

# 공공행정시스템의 디지털화에 있어서 AI기술의 활용 : 국제경험에 기초한 연구

Using AI Technologies in the DIGITALIZATION OF PUBLIC ADMINISTRATION SYSTEM :  
A STUDY BASED ON INTERNATIONAL EXPERIENCE

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## Abstract

New digital technologies are rapidly developing in the current digital era. Artificial Intelligence (AI) is one of the digital technologies that are having a strong impact on all fields of our life. The purpose of this paper is to analyze and identify the key influencing factors of AI-based technologies in digitalization of the public administration system and effective public service operations as well as make a new proposal based on international advanced experiences for the Republic of Uzbekistan. The study also aims to study the importance of AI-based technologies in improving efficiency, safe and convenient new public services to citizen. The contribution of the study is to identify the new opportunities of applying AI technologies in digitalization and the effective operation of the public administration system and make new proposal on enhancing of public service quality, and simple procedures. During the study, conducts survey and scientific articles were reviewed in order to analyze and identify the key influential factors of AI-based technologies in digitalization of public administration system (DPAS-AI). The study serves as a new approach aimed at improving the digitalization and effective operation of the public administration system.

키워드 : 인공지능, 디지털화, 공공행정, 공공서비스, 디지털 혁신

Keywords : artificial intelligence, digitalization, public administration, public service, digital innovation

## 1. Introduction

At the present time, governments around the world are attempting to create value using emerging, disruptive, smart technologies and strategies in digitalization of public administration operation. Currently, the use of AI-based technologies in digitalization of public administration system especially, in public service management and development is still in its initial stages. Public agencies are advancing in the implementation of smart technologies in public sector management across different policy and functions [1]. AI consists of two words “Artificial and Intelligence”, “artificial” defines man-made, “intelligence” defines thinking power, and hence AI means a “man-made thinking power”. The term was

AI was invented by computer scientists John McCarthy (Marvin Minski, Allen Newell and Herbert Simon, Alan Turing [2]) in the 1950s [3], in an academic context to indicate an emerging research field studying (a) the skill of technologies to carry out tasks by performing intelligent, human-like behavior and (b) the capacity of machines to perform as intelligent agents by identifying the situation and taking actions to achieve goals. It describes a potential of study on AI technologies. In addition, AI has the potential to significantly develop and enhance digitalization of public administration system in today’s digital age. This study is based on “Digital Uzbekistan – 2030” governmental strategy. The main contribution of this paper is AI must solve previously unsolved problems, not for solving problems we created first.

## 2. Related works

This section reviews traditional methods, conduct survey and review related literatures on new technologies in digitalization of the public administration system operation (Fig.1). The following research papers on AI and closely related fields in the public sector innovation have studied.

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Most studies [4] have debated the possible applications, advantages and disadvantages of digital, AI-based technologies. Wirtz, Langer, and Fenner [5] studied the literature on big data and AI in the public sector innovation, identifying key tools and applications such as efficiency and process automation, legitimacy, accountability, cost savings, decision-making, knowledge management, digital agents, improved policy analysis and evaluation. Neumann et al., [6] emphasized that current public organizations struggle to adopt AI to increase organizations' potential and improve decision-making and forecasting, improve communication between government and citizens, personalize public services, and reduce administrative burdens.

### 3. Proposed methodology

In this section, the study proposes to analyze and identify the main influencing factors, prospects, and problems of AI in digitalization of public administration system. In addition, the paper conducts online survey and a peer review of scientific papers on AI-based technologies in digitalization of the public administration system and public service development. We present DPAS-AI as a new approach which is based on international best practices and reveals the potential of AI-based technologies for digitalization and the effective operation of the public administration system in today's fast-paced digital age.

### 4. The structure is divided into two main parts

#### 4.1. AI in Public Administration System

AI in public administration system refers to the use of AI technologies and applications in public sector. This includes areas such as governance, policy-making, service delivery, data analysis, decision-making [7] in the follow ways: Increasing efficiency and productivity; Improving decision-making; Predictive analytics; Enhancing citizen services; Fraud detection and prevention; Risk assessment and policy development; Resource management; Data analysis and predictive modeling; Natural language processing.

#### 4.2. AI in Public Service Development

AI-based technologies have the potential to improve public service delivery by automating tasks, analyzing data to identify trends, and providing convenient services to citizens [8]. AI in public service development can be used as follows: Data analysis and decision making; Predictive analytics; Reduce costs; Service automation, virtual assistants, and chatbots; Natural language processing [9].

## 5. International Experiences

The uses of AI-based technologies serve to improve efficiency in digitalization of public administration system:

Table 1. Experiences and practices

| Country       | Experiences and practices  |
|---------------|--|
| Estonia       | A global leader in e-governance and integrated AI into its public services. The country's X-Road data exchange platform facilitates secure data sharing across government agencies, enabling AI-powered applications like chatbots and predictive analytics to enhance service delivery. |
| United States | AI to automate various administrative tasks(automating government processes with AI), such as processing tax returns and issuing social security benefits. This automation has streamlined operations and reduced processing times [10].   |
| China         | China's AI policies prioritize the speeding up of technology development, data collection and implementing pilots, risk management, data privacy, and accountability.  |
| South Korea   | The National Strategy for AI in 2019 [11]. One of the AI-powered approaches is Smart city initiative which is to monitor, regulate traffic management, energy optimization, enhance public safety, provide surveillance for crimes, and digitalization of public services.               |
| Sweden        | AI to personalize public services, such as job matching and skills training. AI algorithms analyze individual profiles and match them with suitable opportunities, enhancing employment prospects and skill development.   |

#### 5.1. AI-based technologies in public service operation

The British government's investment in innovation and technology permits for the creation of support tools for public administration services, making them faster and more digitized. It makes possible to eliminate part of the paper bureaucracy, which requires the physical presence of the citizen, and services are used online, leading to three main significances [12]:(A) Decrease bureaucracy and increase speed of service;(B) Reduction in physical presence in offices; (C) Environmental significance.

## 6. