

The Role of Using Artificial Intelligence for Improving the Public Service Provision and Fraud Prevention

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Abstract

The aim of the article was to establish the effectiveness of artificial intelligence (AI) for improving the public service provision. The aim was to determine the choice of law enforcement practice of EU member states and Ukraine for comparative analysis. Statistical methods and comparative law were employed as the basis of the research. The conducted research showed that the proposed EU regulatory framework for the development and use of artificial intelligence is aimed at analysing risks, promoting the use of human-oriented and trustworthy AI. It was established that introducing communication and cooperation procedures using large language models such as ChatGPT can optimise public service provision. The positive impact of the implementation of AI on the efficiency of public services was proved by applying a justified system of indicators. The analysis results gave grounds for proposing an approach to implementing artificial intelligence in public services. The prospects for further research will be the analysis of the implementation of the proposed EU Law on Artificial Intelligence in EU countries, considering the implementation of AI in the provision of public services.

Keywords: consumer protection; state policy in the field of consumer protection; artificial intelligence; innovative technologies; digital divide.

Introduction

Artificial intelligence (AI) is a new set of technologies with great potential. AI-based software obtains important information from large data sets and can recognise patterns that are not detected by humans. Artificial neural networks help

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increase efficiency, public safety and support the use of the Internet of Things. AI software can generate output data for a given set of objectives. These include content, forecasts, recommendations, and decisions that impact the environment with which they interact. AI-based chatbots can continuously learn, process many requests simultaneously, and provide instant answers (Nirala et al., 2022).

AI-based software is gradually being implemented in the public sector, and its use is expanding (Gesck & Leyer, 2022). Public services have great potential for digital development. Using chatbots reduces the burden on employees and increases the citizens' satisfaction. AI enables public and municipal sector employees to allocate more time to strategic and effective activities. These include shaping policy and public engagement.

Potential threats and challenges posed by AI require developing and implementing more effective public administration agencies and appropriate policies (Samsin et al., 2021). Initiatives of countries in AI implementation should be aimed at improving government efficiency, providing better services, and ensuring accountability (Semenets-Orlova et al., 2022).

In view of the foregoing, the aim of the article is to determine the essence, content and effectiveness of artificial intelligence for improving public service procedures.

Research objectives

- 1) determine the current trends in the legislative regulation of AI use during the provision of public services using the example of the EU and Ukraine;
- 2) Consider the current state of AI use during the provision of public services in the EU, using Finland as an example for further implementing positive experiences in Ukraine.
- 3) describe the process of implementing AI in public services and identify the main tools that can be used to improve the process of providing services.

Methods

The step-by-step research procedure was built considering the outlined objectives (Figure 1).

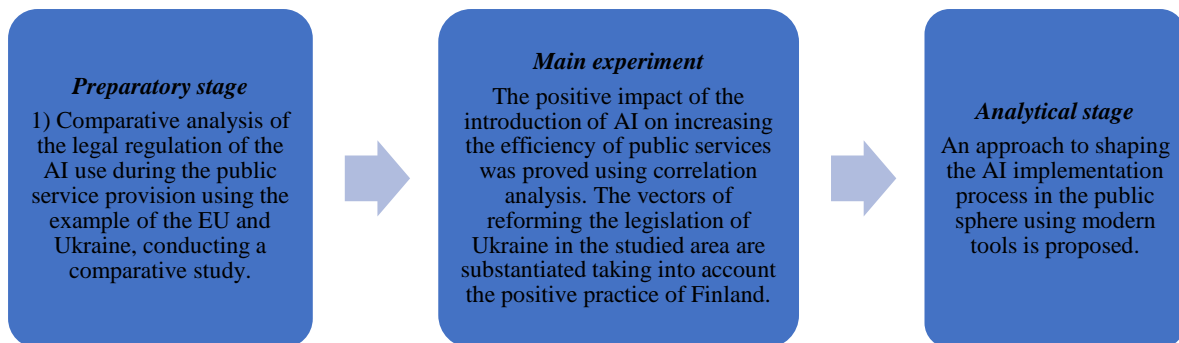


Figure 1. Research design

The statistical method was employed as the primary method in the study. This method was used to identify the current state and prospects for implementing procedures for introducing artificial intelligence into different spheres of social life, including the sphere of public services. It was established through a statistical method that the EU countries decreased their indicators in 2022 compared to 2021 regarding the readiness to introduce AI in the public service provision to citizens.

