Pautz H. Policy making and artificial intelligence in Scotland. *Contemporary Social Science*. 2023. Vol. 18 (5). P. 618–636. DOI: https://doi.org/10.1080/ 21582041. 2023.2293822.

[3] Ващенко С. Теоретичні засади формування цифрових компетентностей державних службовців в Україні. *Публічне управління: концепції, парадигма, розвиток, удосконалення*. 2023. № 3. С. 7–13. DOI: https://doi.org/10.31470/2786-6246-2023-3-7-13.

[4] Копняк К. В., Покиньчереда В. В. Формування цифрової компетентності державних службовців у процесі фахової підготовки. *Державне управління: удосконалення та розвиток*. 2021. № 10. URL: http://www.dy.nayka.com.ua/?op=1&z=2261 (дата звернення: 31.03.2025). DOI: https://doi.org/10.32702/2307-2156-2021.10.31

decisions. The era of Big Data, the proliferation of analytical platforms, and progress in artificial intelligence (AI) are opening up new horizons for evidence-based policy making, but their potential can only be realized if decision makers have the appropriate analytical and interpretive competencies[5,6,7]. Third, global trends in e-government and the latest concepts such as Government as a Platform and Whole-of-Government approach require public managers to have not only technical skills but also a deep understanding of digital ecosystems, interoperability and cybersecurity[8].

For Ukraine, the issue of developing digital competencies in public administration is of particular importance and urgency. This is due not only to global trends, but also to specific national tasks: the implementation of the strategic course towards European integration, which involves the harmonization of standards, including in the field of digital governance; the need to overcome corruption risks and increase the transparency and accountability of public authorities through digitalization of processes; the task of building a modern, customer-oriented service state. These tasks have become even more urgent and complex in the context of full-scale Russian aggression, which requires maximum efficiency, resilience and adaptability of the public administration system, where digital technologies play a critical role in ensuring the continuity of the state's functioning, coordination of efforts and communication. The success of digital transformation in Ukraine, which is already showing significant achievements, in particular through the Diia project[9,10], is impossible without appropriate human resources – training civil servants who are able not only to use digital tools but also to think strategically, manage digital projects, analyze data, understand the ethical and

[5] The Department of Homeland Security Simplified Artificial Intelligence Use Case Inventory. *U.S. Department of Homeland Security*. URL: https://www.dhs.gov/ai/use-case-inventory.

[6] Сиротін В. Д. Сутність та особливості цифровізації у сфері публічного управління. *Проблеми сучасних трансформацій. Серія: право, публічне управління та адміністрування*. 2023. № 8. DOI: https://doi.org/10.54929/2786-5746-2023-8-02-05.

[7] Концепція розвитку цифрових компетентностей: схвалено розпорядженням Кабінету Міністрів України від 03.03.2021 № 167-р. *Офіційний вісник України*. 2021. № 21. Ст. 967. URL: https://zakon.rada. gov.ua/laws/show/167-2021-%D1%80#Text.

[8] Гарькавий І. Б., Федюнін М. Ю. Проблеми розвитку цифрової компетентності державних службовців в контексті повномасштабної війни в Україні. *Право та державне управління*. 2024. № 4. С. 149–153. DOI: https://doi.org/10.32782/pdu.2024.4.20.

[9] Міністерство цифрової трансформації України. Цифрова грамотність державних службовців. Дія.Освіта. URL: https://osvita.diia.gov.ua/courses/civil-servants.

[10] Національне агентство України з питань державної служби. Цифрові компетентності – це must have для кожного публічного службовця, однак за епохою цифровізації не можна втратити головну цінність – людину. 20.02.2024. URL: https://nads.gov.ua/news/tsyfrovi-kompetentnosti-tse-must-have-dlia-kozhnoho-publichnoho-sluzhbovtsia-odnak-za-epokhoiu-tsyfrovizatsii-ne-mozhna-vtratyty-holovnu-tsinnist-liudynu-nataliia-aliushyna.

security aspects of digitalization, and integrate technology into decision-making.

