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AI IMPLEMENTATION AS THE KEY ELEMENT FOR PUBLIC ADMINISTRATION MODERNIZATION*

Abstract: *In modern society, public administration is divided into central government administration, local government units and public services established to fulfill various public needs of community users. The purpose of public administration is to solve economic, social and political problems in the community, according to the political decisions in the community. Regulation of Artificial Intelligence, popularly called AI Act has been adopted in the European Union, with the main purpose of regulating general aspects of AI technology implementation. The main approach in the regulation of AI implementation is based on types of risk, which can be predicted by using AI technological solutions. Gradation exists among the four categories of risk in AI technology implementation: unacceptable risk, high risk, limited risk and no risk. Unacceptable risk is connected with AI application which can be dangerous or harmful to citizens' safety, their rights or livelihoods. The high-risk category of AI implementation influences education, social infrastructure or safety components of market products. The limited AI category of risk defines interaction between humans and AI technological systems, such as chatbots. The lowest category of risk in AI technology implementation is the minimal or no risk category, with implementation*

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of AI technological solutions with minimal influence on humans or social relations, such as spam filters. The future development of AI technology implementation will be regulated according to the common European standards for AI applications. They will be the legal pattern for implementation and control over AI technology beyond EU borders, and contribute to implementation and development of AI application in various aspects of societal life in the European Union and beyond.

Keywords: *Artificial intelligence, digital services, public administration, regulation, modernization.*

1. INTRODUCTION

The application of AI technology solutions in various aspects of economic and social life represents one of the contemporary key research areas which open many technological, organizational and ethical questions and dilemmas. Smart digitalization of public administration is the first step in the modernization of public services and their transformation on interconnected digital platforms. This transformation assures access to many different digital services at the central, regional and local government level. It also assures vertical and horizontal interconnection between different public services and the possibility of access in daily life. There are two main aspects of smart digitalization: the first is digitalization of various e-democracy services such as e-election, e-discussion, e-plebiscite, etc.; the second includes various administrative public services such as e-taxes, e-health, e-education, one stop shop services, access to digitalized personal data, various local services described by common terms such as smart city, etc. A further step of smart digitalization is implementation of AI technological solutions which have enlarged the possibility of using digital public services in many different ways. Implementation of AI technology applications opens many different possibilities and choices between various solutions in digitalized access to public services.[1] According to the field of use, implementation of e-democracy is focused on development of applications which promote political interaction and improving democratic processes in society. Implementation of these technological solutions can be attractive to young voters who often do not go to the polls. This can stimulate their political engagement and influence political processes development in society. The implementation of technological possibilities can encourage various aspects of political participation in political processes of the community. Development of e-administration services is focused on improving the availability and possibility

[1] Jonas Tallberg – Magnus Lundgren – Johannes Geith: AI Regulation in the European Union: Examining Non-State Actor Preferences." Business and Politics Vol. 26, Issue 2, 2024., pp. 218–39, doi.org/10.1017/bap.2023.36.

of using various public services. In the process of digital transformation in public administration smart digitalization plays an important role which includes implementation of AI applications, as an advanced form of digital services provision. AI technology with its rapid development opens up various questions on the implementation and daily use of smart digital applications. One significant question is how AI implementation can contribute to public administration modernization, according to the main aspects of application which include the level of risks in implementation of AI technological solutions. An important part in AI implementation in the EU is the Regulation of Artificial Intelligence (AI Act), as the main regulatory framework. According to this, implementation in the EU is regulated with the level of risks of AI applications, which begs discussion on development standards of AI technology implementation. This discussion is focused on two connected problems of AI technology usage: distortion of virtual reality in digital space which opens the possibility of manipulation with physical persons and abuse of AI digital applications for various purposes. On the other hand, implementation of AI application can contribute to reduction of social complexity and ensure efficient provision of public services, and effective activity of public institutions. AI implementation poses new issues of public administration modernization in two different directions: modernization of political institutions and modernization of administrative bodies. Social, economic, and technological development make those two dimensions important in developing social complexity. This paper will analyze how elements of AI technology implementation influence public administration modernization, as an important contribution in the reduction of social complexity in modern society.

2. METHODOLOGICAL APPROACH

The main elements of this paper will be focused on SWOT analysis of AI implementation in administrative and political institutions to modernize public administration.[2] The first element is strengthening the implementation of AI technological solutions, which includes the possibility of using various digital public services, their connectivity and interoperability. AI implementation as an important part of smart digitalization contributes to more efficient, effective and potential affordable services. In that sense, it is important that there are the possibility of access to various public services by using digital devices, the possibility of using various services from central, regional or local government level by using unique digital interface, the possibility of combining various public services which are

[2] Richard W. Puyt – Finn Birger Lie – Celeste P. M. Wilderom: The origins of SWOT analysis, Long Range Planning, Vol. 56, Issue 3, 2023., pp. 1. – 12.

available on the same platform, and the opportunity to improve the quality of public services by using possibilities of artificial intelligence.[3] Opportunities in the implementation of AI services are the possibility of better accessibility of public services, and the possibility of quality evaluation of public services and support to the social community by the implementation of AI applications.[4] Accessing AI implementation opens the way to various forms of abuse in AI technology implementation, such as manipulating data, distortion of social reality and endangering fundamental human rights. The first element of SWOT analysis is connected with the process of digital transformation public services, which includes development of smart digitalization in various aspects of local and central government services. Public service provision became interactive and interconnected by using common interface, and various services are usually available in the way that enables their accessibility to a large number of users, and at the same time ensures transparency of service provider activities. The second element raises many questions of AI implementation, according to EU regulatory standards, defined by the level of risks. Standards of implementation of AI technological solutions in the community are determined by risk levels which define the approach to use in various parts of community life. Implementation of AI solutions are usually connected to application in the private and public sector. AI technology implementation in the public sector leads to common standards of security risks, according to the specific elements of implementation in central government administration, local government units and public services at central and local government level. Opposite to weakness of AI technology solutions are opportunities of AI applicative solutions, which can be implemented in various aspects of community life, such as public transport, health services, education, regulation of public transport, communication in the community, etc. Threats can be detected according to the level of security risks in the implementation of AI technological solutions. Risk levels have defined potential threats and their impact on social and economic relations in the community and proposed possible solutions for regulations of AI security risk. The intensity of the potential AI risk is proportional to the level of the AI implementation risk, defined within EU regulatory framework. The relation between intensity of the AI risk and defined level of AI implementation risk is important for determining possible threats in the application of AI technological solutions.