The comparative law method emphasised the appropriateness of considering the key principles of public administration during the integration of ChatGPT. This method was used to determine the degree and AI Readiness Index of the EU member states in various spheres and vectors of the development of society. The comparative law was also applied to establish that only Finland, France, and the Netherlands got into the top ten EU countries in the 2022 world ranking. The tested method will also be useful when assessing compliance with the risks of innovative processes in public service provision.

The observation method was applied to identify the step-by-step structure of the ecosystem for introducing AI in Finland's public services field. The same method made it possible to establish Ukraine's degree of readiness to introduce AI in public services.

The method of correlation analysis was used to identify the relationship between AI implementation indicators on the one hand and public service efficiency indicators on the other. This proved the positive impact of the introduction of AI on the efficiency of public services because of the improvement of e-governance, the optimisation of the provision of online services, the introduction of new functions, etc.

The indicated methods made it possible to cover the chosen topic of the article and to express the author's position on the issue under research in the context of the debatable positions of other researchers.

Literature review

Nzobonimpa (2023) concludes that the involvement of citizens in developing and implementing AI-based public services is the key to reducing social prejudices. Melnyk et al. (2022) noted that providing better and more inclusive public services is possible through AI management, reliable AI, impact assessment methodology, and data management. Gesk and Leyer (2022) investigated various factors in assessing the acceptability of AI-based software. The importance of distinguishing between specific and general public services in AI development is noted. It is concluded that specific services are still the sphere of human activity.

Hickok (2021) considered using AI in public service provision, and the procedure for identifying ethical decision-making processes was considered. The conclusion is made on the possibility of avoiding negative ethical consequences from the use of AI thanks to the participation of citizens in innovation processes.

Leikas et al. (2022) emphasise that the sustainable development of AI in the public sector requires dialogue and discussion between developers, decision-makers, end users, and the public. Kvitka et al. (2021) determined the main vectors of the implementation of AI in the practice of the municipal administration of Ukraine based on the analysis of foreign experience. The importance of AI-based digital transformation of municipal management was noted to improve the quality of municipal services significantly.

An active study of the issues under research indicates that special attention should be paid to AI use to improve public service provision. The diversity of academic research in this field is also stated. Therefore, research must be carried out according to new research criteria.

Results

Potential areas of the use of AI in public service provision include knowledge management programmes, task automation, publicly available virtual assistants, and advanced data analysis. They can also include high-level cognitive self-learning applications. The development and implementation of the LLM will require the implementation of new tasks and responsibilities, which will entail an increase in the number of specialised employees. By 2025, 85 million jobs will be displaced by AI, which could lead to 97 million new jobs (World Economic Forum, 2020).

The 2021 AI Readiness Index (Oxford Insights, 2021) and 2022 AI Readiness Index (Oxford Insights, 2022) focus on the technology sector, data, infrastructure, and the relevant vision. The state of management, ethics, digital capacity, adaptability, maturity, human capital, infrastructure, accessibility, and data

representativeness are considered. EU countries received initial results in the respective indexes for 2021 and 2022, grouped in Table 1.

So, in 2022, only Finland, France and the Netherlands got into the top ten EU countries. In general, EU countries decreased their indicators in 2022 compared to 2021 regarding the readiness to introduce AI technologies in public service provision.