One of the most pressing problems is the existing gap between the rapidly growing objective need for a high level of digital competence for effective management decision-making in the public sector and the actual state of preparedness of a significant number of public servants, especially at the level of strategic decision-making. An additional problem is the insufficient conceptualization and methodological elaboration of approaches to the targeted development of those specific digital skills that are critical for a modern public manager. Existing research and curricula often focus on general digital literacy or certain technical aspects, without paying sufficient attention to the integrative competencies required for comprehensive analysis of situations, modeling of consequences, selection of optimal solutions and effective management of their implementation in the digital environment.

1. The essence and structure of digital competencies in public administration

The concept of digital competence has evolved from a simple understanding of computer literacy to a complex integrative characteristic of a personality that allows him or her to act effectively and responsibly in an increasingly digital world. In the context of public governance, this concept gains even more depth and specificity, reflecting not only the ability to use technology but also to understand its impact on society, governance and democratic processes. The definition proposed by the European Commission within the framework of DigComp serves as a starting point: digital competence is the confident, critical, responsible and creative use of digital technologies for learning, working and participating in public life[9]. In the public sector, this definition is complemented by the requirement to use these technologies to achieve public goals, increase the efficiency of public administration and improve the quality of service delivery to citizens[11,4]. Thus, the digital competence of a civil servant is not just a set of technical skills, but a synergistic combination of knowledge (understanding of technologies, their principles of operation, opportunities and risks), skills (practical application of tools to solve specific problems), abilities (automated, confident performance of actions) and value attitudes (critical thinking, ethical behavior, responsibility, openness to innovation, proactivity in the digital environment)[11].

[11] Разумей Г. Ю., Разумей М. М. Формування цифрових *компетентностей громадян як основа діджиталізації України на шляху до єдиного європейського простору. Публічне управління та митне адміністрування. Спецвипуск*. 2022. С. 104–111. DOI: https://doi.org/10.32782/2310-9653-2022-spec.17.

Structuring digital competencies is an important step for their systematic development and assessment. The most recognized and widely used model is the European Digital Competence Framework for Citizens (DigComp), which identifies five interrelated domains[1]:

– information literacy and data management: this area covers the ability to identify information needs, effectively search for information in digital sources, and critically assess its accuracy, relevance, and bias – a skill that is especially critical in the age of disinformation. For public managers, this also means the ability to work with open data, understand the principles of data governance, organize, store and extract information and data for further analysis and use in the decision-making process;

– communication and collaboration: This area refers to the ability to effectively communicate and collaborate using a variety of digital technologies. This includes the use of email, messengers, collaboration platforms, social media, and video conferencing to communicate with colleagues, subordinates, management, other government agencies, citizens, and businesses. Important aspects are also network etiquette, managing one's digital identity and the reputation of the authority in the online space;

– digital content creation: this competency involves the ability to create new and edit existing digital content in various formats (text, tables, images, audio, video, presentations), integrate and process information. For civil servants, this may include preparing reports, analytical notes, presentations, and information materials for websites or social media. It also includes an understanding of copyright and licensing issues when using and creating content, as well as basic programming or website/application design skills[8];

– security: This area is extremely important in the public sector and covers the knowledge and skills to protect devices, personal data of citizens and proprietary information, and one's own digital identity. This includes understanding the main cyber threats (phishing, malware, social engineering), using strong passwords, two-factor authentication, understanding the principles of encryption, secure use of Wi-Fi networks, and knowledge of and compliance with regulatory requirements for the protection of information and personal data;

– problem solving: this competency focuses on the ability to identify and solve technical problems, select appropriate digital tools to achieve a specific goal, use technology to solve conceptual problems and problem situations, and adapt to new technological solutions and creatively use digital technologies to innovate and improve work processes.

It is important to note that Ukraine, striving for European standards and responding to the urgent needs of digital transformation, has developed and officially approved its own digital competence framework based on DigComp

but adapted to the national context[8,12]. The Ministry of Digital Transformation of Ukraine published the Digital Competence Framework for Ukrainian Citizens (DigCompUA) in 2021, which details 6 areas (the "Fundamentals of Computer Literacy" was added as a separate area) and 30 competencies with 6 levels of proficiency[13]. Almost simultaneously, in cooperation with the National Agency of Ukraine on Civil Service (NAUCS) and expert circles, the Digital Competency Framework for Ukrainian Civil Servants was developed and presented[14]. This framework, intended for all categories of civil servants, specifies requirements based on the specifics of their professional activities, in particular, emphasizing the search for and work with professional information, secure use of e-services, understanding of the principles of information classification, data protection, electronic signatures, and e-government. These adopted frameworks have become the official basis for the development of training programs, competency assessment and the formation of personnel policy in the civil service[15,16].