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[3] Maria Palazzo: The SWOT Analysis: An Evolving Decision-Making Model, in Maria Palazzo – Alessandra Micozzi: Rethinking Decision-Making Strategies and Tools: Emerging Research and Opportunities, Emerald Publishing Limited, 2024., pp. 53. – 70.

[4] Juan Piñeiro-Chousa – M. Ángeles López Cabarcos – Noelia Romero-Castro – Isaac González-López: Artificial Intelligence and Sustainability, in María Teresa Del Val Núñez – Alba Yela Aránega – Domingo Ribeiro-Soriano: Artificial Intelligence and Business Transformation. Impact in HR Management, Innovation and Technology Challenges, Springer, 2024., pp. 61. – 81.

Elements of SWOT analysis will be described in the context of the regulatory framework of the EU, which is important for regulation, implementation and development of AI technological solutions, not only in the EU, but also further, because of the influence of European regulatory practice on development of regulatory framework in other legal and administrative systems.

3. AI IMPLEMENTATION AND PUBLIC SECTOR MODERNIZATION

3.1. General overview of AI public sector implementation

Regulation of AI technological solutions is generally established on a risk-based approach, where regulation of AI implementation and use of AI technology depend on the risks of AI, which can cause misuse in many aspects of economic and social relations in society.[5] On the other hand, the benefits of using AI are increasing and have many implications in public and private sector application. The possibility of using AI in the public sector are innumerous, especially in public transport, traffic, healthcare system, education, science and communication with citizens.[6] Implementation of AI technology is an important element in developing a smart government model, which is an additional step in the modernization and digitalization of public administration institutions.[7] Smart government, as an advanced digital platform for vertical and horizontal integration of public services, can be divided into central and local smart government services. This includes common access to central and local government services, and a better approach to various public services such as health services, educative services, cultural services, communal services and traffic. Implementation of AI usually means development of smart digital services which can perform tasks and activities without human intervention.[8] These applications are usually based on a machine learning method technology, but not necessarily. They can include many other technologies to assure performance of the tasks which usually need human intelligence. In general, AI applications can increase the efficiency of public services and support of government decision making process by simulating various policy

[5] Vincent. C. Müller: Risks of general artificial intelligence, Journal of Experimental & Theoretical Artificial Intelligence, Vol. 26, Issue 3, 2014., pp. 297. – 301.

[6] Olivia J. Erdélyi, Judy Goldsmith, Regulating artificial intelligence: Proposal for a global solution, Government Information Quarterly,Volume 39, Issue 4, 2022, pp. 1. – 16., doi.org/10.1016/j.giq.2022.101748.

[7] Giusella Finocchiaro: The regulation of artificial intelligence, AI & Society, Vol. 39, 2023., pp. 1961. – 1968.

[8] Oskar J. Gstrein – Noman Haleem – Andrej Zwitter: General-purpose AI regulation and the European Union AI Act, Vol. 13, Issue 3, Internet Policy Review, pp. 1.- 26.

options and their solutions.[9] In that sense, implementation of AI technology can be divided into governmental services and public administration services application.[10] Governmental services include using AI technology in the election process, political decision making and communication between citizens and political institutions, where AI application replaces human intervention in managing various tasks or simulates various policy solutions in the decision making process.[11] AI technologies assure better provision of information for citizens, personalizing public services and providing better understanding for citizens' needs and expectations from public institutions.[12] Public administration services include better quality of the tasks and their improvement to citizens.[13] Public services can be provided from central and local government administration, public institutions and public or private enterprises. According to this approach, managing public tasks can be divided into vertical and horizontal provision. Vertical provision includes delivery of public tasks from central and local government administration. Horizontal provision includes delivery of public tasks from public bodies, public institutions and public or private enterprises. Implementation of AI technology in improving administrative service quality enables an integrative availability approach of central and local public services, quality evaluation of the provided services and the possibility of prediction services demand in the future[14].

3.2. AI implementation in the public sector according to the level of risks

Implementation of AI technology in governmental services raises some potential risks and threats, which need to be considered in daily application[15]. According

[9] Christopher Wilson: Public engagement and AI: A values analysis of national strategies, Government Information Quarterly, Vol. 39, 2022., pp. 1. – 10., doi.org/10.1016/j.giq.2021.101652.

[10] Ines Mergel – Helen Dickinson, – Jari Stenvall – Mila Gasco: Implementing AI in the public sector, Public Management Review, 2023., pp. 1. -14., doi.org/10.1080/14719037.2023.2231950

[11] Rony Medaglia – Ramon Gil-Garcia J. – Theresa A. Pardo: Artificial Intelligence in Government: Taking Stock and Moving Forward, Social Science Computer Review, Vol 41, Issue 1, 2021., pp. 123. – 140., doi.org/10.1177/08944393211034087.

[12] Rohit Madan – Mona Ashok: AI adoption and diffusion in public administration: A systematic literature review and future research agenda, Government Information Quaterly, Vol. 40, Issue 1, 2023., pp. 1. – 18., doi.org/10.1016/j.giq.2022.101774.