Table 1. Initial results in the AI Readiness Index for 2021 and 2022 (grouped by the author based on Oxford Insights (2021; 2022))

EU countries	The place in AI Readiness Index by Oxford Insights 2021 out of 172 countries	The place in AI Readiness Index by Oxford Insights 2022 out of 181 countries
Austria	24	16
Belgium	28	21
Bulgaria	42	44
Hungary	43	42
Germany	8	15
Greece	50	50
Denmark	9	11
Ireland	17	18
Spain	25	27
Italy	27	24
Cyprus	44	48
Latvia	37	46
Lithuania	30	38
Luxembourg	16	26
Malta	32	33
Netherlands	5	10
Poland	35	34
Portugal	33	25
Romania	56	58
Slovakia	39	64
Slovenia	31	41
Finland	4	4
France	11	7
Croatia	61	66
Czech Republic	29	30
Sweden	6	13

Estonia	21	19
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The role of AI in the system of public services can be demonstrated by conducting a correlation analysis between indicators of the introduction of AI, on the one hand, and indicators of the effectiveness of providing public services, on the other (Table 2). The indicators of the introduction of AI included: 1) the number of AI functions used in state initiatives of countries; 2) assessment of the country according to the AI Readiness Index. Indicators of the effectiveness of public services include: 1) E-Government Index; 2) E-Participation Index; 3) Online Service Index; 4) Human Capital Index; 5) Telecommunication Infrastructure Index. It is worth noting that the last four indexes are sub-indexes for the E-Government Index.

Table 2. Results of the correlation analysis between AI adoption indicators and public service performance indicators (calculated by the author based on AI Watch (2020), United Nations (2022), Oxford Insights (2023))

	E- Government Index	E- Participation Index	Online Service Index	Human Capital Index	Telecommunication Infrastructure Index
The number of AI functions used in government initiatives of countries	0.496961	0.358030	0.409880	0.347346	0.442403
Assessment of countries according to the AI Readiness Index	0.740134	0.515863	0.576108	0.567124	0.667821

The analysis results indicate a moderately positive relationship between the number of functions introduced by the state in AI initiatives in the field of public services and such indicators of the effectiveness of public services as E-Government Index, Online Service Index and Telecommunication Infrastructure Index. There is a noticeable or high (for the E-Government Index) positive correlation between the AI Readiness Index and all public service performance indicators.

The obtained results indicate that the readiness to implement AI and the number of different AI functions used in government initiatives in public services are related to the effectiveness of public service delivery. At the same time, the growth of the indicators of the introduction of AI entails an increase in efficiency because of the positive direction of the revealed relationship. Increasing efficiency can be expressed in improving the e-government system, enhancing citizen participation in e-government, improving online service, etc.

Given the speed of technological change and possible problems with implementing AI technologies, the EU is directing its efforts to develop a balanced approach. Following EU values, rights, and principles, new technologies must be developed and applied. The promotion of AI implementation and the elimination of relevant risks in the EU countries is reflected in the White Paper on Artificial Intelligence (65 final) (European Commission, 2020). In April 2021, the European Commission proposed an EU regulatory framework (AI Act) for AI (European Commission, 2021). AI systems that can be used in different applications should be analysed and classified depending on the risk to users.

The classification of AI risks was grouped in Table 3.

Table 3. Classification of risks of AI implementation (grouped by the author)

Unacceptable risk	High risk	Limited risk
- cognitive behavioural manipulation of people or specific vulnerable groups; - classification of people based on behaviour, socio-economic status, personal characteristics; - application of biometric identification systems in real time and remotely.	- AI systems used in products subject to EU product safety legislation; - generative AI, such as ChatGPT, must meet transparency requirements; - eight areas of AI that must be registered in the EU database: 1) biometric identification and categorisation of individuals; 2) management and operation of critical infrastructure; 3) education and professional training; 4) employment, personnel management; 5) access and use of basic private services, as well as state services and benefits; 6) law enforcement agencies; 7) migration management; 8) assistance in legal interpretation and application of the law.	AI systems with limited risk must meet minimum transparency requirements that will allow users to make informed decisions about continued use

The supplier responsible for placing the AI system on the market or operating it must ensure the risk compliance assessment procedure is carried out. The supplier needs to draw up the necessary documentation to provide a monitoring system that will be implemented after the sale of the AI system. In this way, the harmonised functioning of the EU internal market will be ensured with the use of AI technologies. This document complies with current EU legislation on services regulated by the Directive on Electronic Commerce 2000/31/EC 15, the Commission's proposed Digital Services Act (DSA). On June 14, 2023, the negotiating position of the Parliament regarding the AI Act was approved.