In addition to these five/six main areas, additional aspects are gaining importance for public governance, especially at the decision-making level:

– digital transformation understanding and leadership: the ability to understand the strategic goals of digital transformation at the national and organizational levels, identify opportunities for process improvement through technology, drive digital initiatives, and manage change in the team;

– ethical and responsible use of technology: awareness of ethical dilemmas related to the use of data and algorithms (e.g., risks of bias in AI algorithms), ensuring fairness, transparency, and accountability in the implementation of digital solutions.

Thus, the digital competence of a public manager is a multifaceted construct that requires not only mastery of tools but also a deep understanding of the digital environment, strategic vision, analytical abilities,

[12] Польовий П. В. Концептуальні засади розвитку цифрових компетентностей кадрів органів публічної влади: дис.... д-ра філософії : 281 / Національний університет цивільного захисту України. Харків, 2023. 265 с.

[13] Рамка цифрової компетентності для громадян України DigCompUA. URL: https://thedigital.gov.ua/storage/uploads/files/news_post/2021/3/mintsifra-oprilyudnyue-ramku-tsifrovoi-kompetentnos ti-dlya-gromadyan/OP%20ЦК.pdf.

[14] Рамка цифрових компетентностей для державних службовців України. URL: https://osvita.diia.gov.ua/uploads/0/2902-2619_ramka_derzsluzbovci_3_ compressed.pdf.

[15] Матвейчук Л.О., Польовий П.В. Цифрова компетентність публічних службовців: теоретична площина. *Вчені записки Таврійського національного університету ім. В.І. Вернадського. Серія: Публічне управління та адміністрування*. 2022. Т. 33 (72), № 2. С. 55–64. DOI: 10.32838/TNU-2663-6468/2022.2/10.

[16] Разумей Г. Ю., Разумей М. М. Формування цифрових компетентностей громадян як основа діджиталізації України на шляху до єдиного європейського простору. *Публічне управління та митне адміністрування. Спецвипуск.* 2022. С. 104–111. DOI: 10.32782/2310-9653-2022-spec.17.

communication skills, and ethical responsibility. It is this comprehensive competence that becomes the basis for making effective and adequate management decisions to meet modern challenges.

2. Specific digital competencies for management decision-making

The decision-making process in the public sector is a complex, multi-stage cycle that requires managers to analyze large amounts of information, evaluate alternatives, predict consequences, coordinate actions, and monitor results. Digital technologies penetrate each of these stages, and relevant competencies are becoming not just desirable, but critical to ensure the quality and effectiveness of decisions[2,7,17]. While general digital literacy is a basic requirement for all civil servants, decision makers need a much higher level of specific digital competencies.

At the stage of identifying the problem and collecting information, advanced skills in searching, aggregating and filtering information from various digital sources are key. This includes the ability to work not only with official state registries and databases, but also to effectively use Open Data resources, scientific databases, media resources, and social networks to identify social problems, citizens' needs, and trends. Equally important is the competence of critical evaluation of information – the ability to determine the reliability, objectivity, relevance and potential bias of sources, especially in the context of information wars and the spread of fakes.

The situation and data analysis stage requires public managers to have developed analytical competencies in the digital environment. This means the ability to work with data analysis tools – from advanced use of spreadsheets to specialized software for statistical analysis, modeling and visualization. A manager must be able not only to process data but also to interpret the results correctly, to identify hidden patterns, correlations, and cause-and-effect relationships. Data visualization using charts, graphs, maps, and infographics is becoming a necessary skill to present complex analytical findings in a clear way for yourself and other stakeholders. With the development of artificial intelligence technologies, the need for basic AI literacy is growing. This does not mean that every manager should become a machine learning expert, but they should understand the basic principles of AI algorithms, their capabilities for big data analysis, forecasting, anomaly detection, and also be aware of their limitations, potential risks of bias, and ethical issues related to their use in the public sphere[16].