[13] Khalifa Alhosani – Saadat M. Alhashmi: Opportunities, challenges, and benefits of AI innovation in government services: a review, Discover Artificial Intelligence, Vol 4, issue 18, pp. 1. – 19., doi.org/10.1007/s44163-024-00111-w.

[14] Abhinandan Kulal – Habeeb Ur Rahiman – Harinakshi Suvarna – N. Abhishek – Sahana Dinesh: Enhancing public service delivery efficiency: Exploring the impact of AI, Journal of Open Innovation: Technology, Market, and Complexity, Vol 10, Issue 3, 2024., pp. 1. – 16., doi.org/10.1016/j.joitmc.2024.100329.

[15] Jose Vida Fernandez: Artificial Intelligence in Government: Risks and Challenges of Algorithmic Governance in the Administrative State, Indiana Journal of Global Legal Studies, Vol 30, Issue 1, 2023., pp. 65. – 96., doi:10.2979/gls.2023.a886163.

to the EU approach to regulation of AI implementation, there can be specified various levels of risk, which depend on the possibility of abuse. This approach is developed in the European regulatory framework to describe implications in implementations of AI technologies. The significant possibility of AI technology abuse is in correlation with the level of risk. The greater possibility of AI abuse leads to the higher level of risk. Smart digitalization and AI implementation in every aspect of social life in the community need to be harmonized with the rated level of risk. This means that the risk of implementation must be acceptable and aligned with the possible benefits of AI application use.[16] It is clear that AI applications must be controllable by serious checking mechanisms. Those mechanisms are closely correlated with the complexity of AI applications and their implementation according to the level of risk.

Digitalization of public services is a continuous process of public administration modernization, and smart digitalization is an additional step in the further improvement of efficiency and effectiveness of public institutions. The process of smart digitalization of public administration has been present and current over the last 10 years and has many implications in the direction of improving public services and their delivery to citizens. According to the expectations and needs of citizens, smart digitalization introduces new standards in developing digital public services. Smart digitalization enables and assures measurement of public services quality, enables monitoring of their provision in real time and helps in improving tasks provided by public entities. Quality improvement of public services can be visible in e-democracy services as well in e-administration services. Focus in the delivery of digital governmental services is on improving classic political tools such as e-referendum, e-plebiscite, e-discussion, e-elections, etc.

Implementation of AI technological solutions opens up new possibilities in public administration modernization and contributes to new forms of interaction between citizens and governmental bodies, without human interference. That raises more questions on potential risks and threats of AI application, and one of these questions is the security of the daily use of applications with AI background.[17] Intensity of the AI risk implementation is growing with the complexity of AI technological solutions and the possibility of manipulation with the services and the tasks generated by AI applications.

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[16] Anja Folberth – Jutta Jahnel – Jacha Bareis – Carsten Orwat – Christian Wadephul: Tackling problems, harvesting benefits – A systematic review of the regulatory debate around AI, Karlsruher Institut für Technologie (KIT), Karlsruhe, 2022., pp. 2. – 3.

[17] Bernd W.Wirtz – Jan C. Weyerer – Benjamin J. Sturm: "The Dark Sides of Artificial Intelligence: An Integrated AI Governance Framework for Public Administration." International Journal of Public Administration, Vol 43, No 9, 2020., pp. 818–829, doi:10.1080/01900692.2020.1749851.

The Artificial Intelligence Act[18] generally determines levels of risk by implementation of AI technology solutions to describe potential risks and threats of abusing AI technology. Level of risks are security standards in the daily use of AI applications, and describe prerequisites which must respect implemented technology based on AI solutions. They stand as the main principles of AI application for general purposes of implementation.[19] The standards are generally specified and can be applicable both in the private and public sector. They are important as general legal standards in AI technology implementation. According to those specified levels of risk, there are special obligations of the AI providers to assure legal security procedures in overcoming potential threats and possible advantages. The level of risks, based on the risk based approach by the Artificial Intelligence Act are: unacceptable risk, high risk, limited risk and no risk categories. The Artificial Intelligence Act specifies those levels of risks as: prohibited AI practices, high-risk AI systems and non-high-risk AI systems. Special attention has been dedicated to differentiation between prohibited AI practices and differentiation between high-risk and no-high risk systems, with the risk management system, defined as "continuous interactive process planned and run throughout the entire lifecycle of a high-risk AI system, requiring regular systematic review and updating"[20]. The Artificial Intelligence Act includes implementation of ethical principles important for measuring the intensity of AI risk implementation. Principles are: human behavior and oversight, which means active human shuffle and control over AI delivery services; technical robustness and safety, which is closely connected with human characteristics in the AI implementation process; privacy and data governance, with the regulatory framework such as the GDPR Act, or other treaties which regulate privacy protection; diversity, non-discrimination and fairness in accessing or using AI services, which means the possibility of citizens to use various smart digital services, established in AI technology. The last principle in AI technology implementation is societal and environmental well-being and accountability.[21] According to this principle, implementation of AI technology must be social and environmentally acceptable and ensure the use of smart technologies for improving

[18] Regulation EU 2024/1689 of the European Parliament and of the Council of 13. June 2024. laying down harmonized rules on artificial intelligence and amending Regulations (EC) No 300/2008, (EU) No 167/2013, (EU) No 168/2013, (EU) 2018/858, (EU) 2018/1139 and (EU) 2019/2144 and Directives 2014/90/EU, (EU) 2016/797 and (EU) 2020/1828 (Artificial Intelligence Act, 2024, OJ L, 12.07.2024), pp. 1. – 144.