There are several initiatives in the EU that aim to improve Europe's position in LLM. In 2022, the funding of AI start-ups in the EU amounted to more than \$1.4 billion (Statista, 2023). The Consortium for High Performance Language Technologies aims to develop multilingual learning materials and learning language models that support European languages. Aleph Alpha start-up launches Europe's fastest commercial AI-based data centre. The European High Performance Computing Joint Undertaking (EuroHPC JU) is a joint initiative of the European Commission, EU countries, and private partners to develop the European supercomputer ecosystem. The European Commission is putting a lot of effort into developing the interoperability of advanced language technologies through the Horizon programme. The goal is human-centered development of language models.

The Finnish National AI Programme AuroraAI deserves attention (Ministry of Finance Finland, 2023). It aims at providing citizens with adapted and timely services using sustainable and inclusive AI. AuroraAI strives to become a service network that connects services so that they can support and interact with each other. AuroraAI's tasks also include the implementation of AI innovations based on citizens' key life events. These are family situations, such as enrolling in kindergarten, attending school, starting a family, working, caring for family members, and retiring. The appropriate ecosystems facilitate the creation of service chains that automatically support life events' transitions. The result is giving citizens access to the best personalised services. Individuals can create data themselves (DigiMe) and access it in a convenient digital format from the data controller.

Ukraine ranked 64th in the AI Readiness Index for 2021 (Oxford Insights, 2021), 62nd in this Index in 2022 (Oxford Insights, 2022). The improvement in indicators shows the country's desire to continue AI development despite the difficult situation due to aggression from the Russian Federation. In 2019, Ukraine supported the Recommendations of the Organization for Economic Cooperation and Development on Artificial Intelligence (OECD, 2019). In 2020, the Concept of the Development of Artificial Intelligence was approved in Ukraine (Verkhovna

Rada of Ukraine, 2020). The document defines AI development's purpose, principles, and tasks as an important scientific and technological research direction.

The list (Verkhovna Rada of Ukraine, 2023) and the principles of providing public services (Verkhovna Rada of Ukraine, 2021) are legally defined in Ukraine. To improve the provision of public services, it is necessary to prepare types of administrative services decisions that can be made automatically (Verkhovna Rada of Ukraine, 2020). Special attention should be paid to AI development in healthcare and the implementation of a dialogue interface for electronic AI-based administrative services. The goal is also the AI development for digital identification and verification of individuals, including providing public services. AI can assist in performing analysis, forecasting, and modelling to provide public services. Special attention should be paid to the mechanism of detection of unlawful intervention and dishonest practice of actions of subjects of public service provision. Developing mechanisms for anonymising personal and other data during processing in AI systems is also necessary. The AI must be developed and used in compliance with ethical standards based on the international standardisation subcommittees ISO/IEC JTC 1/SC 42 Artificial Intelligence.

Ukraine provides consumers with state protection of their rights (Verkhovna Rada of Ukraine, 1991). AI assistance in this area can be achieved by implementing projects such as Holos Hromadian (The Voice of Citizens), which is under development in the country. In real time, problematic issues related to improper public service provision, for example, in the housing sector, will be scanned in social networks. The issues will be presented in dashboards with key topics and provided to responsible officials (Dudko, 2023).

The analysis provided grounds for proposing an approach to the introduction of AI in the field of public services. First of all, the process of implementing AI should be based on a clear understanding of the goals of such a process, as well as taking into account the basic principles that ensure the effectiveness and ethical aspects of the process. The principles and goals of AI implementation in public services are summarised in Figure 2.