[17] Bertot J. C., Estevez E., Janowski T. Universal and contextualized public service design: A data-centric approach for government transformation. *Government Information Quarterly*. 2016. Vol. 33, Issue 3. P. 405–409. DOI: 10.1016/j.giq.2016.08.005.

Digital tools offer powerful opportunities at the stage of developing and evaluating alternative solutions. This includes the use of software to model and simulate various scenarios and assess the potential socio-economic, financial, and other consequences of various management interventions. For example, modeling traffic flows in urban infrastructure planning or forecasting demand for social services. It is also important to be able to use online collaboration and collaboration platforms that allow experts, members of the public, and other stakeholders to discuss and improve draft decisions, regardless of their geographic location. AI agents are already being used as moderators or even participants in such online discussions[5].

Decision Support Systems (DSS) that integrate data, models, and analytical tools to help managers choose the best option can be used at the final decision-making and communication stage[1,6]. Although full automation of decision-making with AI in critical areas is still the exception and involves significant ethical and legal issues, the use of AI as a support tool that provides recommendations based on data analysis is becoming more common. Once a decision has been made, the competence of effective digital communication becomes critical – clear and understandable communication of the essence of the decision, its rationale, and expected results to the executors, the public, and other stakeholders through appropriate digital channels (official websites, social media, newsletters, etc.).

Finally, at the stage of monitoring and evaluation of the implementation of the decision, digital competencies allow for the effective use of monitoring information systems to track key performance indicators (KPIs) in real time, analyze the dynamics of achieving goals, and detect deviations in time. Collecting and analyzing feedback from citizens and executives is also greatly facilitated by digital tools such as online surveys, sentiment analysis on social media using AI, and handling electronic appeals.

International experience demonstrates the growing use of digital tools and AI to support decision-making in the public sector:

– healthcare and social services: governments are using AI to optimize the allocation of healthcare resources by analyzing data on service utilization and forecasting demand. Finland has developed the Itla View tool, an AI-based crowdsourcing platform that collects observations of social workers and analyzes them in combination with other data to better understand the well-being of children and families and make decisions on preventive measures[18]. AI-powered chatbots help citizens obtain information on social benefits, eligibility criteria, and application procedures;

[18] Sanna Ulmanen, Mari Hirvonen, Peter Tattersall at all. Description of Crowdsourcing and AI-Based Tool for Knowledge Management and Systems Change in Public Services *International Journal of Innovation and Technology Management*. 2024, Volume 21, Issue 04. DOI: https://doi.org/10.1142/S0219877024500275.

– urban planning and infrastructure management: cities such as Pittsburgh (USA) use AI to analyze traffic flows at key intersections in real time and optimize traffic lights to reduce congestion and emissions. AI is also being used to analyze data from IoT sensors to monitor and optimize energy consumption in municipal buildings and infrastructure facilities. FEMA (the US Federal Emergency Management Agency) uses AI for geospatial damage assessment after natural disasters[19];

– justice and law enforcement: In the UK, the Ministry of Justice uses algorithms to analyze data and better understand how citizens interact with the justice system. In the United States, the Customs and Border Protection (CBP) uses "AI for Autonomous Situational Awareness" and the Cybersecurity and Infrastructure Security Agency (CISA) uses it for automated exchange of cyber threat indicators[20]. However, the use of AI in this area (e.g., predictive policing) is associated with significant ethical risks and discussions about bias and discrimination;

– policy development and citizen engagement: governments are increasingly using AI to analyze large amounts of data (including social media data) to predict the socioeconomic impact of policy decisions and identify public sentiment. Scotland has developed a platform based on "Explainable AI" to help civil servants understand how AI affects decision-making and make more informed and transparent decisions in cooperation with AI[21];

– economy and trade: The UK Department of Business and Trade uses an algorithmic tool to predict companies with export potential, which helps the government to target support more effectively to stimulate economic growth.

Ukraine also has examples of the use of digital tools and AI elements, albeit at an early stage. The Diia app is a prime example of the digitalization of services. Chatbots are actively used to provide consultations in various government agencies, for example, to help pay for utilities in Kyiv. The State Statistics Service uses AI to automate the collection and processing of statistical data. Data analysis, including that obtained through digital channels of interaction, is gradually becoming part of the decision-making process.

Ukrainian scientists are actively exploring the possibilities of using AI: the works of O. Karpenko and Y. Karpenko are devoted to the study of smart infrastructure, digital business intelligence systems and AI transfer as a tool

[19] Federal Emergency Management Agency – AI Use Cases. URL: https://www.dhs.gov/ai/use-case-inventory/fema.

[20] The Department of Homeland Security Simplified Artificial Intelligence Use Case Inventory. *U.S. Department of Homeland Security*. URL: https://www.dhs.gov/ai/use-case-inventory.

[21] Hartwig Pautz. Policy making and artificial intelligence in Scotland. *Journal of the Academy of Social Sciences*. 2023. Vol. 18. P. 618–636. DOI: https://doi.org/10.1080/21582041.2023.2293822.

for public administration of socio-economic development[22]; S. Kvitka, N. Novychenko and O. Bardakh identified the vectors of AI development in municipal administration[23]; Z. Hbur considers the use of artificial intelligence in the information security of Ukraine[24]; V. Telychko considers the possibilities of using AI and the Internet of Things in the post-war development of Ukraine, taking into account the requirements of European legislation in the field of artificial intelligence[25]; O. Nikoliuk, T. Savchenko, O. Rodina analyze the problems and advantages of artificial intelligence as an effective institution for developing management decisions in public administration[26]. A large-scale and thorough monographic study "Strategy for the Development of Artificial Intelligence in Ukraine" was conducted[27].

The targets demonstrate the enormous potential of developing digital competencies, especially those related to data analysis and the use of AI, to transform the decision-making process, making it more informed, efficient, and adaptive. At the same time, they emphasize the need to develop not only technical, but also analytical, critical, and ethical competencies of public servants.

3. Strategies and tools for the development of digital competencies of public managers in Ukraine

Effective development of digital competencies in civil servants, especially in managerial positions, requires a systematic, multidimensional and long-term approach that goes beyond ad hoc training. It should be a holistic strategy

[22] Карпенко О. В., Карпенко Ю. В. Штучний інтелект як інструмент публічного управління соціально-економічним розвитком: смарт-інфраструктура, цифрові системи бізнес-аналітики та трансферти. *Державне управління: удосконалення та розвиток*. 2021. № 10. URL: http://www.dy.nayka. com.ua/?op=1&z=2257 (дата звернення: 31.03.2025). DOI: 10.32702/2307-2156-2021.10.2.

[23] Квітка С., Новіченко Н., Бардах О. Штучний інтелект у муніципальному управлінні: вектори розвитку. *Аспекти публічного управління*. 2021. № 9(4). С. 85–94. https://doi.org/10.15421/152140.

[24] Гбур З. В. Використання штучного інтелекту в інформаційній безпеці України. *Державне управління: удосконалення та розвиток*. 2022. № 1. URL: http://www.dy.nayka.com.ua/?op=1&z=2601 (дата звернення: 31.03.2025). DOI: 10.32702/2307-2156-2022.1.2.

[25] Теличко В. С. Використання штучного інтелекту та інтернету речей у повоєнному розвитку України. *Проблеми сучасних трансформацій. Серія: право, публічне управління та адміністрування*. 2023. № 9. https://doi.org/10.54929/2786-5746-2023-9-02-12.

[26] Ніколюк О. В., Савченко Т. В., Родіна О. В. Проблеми та переваги штучного інтелекту як ефективного інституту для розбудови управлінських рішень в публічному управлінні. *Вчені записки ТНУ ім. В.І. Вернадського. Серія: Публічне управління та адміністрування*. 2023. Т. 34(73). № 3. С. 124–130. DOI: https://doi.org/10.32782/TNU-2663-6468/2023.3/19.

[27] Стратегія розвитку штучного інтелекту в Україні : монографія / кол. авт. ; за заг. ред. А. І. Шевченка. Київ: ІПШІ, 2023. 305 с. URL: https://jai.in.ua/archive/2023/ai_mono.pdf.

integrated into the overall civil service human resource management policy and aligned with national priorities for digital transformation. In Ukraine, taking into account the adopted Digital Competence Framework and the Concept for the Development of Digital Competences until 2025, such a strategy can be based on several key areas.