[19] Oliver Neumann – Katharina Guirguis – Reto Steiner: Exploring artificial intelligence adoption in public organizations: a comparative case study, Public Management Review, Vol 26, Issue 1, 2024., pp. 114. – 141., doi.org/10.1080/14719037.2022.2048685.

[20] Article 9 AI Act.

[21] Nathalie A. Smuha: From a 'Race to AI' to a 'Race to AI Regulation': Regulatory Competition for Artificial Intelligence., Law, Innovation and Technology, Vol 13, Issue 1, 2021., pp. 57–84., doi: 10.1080/17579961.2021.1898300.

social, institutional and economic development of society in both directions: private and public.[22] Smart technologies upgraded with AI technology solutions are a further step in the development of e-government. Establishing an AI regulatory framework directs development of smart technologies and assures implementation of digital technologies in two different directions: digital public services and digital governmental services. Digital public services are focused on providing various digitalized administrative services from central and local government authorities. Local government services are connected on a common digital platform – smart city. This platform regulates various services such as traffic intensity, coordination of public transport services, access to health services, managing and coordination of local communal services etc. Digital governmental services are focused on various elements of citizen's participation from national or local political institutions. They are divided into e-election, e-plebiscite, e-discussion, and other forms of citizen participation in digital space. AI technology needs to assure support to the citizens and improve their participation in the political process. Another aspect of AI smart digitalization is protection from manipulative political behavior by using digital technologies and implementation of AI applications which can limit abuse of digital technologies for manipulation or other forms of unacceptable social or political influence. According to defined ethical standards, prohibited AI practices are the type of digital technology where AI application can be used for manipulative purposes for the distortion of social, political, or economic reality. High risk AI systems can cause serious disorders by distorting facts in the virtual space. Non-high risk AI systems can be divided into two main categories: limited risk category and non-risks category, according to the low intensity risk. These two categories are supported by implementation of AI applications limited to perform relatively simple tasks and managing obligations, according to the social and economic relations in society.

The AI Act defines the role of the high-risk AI systems in society. They need to be developed in a way that natural persons can oversee their functioning and they must ensure their use according to their predicted purpose, which is in accordance with the AI system's lifecycle. Adequate human oversight measures should be identified by the provider of the system before daily use. According to this, AI systems need to include a mechanism for guiding and informing a natural person to make decision on measures which would be implemented to avoid negative consequences or risk by unpredictable behavior of the AI system.[23]

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[22] Mona Nabil Demaidi,: Artificial intelligence national strategy in a developing country, AI & Society, 2023., pp. 1. – 13., doi.org/10.1007/s00146-023-01779-x.

[23] Olaf Zawacki-Richter – Victoria I. Marin – Melissa Bond – Franziska Gouverneur: Systematic review of research on artificial intelligence applications in higher education – where are the educators?, International Journal of Educational Technology in Higher Education, Vol 16, Issue 39, 2019., pp. 1. – 27., doi.org/10.1186/s41239-019-0171-0.

3.3. The role of the Board as advisory public institution for standardization of AI implementation

The most important part of regulation is establishing a governance framework that coordinates and supports implementation of AI regulation at national and European level. For implementation and coordination of AI technologies, the AI Office plays an important role, with the main purpose of developing EU expertise and capabilities in the field of AI, and contribution to the implementation of EU law in field of AI. An additional element in the better functioning of the AI Office is a Board which will be established by representatives of Member states.[24] This Board is a scientific panel and advisory forum for scientific community integration in the field of AI implementation, according to the AI regulation with EU law. The Board is responsible for a number of advisory tasks, such as special opinions, recommendations and advice, which also includes enforcement matters, technical specifications and development of existing standards in AI systems implementation. As representatives of Member states in the Board, any persons from public entities with the relevant competences and powers to organize coordination at national level and help in achieving the Board's tasks can be a member. In the Board, two standing groups need to be established for the organization of a platform for cooperation and exchange among market surveillance authorities. The Board can also establish other sub-groups for examining other specific purposes. In implementation and development of AI regulation, the Board cooperates with the relevant EU bodies, expert's groups and networks active in the implementation of EU regulation connected with AI technology and smart digital applications. The role of the Board is important in two directions. The first is development of AI regulatory framework and harmonization of technical, ethical, and legal standards for developing AI according to level of risk general-purpose AI models and systems. The second direction of Board activity is daily implementation of AI applications which influence social, political, and economic relations in the local, national and European context. Additionally, standardization of the AI regulatory framework facilitated by Board activity is important for other, non-EU states because it contributes to developing general applicable standards of AI implementation across the world.

3.4. The role of the AI Office as official public authority in AI technology implementation

AI regulation standards are based on the level of risks, which depends on the possibility of major accidents, disruptions of critical sectors and serious conse-

[24] Esmat Zaidan – Imad Antoine Ibrahim: AI Governance in a Complex and Rapidly Changing Regulatory Landscape: A Global Perspective, Humanities and Social Sciences Communications, Vol. 11, Issue 1121, 2024., pp. 1. – 18., https://doi.org/10.1057/s41599-024-03560-x

quences for public health and safety. The second important institution for AI implementation is the AI Office. The role of the AI Office is to harmonize coordination between various subjects, academic institutions and governmental bodies.[25] The AI office should be able to carry out evaluations of compliance and inform the Board and other market surveillance authorities accordingly. The AI Office involves independent experts to carry out evaluations on its behalf. AI models following the results of monitoring activities, or upon request from market surveillance authorities in line with the conditions set out in this Regulation. To support effective monitoring of the AI Office, it should provide for the possibility that downstream providers lodge complaints about possible infringements of the rules by providers of general-purpose AI models and systems. The AI Office is established by Commission Decision on establishing the European Artificial Intelligence Office[26], as part of administrative organization of the Directorate-General for Communication Networks, Content and Technology. The main tasks of the AI Office are harmonization and implementation of AI regulation. Additional tasks of the AI Office are support for developing AI systems and applications that bring social and economic benefits and contribute to competitiveness and economic growth of the Union; strengthening of actions and politics of AI technology implementation and regulation by the Commission which supports societal and economic growth of the Union.