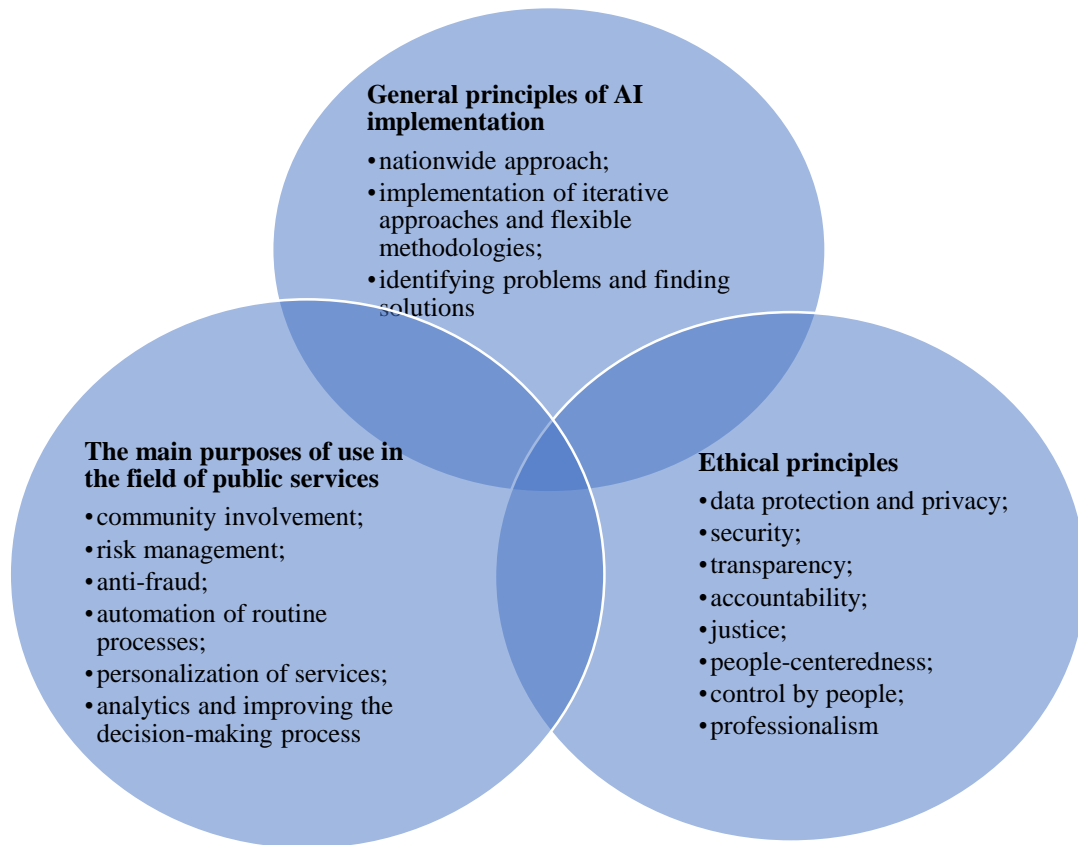


Figure 2. Principles and goals of AI implementation in the field of public services

Adherence to the specified principles will make it possible to unify the process of implementing AI at the state level and increase its safety and efficiency. The set goals enable a clear understanding of what problems AI will solve in the field of public services, as well as what tasks the necessary resources will be directed to. For example, it is worth noting how AI helped achieve the goals in some countries' experiences. For example, in the US, AI was used to engage the community to analyse the citizens' sentiments regarding government policies, for which more than 21 million comments were processed. Risk management using AI in Armenia significantly increased the tax agency's revenue. AI was successfully used to detect fraud at 500 companies in Brazil. Automation has greatly facilitated the processing of pension claims in the United Kingdom, and AI-enabled analytics and decision-making are widely used worldwide, particularly to detect illicit financial flows (World Bank Group, 2021).

However, defining the global goal and specific tasks of implementing AI in public services is not simple. It should be preceded by a detailed analysis of the problem and the impact of AI on its solution. For this purpose, it is proposed that thorough answers to the questions identified in Figure 3 be provided. The lists of proposals for consideration are offered within individual questions.