First, the development and implementation of differentiated educational and training programs. It is important to move away from standardized "one-size-fits-all" courses and create targeted training modules that take into account the specifics of functional responsibilities and position level. For public managers, programs should focus not so much on basic literacy as on the development of analytical, strategic, and leadership digital competencies. This includes an in-depth study of data analysis methods (including working with specialized software), data visualization, the basics of modeling and forecasting, the principles of operation and ethical use of AI, digital project management, strategic digital communication, cyber hygiene, and risk management in the digital environment. It is important to use modern educational technologies and formats: blended learning, interactive online courses (as on the Diia.Osvita platform), simulations of real-life management situations, case studies of successful and unsuccessful digitalization, project-based learning, where participants develop and pilot digital solutions for real-world problems in their agencies. Involvement of leading Ukrainian and international experts, representatives of technology companies and the academic community in the development and teaching of such programs is critical.

Secondly, the integration of digital competence requirements into the public service HR management system. The adopted Digital Competency Framework for Civil Servants should become a practical tool for human resources services. This means including specific requirements for the level of digital competencies (in accordance with the approved levels A1-C2) in the qualification requirements for various positions, especially managerial ones. It is necessary to develop and implement valid and reliable tools for assessing digital competencies (testing, practical tasks, 360-degree assessment) that would be used during competitive selection, annual evaluation, certification and career planning. The system of motivation (financial and non-financial) should encourage civil servants to improve their digital capabilities.

Thirdly, the formation of a culture of lifelong learning and an organizational environment conducive to innovation. In the context of rapid technological change, knowledge and skills quickly become outdated. Therefore, it is critical to create an atmosphere in government agencies where continuous professional development, including in the digital sphere, is perceived as a norm and a necessity. This involves providing employees with

access to quality educational resources (online platforms, libraries, knowledge bases, such as the Ukrainian Knowledge Management Portal), allocating time for training in their work schedule, and encouraging self-education. The development of internal mechanisms for sharing knowledge and experience plays an important role: creating communities of practice, mentoring programs, and internal seminars and workshops. Managers at all levels should set a personal example in the use of digital tools and support the initiatives of their subordinates to implement innovations.

Fourth, the development of digital leadership. Successful digital transformation requires not only competent executives, but also visionaries and "change agents" in leadership positions. Special programs are needed to develop digital leaders – civil servants who are able to develop digital strategies for their departments, effectively manage the implementation of digital projects, motivate teams, overcome resistance to change, and build effective interaction with the IT sector and other stakeholders.

Fifth, providing the necessary infrastructure, access to data and tools. Training in digital skills will be ineffective if officials do not have adequate technical equipment, access to modern software (including analytical tools, platforms for collaboration) and, most importantly for decision-making, access to high-quality, complete and interoperable data from state registries and other sources. Solving the problems of data fragmentation, ensuring its quality and creating secure mechanisms for data exchange between agencies is a prerequisite for the development of analytical competencies and the implementation of data-driven decision making.

Sixth, active international cooperation and the use of best international practices. Ukraine can significantly accelerate the development of digital competencies by studying and adapting the successful experience of other countries and international organizations (EU, OECD, UN). This applies to both methodologies for developing and assessing competencies and specific curricula, tools, and examples of the use of technologies (including AI) in public administration. Participation in international projects, exchange programs, and networks allows attracting expertise, financial resources, and professional development of Ukrainian specialists. For example, Scotland's experience in creating "explanatory AI" for government officials or New Zealand's approach to implementing digital decision support tools at the "street level" could be useful for Ukraine.

A vivid example of the development of international cooperation opportunities to improve the national system of training, retraining and advanced training of civil servants and local government officials is the international modular program U-train (Online Teaching during and after the war). The program, implemented with the participation of teachers from Ivan Franko National University of Lviv and Dnipro University of Technology in

cooperation with the Department of Computer and System Sciences at Stockholm University (Sweden), NGO “Ukrainian Distance Learning System” and Khazar University (Azerbaijan), included four starting modules (4 ECTS). These modules (“Artificial Intelligence in Higher Education”, “Course Development, Communication and Evaluation”, “Digital Exams and Peer Review”, “Student and Faculty Welfare...”) contribute to improving the teaching of disciplines for the master's programs “Public Management and Administration” and “Digital Governance”. Participation in the project made it possible to prepare proposals for improving the e-course of the discipline “Strategic Management and Change Management in the Public Sphere” using the corporate services of Dnipro Technological University MS Teams and Moodle for online and asynchronous learning. The proposals were submitted in the form of a project application: Design Online Course Improvement Activity (OCIA). The University also started improving the programs of the disciplines “Digital Methods and Models for Optimizing Public Administration Decisions” and “Technologies for Management Decision Making” to expand the use of artificial intelligence and modern digital solutions in management decision making.