The AI Office will be also developing tools, methodologies and benchmarks for evaluating capabilities of general-purpose AI models, in particular for very large general purpose AI models with systemic risks according to the AI Act; monitoring the implementation and application of rules on general-purpose AI models and systems, in particular where the model and the system are developed by the same provider; monitoring the emergence of unforeseen risks stemming from general-purpose AI models, including by responding to alerts from the scientific panel; investigating possible infringements of rules on general-purpose AI models and systems, including by collecting complaints and alerts, assisting in the preparation of decisions of the Commission and conducting evaluations pursuant to the forthcoming Regulation; supporting the implementation of rules on prohibited AI practices and high-risk AI systems in coordination with relevant bodies responsible under sectoral legislation, including facilitating information exchange and collaboration between national authorities, collecting notifications and establishing information platforms and databases, in particular when a general-purpose AI model or system is integrated into a high-risk AI system.[27]

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[25] Philipp Hacker – Jessica Morley – Jarle Trondal – Luciano Floridi: A Robust Governance for the AI Act: AI Office, AI Board, Scientific Panel, and National Authorities, European Journal of Risk Regulation, 2024., pp. 1. – 25., doi:10.1017/err.2024.57

[26] Commission Decision of establishing the European Artificial Intelligence Office of 24. January 2024 (C (2024) 390 final.)

[27] See article 3 paragraph 1 of Commission Decision.

In achieving the targets and goals which are defined by the AI Act, the AI Office will contribute by assisting the Commission in the preparation of relevant Commission Decisions. The AI Office will also support the Commission in the preparation of guidance and guidelines in implementation of the AI Act with developing supportive tools, according to the practice of relevant Commission services, and bodies, offices, and agencies of the EU. The next element of the AI Office is technical support, advice and tools for the establishment and management of AI regulatory sandboxes[28] and coordination with authorities of member states for the establishment of sandboxes.[29]

3.5. AI implementation in public administration as an additional step in developing a smart government approach

Implementation of AI applications can be divided into governmental services and public administration services, according to the previous division and similar approaches of systematization AI technology solutions.[30]

Governmental services can be called digital political services because they provide various digital political activities in the community. They are focused on implementation of smart technologies in political services available in virtual space, such as e-discussion, e-counselling, e-vote, e-plebiscite, etc. E-discussion and e-counselling are important in the political decision-making process, impacting on shaping political and ethical standards and principles in society.[31] Development of e-vote can be significant for facilitating the possibility for the participation of younger voters in political activities, and a greater opportunity for their participation in governmental politics creation and future political direction of societal development. Implementation of AI technology in governmental services can improve various aspects of smart digital services, especially their availability and ease of use, but also can bring about the possibility of distortion of virtual reality and other forms of political manipulation. Because of that, approaching the implementation of governmental services it is not so widespread as it might be expected, considering today's development of smart digital technologies.[32] An additional

[28] AI regulatory sandboxes are secure environment to explore generative AI with reducing of many security and other risks, which can be induce by development or using of AI technology solutions.

[29] Article 4 paragraph 2 of Commission Decision.

[30] J. Ignacio Criado – Rodrigo Sandoval-Almazán – J. Ramon Gil-Garcia: Artificial intelligence and public administration: Understanding actors, governance, and policy from micro, meso, and macro perspectives, Public Policy and Administration, 2024., pp. 1. – 12., doi.org/10.1177/09520767241272921.

[31] Z.R.M. Abdullah Kaiser: Smart governance for smart cities and nations, Journal of Economy and Technology Vol 2, 2024., pp. 216. – 234., doi.org/10.1016/j.ject.2024.07.003

[32] Yannick Meneceur: Artificial Intelligence, Public Administration, and the Rule of Law, in Markku Suksi: The Rule of Law and Automated Decision-Making. Exploring Fundamentals of Algorithmic Governance, Springer Cham, 2023., pp. 117. – 145., doi.org/10.1007/978-3-031-30142-1.

reason for difficulties of AI implementation can be found in the resistance of main political actors to implement some digital services such as e-vote or e-referendum, because they are not sure of the implementation consequences.

Smart digital administration has been implemented in various parts of public administration, by using common digital platform to connect various digital services at local, regional and national level.[33] The most important parts of AI implementation in communal services are waste management, water supply, local traffic management, energy services, urban planning and organization of public transport. Local traffic management can be also improved by using AI regulation to optimize traffic intensity in congested traffic areas. Implementation of AI in waste management services ensures optimization of waste management collection and detects areas with various intensity of waste generation, which helps in efficient treatment of waste disposal and reduces impact on environment.[34] AI implementation in water supply management helps in reducing the losses in the water supply network and assures optimization of the water supply infrastructure. Implementation of AI in energy services assures optimization of energy consumption, contributes to energy saving and optimizes costs of energy systems. One of the most important parts of AI implementation is in urban planning, where it can be used in developing analytical tools important for sustainable development and managing with the local community. Other parts of AI implementation in public administration services are connected with healthcare services, education, sustainability development, intercity transport services, public safety, fraud detection and customer services.[35] Public safety and fraud detection can be improved by using specific AI applications, which can disable or prevent malicious or illegal behavior. The implementation of AI tools in communal services is connected with common digital platform for local government services, which creates a smart city services model approach. These services are upgraded by interconnection with a central government digital platform which includes AI improved smart digital services in the field of education, healthcare, sustainability development solutions and intercity traffic. Development of AI solutions is an important part of the smart government approach model in the provision of digital public services and leads to comprehensiveness and universality, which is a key factor in public administration modernization.[36]

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[33] Hans Jochen Scholl – Suha Alawadhi: Creating Smart Governance: The key to radical ICT overhaul at the City of Munich, Information Polity, Vol 21, Issue 1, pp. 21. – 42.