Primary analysis

- What specific problem should the introduction of AI in the field of public services solve?
- assessment of AI capabilities to solve the problem;
- analysis of advantages and disadvantages of alternative ways of solving it;
- determining the priorities;
- building a system of criteria, etc.
- Has the introduction of AI been analyzed in terms of different spheres of activity?
- collection of expert opinions in the technical, legal, financial, ethical sphere, as well as in the field of service provision.
- What data should be used to train AI?
- availability, completeness, reliability and other data characteristics.
- How is interaction and communication organized between technical and non-technical specialists?
- How will the public be involved?

Choice of tools

- Which AI tools will be the most suitable for solving the tasks?
- the availability of ready-made solutions or the need for development/purchase;
- analysis of the experience of use by other countries;
- system of evaluation criteria for tools;
- technical characteristics;
- ensuring impartiality;
- availability of data for the operation of tools;
- required skills to work with tools;
- availability of workers with the necessary skills;
- the need to hire new employees, etc.

Implementation

- How will the public be informed about the introduction of AI in the field of public services?
- What are the ways to challenge AI solutions?
- Are the uses of AI consistent with previous approaches to public service delivery?
- What are the ways to evaluate the use of AI?
- data quality;
- AI productivity;
- probable failures;
- ways of analysing individual components and the system as a whole.
- How will support, monitoring, correction of problems in the system take place?

Figure 3. Approach to analysing the problem and the influence of AI on its solution
(summarised by the author based on Partnership for Public Service (2023))

Determining the goals and tasks of using AI in the public sphere enables moving on to forming a general approach to its implementation. The main steps of the AI implementation process are presented in Figure 4.

A particularly important stage is the selection of appropriate AI tools that can be the most effective in the field of public service provision. There are many different AI tools designed to perform different AI implementation tasks. For example, it is proposed that frequently used tools for automating routine processes be considered. Table 4 contains different types of AI tools for use by professionals in the field of public services and specific examples of technologies.

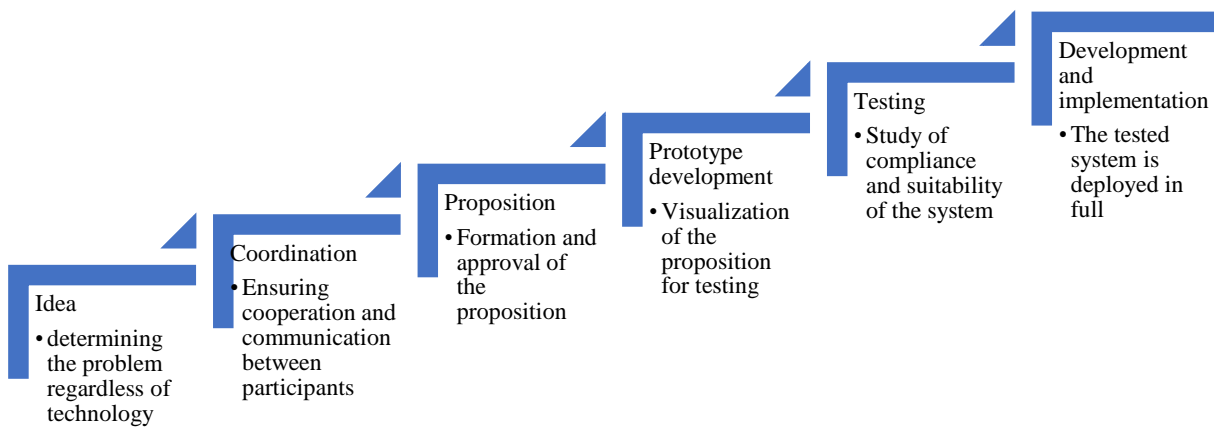


Figure 4. The process of implementing AI in the field of public services (created by the author based on World Bank Group (2021))

Table 4. Types of AI tools and specific technologies for use in the field of public services

Types of tools	Purpose	Examples
Virtual assistants	Simplification of routine tasks of specialists in the field of providing public services	Alexa (Amazon), Siri (Apple), Google Assistant, Microsoft Cortana, Samsung Bixby
Tools for planning	Effective time management	Cabinet, Clockwise
E-mail management tools	Sorting letters, determining priority messages, automatic replies	SaneBox, Boomerang
Transcription	Automatic transcription of video	Otter, Trint

tools	and audio files
Data entry and analysis tools	Entering large amounts of data, Salesforce, Watson minimising errors, automating Analytics processes, writing e-mails, visualising data, etc.