Implementation of these strategies requires coordination of efforts between the Ministry of Digital Transformation, the NAUCS, other central executive authorities, regional state administrations, local governments, educational institutions, the public sector, and international partners. Already existing initiatives, such as the Diia.Osvita portal, the Digital Accessibility Competence Center, NAUCS programs, and the adopted competency framework, provide a good basis, but need to be further systematized, scaled up, and focused on the specific needs of public decision makers. The sustainability and effectiveness of these efforts will directly determine the ability of the Ukrainian state to function effectively and develop in the digital age.

CONCLUSIONS

In today's era of comprehensive digitalization, the development of digital competencies of civil servants, especially those who formulate and implement public policy and make management decisions, is turning from a desirable option into a strategic imperative. This is a fundamental prerequisite for the successful modernization of public governance, increasing its efficiency, transparency, accountability, and ability to adequately respond to the dynamic challenges of the modern world and the growing expectations of citizens.

The study has confirmed that digital competence in public administration is a complex, multidimensional construct that integrates knowledge, skills, abilities, and attitudes. It covers a wide range of capacities: from basic digital

literacy and information hygiene to advanced skills in big data analysis, critical evaluation of information, use of artificial intelligence tools, digital communication and collaboration, cybersecurity, as well as strategic vision, digital leadership and ethical responsibility. The Digital Competence Framework for Citizens and the Framework for Civil Servants, developed on the basis of European experience (DigComp) and national specifics, created in Ukraine, provide a solid basis for a systematic approach to the development of these competencies.

It has been established that specific digital competencies play a critical role at all stages of the management decision-making process. They help to increase the validity of decisions by moving to data-driven approaches, speed up analysis and approval processes, improve the quality of forecasting and risk management, ensure a higher level of transparency and stakeholder engagement, and optimize the use of resources. International experience, in particular the growing use of data analysis and artificial intelligence tools in countries such as the United Kingdom, the United States, Finland, Scotland, and others, demonstrates the significant potential of these technologies for transforming public administration, although it also emphasizes the need for their responsible and ethical use.

Despite Ukraine's significant progress in digitalization, the development of relevant competencies among public servants still faces a number of challenges, such as institutional inertia, limited resources, rapidly aging technologies, the need to adapt training programs to the specific needs of managers, and problems with data quality and availability. The conditions of martial law add to these challenges security threats and the need to ensure the resilience of digital infrastructure.

To overcome these challenges and ensure the sustainable development of digital competencies among public managers in Ukraine, a comprehensive, strategic approach is needed. It should include the development and implementation of differentiated educational programs focused on analytical and strategic skills; full integration of the requirements for digital competencies defined by the national Framework into all civil service personnel processes (selection, evaluation, promotion, motivation); active formation of a culture of continuous learning and innovation within public authorities; targeted development of digital leadership; provision of the necessary technological infrastructure and access to quality data; and continuous learning and adaptation of the practical significance of this study lies in the formulation of specific recommendations for government agencies responsible for shaping civil service and digital transformation policy, educational institutions that train and upgrade the skills of civil servants, and international partners supporting reforms in Ukraine.

Further research could be aimed at developing and validating tools for assessing the level of digital competencies that are critical for decision-making; comparative analysis of the effectiveness of different models and methods of teaching digital skills in the public sector; in-depth study of the specifics of digital needs and barriers for managers at different levels of management and in different areas of activity; and development of ethical codes and regulatory mechanisms for responsible implementation of AI in decision-making processes.

In conclusion, it should be emphasized that investing in the development of digital competencies of civil servants is a strategic investment in building a capable, efficient, innovative and sustainable public administration system, capable of ensuring Ukraine's sustainable development and its successful integration into the European digital space, especially in today's challenging environment.

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