[34] Pedro Miguel Alves Ribeiro Correia – Ricardo Lopes Dinis Pedro – Ireneu de Oliveira Mendes – Alexandre D. C. S. Serra: The Challenges of Artificial Intelligence in Public Administration in the Framework of Smart Cities: Reflections and Legal Issues, Social Sciences, Vol. 13, Issue 2, 2024., pp. 1. – 13., doi.org/10.3390/socsci13020075.

[35] David Geneviève: Artificial Intelligence: Opportunities and Challenges for Public Administration, Canadian Public Administration, Vol. 67, Issue 3, 2024., pp. 388. – 406.

[36] Goran Trajkovski: Bridging the public administration–AI divide: A skills perspective, Public Administration and Development, Vol. 44, Issue 5, 2024., pp. 412. – 426., doi.org/10.1002/pad.2061.

4. DISCUSSION

Public administration modernization reflects adaptation of public institutions according to societal, economic, and political situations in society. Transformation of public administration follows social, political, and economic challenges.[37] Development of society, economic transformation, or socio-political phenomena such as mass migration, technological development, armed conflicts, or climatic changes bring about adjustment of political and administrative institutions. One of the most important factors in public administration modernization is the development of digital technologies, with the development of smart government. An additional step in the development of smart e-government technologies is implementation of AI technological solutions, which allows interactive communication between different parts of administrative and political institutions. The possibility of AI implementation is significant, with risks, abuses and challenges which new technology brings about, with potentially unpredicted consequences. Implementation of AI public administration tools usually leads to similar solutions from the private sector. Development of AI application and their successful implementation in the social and economic life of the community opens up the possibility of development of specific AI applications adopted for public administration. Adoption of public administration services ensures their faster adjustment to social, economic, and political advantages, which makes political and administrative systems much more elastic in solving unpredictable situations and problems. This modernization, with the implementation of smart digital technologies as a new component, leads to the development of new qualitative dimensions of public administration, which can assess and adjust public administration services according to the political, economic, and social context. This possibility of adoption, according to the time frame and the social, or economic circumstances in reality, can be an important feature and advantage in solving complex social problems. This characteristic can be important in situations where the community need reduction of complexity, according to standpoints where contemporary society can be described as complex communicative system, with various parts such as economic, religion, education, science, law, administration, politics etc.[38] According to this stance, smart digitalization with AI can enable connection and interactive integration between different parts of society, with the use of communication as the key element for social integration of various parts of the community. In that sense, different parts of the community react differently, according to their characteristics and specific

[37] Anouar Abdel Malek: Civilizations and Social Theory, State University of New York Press, New York, 1982., pp. 10. – 18.

[38] See Nicholas Luhmann: Einführung in die Systemtheorie, Carl-Auer-Systeme Verlag, Heidelberg, 2004. See also Luhmann, N., Soziale Systeme: Grundriss einer allgemeinen Theorie, Suhrkamp, Frankfurt am Main, 1988.

tools for reacting, which are used as answers for solving problems. A smart social communicative system can connect and integrate all of these specific reacting tools, unify various levels of communication and adapt individual parts of the social system, such as politics, economy, administration, education, etc. Unifying various components of the social communicative system, AI can be the solution for proposing complex unique answers in the social system, which will be harmonized with temporal advantages in society. That allows many advantages in the development of modern administrative institutions, but also raises ethical, political and legal questions of regulation and possible misuse of digital technologies. The important part for harmonization and answering these specific questions in AI implementation will be a smart regulatory framework, which will coordinate the dynamics of developing smart digital technologies in the future.

5. CONCLUSION

Smart digitalization with AI technology implementation raises many questions in the development of digital technologies, especially in public administration modernization. According to complex social problems, political and administrative institutions need to be more responsive in solving problems in various aspects of economic, social and cultural life. There are various questions raised by security crisis, health crisis and socio-economic factors such as ecological transition of society, and there are no unique and predictable answers. Public administration modernization can be one of the possible solutions to complex social, economic, and political challenges in the modern state. But modernization usually depends on socio-economic factors, political circumstances and technological development. Development or change in one or more of the social components in society usually causes the need for public administration modernization. The ability of public administration to adopt social, political and economic changes is especially important for challenge adjustment in contemporary society. In that sense, technological development can be an important part of modernization, which includes the possibility of reduction in social complexity. Implementation of AI technology solutions can play an important part in the possibility of reducing social complexity by efficiently connecting various parts of the social system. In complex relations of modern society, it is necessary to ensure a quick and timely response to various societal situations and challenges: economic, political, security or cultural. Development of smart digital technologies with the application of AI solutions can integrate social resources and open up new possibilities in all social areas. The key element of new technology implementation is social connection and interaction, which allows the reduction of social complexity and more efficiency in the decision-making process. Some of the problems which may appear in the implementation

process are connected with the possibility of abuse, manipulation and distortion in the communication process. Development of EU regulatory framework in the implementation of digital technologies, including AI applications, is an important step in future implementation of security standards, not only in Europe, but also in other countries. The definition and setting of security standards are necessary for safe use of new AI technologies. The most important issue of public administration modernization is the possibility of complexity reduction by using AI applications, which opens up the problem of efficient control over communication processes and the possibility of abuse or distortions of information in communication channels. It is important to maintain clarity in communication processes, without possible distortions which implementation of AI or other types of smart digital technologies can cause. Reduction of social complexity and interaction between various parts of the social system needs to assure transparent control over procedures, measures, and politics of public institutions. On the other hand, smart technologies and digital tools applied in political, economic, social or cultural relations must enable the adjustment of the social system to the dynamics of societal changes in the contemporary community. AI needs to be controllable by the users and adaptable in interactive social processes, according to the implementation public policies and decisions in social relations. Reduction of social complexity is an important element in public administration modernization because it simplifies public policy measures and procedures for their effective implementation in society. AI technology implementation can be an effective tool in harmonizing this goal with the complex challenges brought by rapid technological and social development.