AI tools can be used in various directions – from simplifying routine processes to combating fraud and overcoming risks. The choice of tools depends, first of all, on the security and confidentiality of data, ensuring the impartiality and effectiveness of AI in general.

Discussion

It can be stated that AI solutions in public services are becoming better than solutions provided by humans. However, more and more administrations can develop AI but face difficulties in its implementation (van Noordt & Tangi, 2023). The researchers believe that a decisive role is played by the lack of technical knowledge for maintenance and updating of AI systems and legal problems in the deployment of AI systems. There is also no opportunity to make changes to the organisation of the implementation process to guarantee the system's operability. It is important to distinguish between specific and general public services. Each type requires consideration of different factors when evaluating the acceptability of AI-based software (Gesik & Leyer, 2022). According to the researchers, specific services remain the prerogative of humans, not AI.

It can be stated that AI provides key opportunities for the development of society. There is a need for more use of AI in predictive analytics in public services (Chen et al., 2023). According to the researchers, this will provide an opportunity to better understand how public values interact with AI systems. The result will be the most effective configuration of the management structure. It can be concluded that governments have given AI an increasingly centralised role, including providing public services to citizens. It is necessary to study the problems of inter-organisational cooperation at different stages of AI implementation and use organisational procedures to solve these problems (Campion et al., 2022).

The position is expressed that the ethical component of AI is extremely important. Ethical advantages, disadvantages, opportunities, and risks should be explained during citizen inquiries or online portals (Hickok, 2021). Local public service providers must be prepared to invest in developing solutions at the local level and involve their citizens in ethical evaluation (Koskimies & Kinder, 2022). It can be concluded that the AuroraAI programme is designed to create a human-centred society and contains predictive capabilities. Its value is focused on a society

using AI and other advanced technologies to empower people to achieve life goals through the DigiMe programme (Leikas et al., 2022). According to the researchers, AuroraAI should offer a practical solution to other EU countries, which will be a breakthrough in making life easier for citizens.

It can be stated that public administration contains huge data sets. It is necessary to comprehensively digitise relevant documents to achieve digital AI-based public administration in Ukraine (Kvitka et al., 2021). The researchers state that with the automation of the public service provision, a radical increase in the degree of data processing with AI will increase the efficiency of municipal and state departments many times over.

Conclusions

The implementation of AI in public service provision leads to the optimisation of resources, an increased level of public services, and the stimulation of the introduction of innovations in government agencies.

Implementation of the procedure of communication, cooperation in the state and municipal sectors with the help of ChatGPT can lead to the optimisation of the public service provision. Attention should be paid to analysing the risks of using large language models. The development and implementation of LLM will require the fulfilment of new tasks, leading to an increased number of specialised employees.

New EU legislative initiatives on the development and use of AI are aimed at promoting the implementation of human-centred and trustworthy AI technologies. Protecting health, safety, and basic rights from harmful consequences is the priority. A balance should be created between the advantages of AI and ethical considerations based on the regulatory framework proposed by the EU.

The proposed approach to the AI implementation process in public services may also be useful in Ukrainian practice. The effectiveness of AI implementation in public services will be the object of further research.

Recommendations

Successful implementation of AI in public services is possible considering the following recommendations:

- to determine the main goal of AI implementation in public services;
- to create a list of tasks that must be solved with the introduction of AI;
- to choose the necessary AI tools that correspond to the set goals and tasks;
- to assess the need for resources (human, monetary, time, etc.);

- to develop a detailed AI implementation plan considering the available opportunities and risks.

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