REFERENCES

Abdel Malek, Anouar: Civilizations and Social Theory, State University of New York Press, New York, 1982.

Alhosani, Khalifa – Alhashmi, Saadat M.: Opportunities, challenges, and benefits of AI innovation
in government services: a review, Discover Artificial Intelligence, Vol 4, issue 18, pp. 1. – 19., doi.org/10.1007/s44163-024-00111-w.

Abdullah, Z.R.M. Kaiser : Smart governance for smart cities and nations, Journal of Economy and Technology Vol 2, 2024., pp. 216. – 234., doi.org/10.1016/j.ject.2024.07.003

Commission Decision of establishing the European Artificial Intelligence Office of 24. January 2024 (C (2024) 390 final.)

Correia, Pedro Miguel Alves Ribeiro –Lopes Dinis Pedro, Ricardo – de Oliveira Mendes, Ireneu –Serra, Alexandre D. C. S.: The Challenges of Artificial Intelligence in Public Administration in the Framework of Smart Cities: Reflections and Legal Issues, Social Sciences, Vol. 13, Issue 2, 2024., pp. 1. – 13., doi.org/10.3390/socsci13020075.

Criado, J. Ignacio – Almazán-Sandoval, Rodrigo – Gil-Garcia, J. Ramon: Artificial intelligence and public administration: Understanding actors, governance, and policy from micro, meso, and macro perspectives, Public Policy and Administration, 2024., pp. 1. – 12., doi.org/10.1177/09520767241272921.

Demaidi, Mona Nabil: Artificial intelligence national strategy in a developing country, AI & Society, 2023., pp. 1. – 13., doi.org/10.1007/s00146-023-01779-x.

Erdélyi, Olivia J. – Goldsmith, Judy: Regulating artificial intelligence: Proposal for a global solution, Government Information Quarterly,Volume 39, Issue 4, 2022, pp. 1. – 16., doi.org/10.1016/j.giq.2022.101748.

Fernandez, Jose Vida: Artificial Intelligence in Government: Risks and Challenges of Algorithmic Governance in the Administrative State, Indiana Journal of Global Legal Studies, Vol 30, Issue 1, 2023., pp. 65. – 96., doi:10.2979/gls.2023.a886163.

Finocchiaro, Giusella: The regulation of artificial intelligence, AI & Society, Vol. 39, 2023., pp. 1961. – 1968.

Folberth, Anja –Jahnel, Jutta –Bareis, Jacha –Orwat, Carsten –Wadephul, Christian: Tackling problems, harvesting benefits – A systematic review of the regulatory debate around AI, Karlsruher Institut für Technologie (KIT), Karlsruhe, 2022., pp. 2. – 3.

Geneviève, David: Artificial Intelligence: Opportunities and Challenges for Public Administration, Canadian Public Administration, Vol. 67, Issue 3, 2024., pp. 388. – 406.

Gstrein, Oskar J. –Haleem, Noman –Zwitter, Andrej: General-purpose AI regulation and the European Union AI Act, Vol. 13, Issue 3, Internet Policy Review, pp. 1.- 26.

Hacker, Philipp –Morley, Jessica –Trondal, Jarle –Floridi, Luciano: A Robust Governance for the AI Act: AI Office, AI Board, Scientific Panel, and National Authorities, European Journal of Risk Regulation, 2024., pp. 1. – 25., doi:10.1017/err.2024.57

Kulal, Abhinandan –Ur Rahiman, Habeeb –Suvarna, Harinakshi –Abhishek, N. – Dinesh, Sahana: Enhancing public service delivery efficiency: Exploring the impact of AI, Journal of Open Innovation: Technology, Market, and Complexity, Vol 10, Issue 3, 2024., pp. 1. – 16., doi.org/10.1016/j.joitmc.2024.100329.

Luhmann. Nicholas: Einführung in die Systemtheorie, Carl-Auer-Systeme Verlag, Heidelberg, 2004. See also Luhmann, N.,Soziale Systeme: Grundriss einer allgemeinen Theorie, Suhrkamp, Frankfurt am Main, 1988.

Madan, Rohit – Ashok, Mona: AI adoption and diffusion in public administration: A systematic literature review and future research agenda, Government Information Quaterly, Vol. 40, Issue 1, 2023., pp. 1. – 18., doi.org/10.1016/j.giq.2022.101774.

Malek, Anouar Abdel: Civilizations and Social Theory, State University of New York Press, New York, 1982., pp. 10. – 18.

Medaglia, Rony – Gil-Garcia J., Ramon – Pardo, Theresa A.: Artificial Intelligence in Government: Taking Stock and Moving Forward, Social Science Computer Review, Vol 41, Issue 1, 2021., pp. 123. – 140., doi.org/10.1177/08944393211034087.

Meneceur, Yannick: Artificial Intelligence, Public Administration, and the Rule of Law, in Suksi, Markku: The Rule of Law and Automated Decision-Making. Exploring Fundamentals of Algorithmic Governance, Springer Cham, 2023., pp. 117. – 145., doi.org/10.1007/978-3-031-30142-1.

Mergel, Ines – Dickinson, Helen – Stenvall, Jari – Gasco, Mila: Implementing AI in the public sector, Public Management Review, 2023., pp. 1. -14., doi.org/10.1080/14719037.2023.2231950

Müller, Vincent. C.: Risks of general artificial intelligence, Journal of Experimental & Theoretical Artificial Intelligence, Vol. 26, Issue 3, 2014., pp. 297. – 301.

Neumann, Oliver – Guirguis, Katharina – Steiner, Reto: Exploring artificial intelligence adoption in public organizations: a comparative case study, Public Management Review, Vol 26, Issue 1, 2024., pp. 114. – 141., doi.org/10.1080/14719037.2022.2048685.

Scholl, Hans Jochen – Alawadhi, Suha: Creating Smart Governance: The key to radical ICT overhaul at the City of Munich, Information Polity, Vol 21, Issue 1, pp. 21. – 42.

Palazzo, Maria: The SWOT Analysis: An Evolving Decision-Making Model, in Maria Palazzo – Alessandra Micozzi: Rethinking Decision-Making Strategies and Tools: Emerging Research and Opportunities, Emerald Publishing Limited, 2024., pp. 53. – 70.

Piñeiro-Chousa, Juan –López Cabarcos, M. Ángeles –Romero-Castro, Noelia – González-López, Isaac: Artificial Intelligence and Sustainability, in María Teresa Del Val Núñez – Alba Yela Aránega – Domingo Ribeiro-Soriano: Artificial Intelligence and Business Transformation. Impact in HR Management, Innovation and Technology Challenges, Springer, 2024., pp. 61. – 81.

Puyt, Richard W. –Lie, Finn Birger –Wilderom, Celeste P. M.: The origins of SWOT analysis, Long Range Planning, Vol. 56, Issue 3, 2023., pp. 1. – 12.

Smuha, Nathalie A.: From a 'Race to AI' to a 'Race to AI Regulation': Regulatory Competition for Artificial Intelligence., Law, Innovation and Technology, Vol 13, Issue 1, 2021., pp. 57–84., doi:10.1080/17579961.2021.1898300.

Tallberg, Jonas – Lundgren, Magnus – Geith, Johannes: AI Regulation in the European Union: Examining Non-State Actor Preferences." Business and Politics Vol. 26, Issue 2, 2024., pp. 218–39, doi.org/10.1017/bap.2023.36.

Trajkovski, Goran: Bridging the public administration–AI divide: A skills perspective, Public Administration and Development, Vol. 44, Issue 5, 2024., pp. 412. – 426., doi.org/10.1002/pad.2061.

Wilson, Christopher: Public engagement and AI: A values analysis of national strategies, Government Information Quarterly, Vol. 39, 2022., pp. 1. – 10., doi.org/10.1016/j.giq.2021.101652.

Wirtz, Bernd W. – Weyerer, Jan C. – Sturm, Benjamin J.: "The Dark Sides of Artificial Intelligence: An Integrated AI Governance Framework for Public Administration." International Journal of Public Administration, Vol 43, No 9, 2020., pp. 818–829, doi:10.1080/01900692.2020.1749851.

Zaidan, Esmat – Ibrahim, Imad Antoine: AI Governance in a Complex and Rapidly Changing Regulatory Landscape: A Global Perspective, Humanities and Social Sciences Communications, Vol. 11, Issue 1121, 2024., pp. 1. – 18., https://doi.org/10.1057/s41599-024-03560-x

Zawacki-Richter, Olaf –Marin, Victoria I. – Bond, Melissa – Gouverneur, Franziska: Systematic review of research on artificial intelligence applications in higher education – where are the educators?, International Journal of Educational Technology in Higher Education, Vol 16, Issue 39, 2019., pp. 1. – 27., doi.org/10.1186/s41239-019-0171-0.

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Примена вештачке интелигенције као кључни елемент модернизације јавне управе

Сажетак: *У модерном друштву, јавна управа се дели на централну (државну) управу, јединице локалне самоуправе и јавне службе основане како би задовољиле различите јавне потребе корисника у заједници. Јавна управа служи томе да реши економске, друштвене и политичке проблеме у заједници, у складу са политичким одлукама у заједници. У Европској унији усвојена је Регулатива о вештачкој интелигенцији, популарно названа Акт о вештачкој интелигенцији, чији је главни циљ регулисање општих аспеката примене технологије вештачке интелигенције. Главни приступ у регулисању примене технологије вештачке интелигенције заснива се на врстама ризика, које могу да се предвиде коришћењем технолошких решења вештачке интелигенције. Постоји градација између четири категорије ризика у примени технологије вештачке интелигенције: неприхватљив ризик, висок ризик, ограничен ризик и непостојање ризика. Неприхватљив ризик повезан је са применом вештачке интелигенције која може бити опасна или штетна по безбедност грађана, њихова права или средства за живот. Категорија високог ризика примене вештачке интелигенције утиче на образовање, друштвену инфраструктуру или безбедносне компоненте тржишних производа. Ограничена категорија ризика примене вештачке интелигенције дефинише интеракцију између људи и технолошких система вештачке интелигенције, као што су четботови. Најнижа категорија ризика у примени технологије вештачке интелигенције је категорија минималног или непостојећег ризика, са применом технолошких решења вештачке интелигенције која минимално утичу на људе или друштвене односе, као што су филтери за спам. Будући развој примене вештачке интелигенције биће регулисан у складу са заједничким*

Европским стандардима за примену вештачке интелигенције. Они ће бити правни образац за примену и контролу над технологијом вештачке интелигенције ван граница Европске уније и допринеће примени и развоју вештачке интелигенције у различитим видовима друштвеног живота у Европској унији и шире.

Кључне речи: *Вештачка интелигенција, дигиталне услуге, јавна управа, регулација, модернизација.*

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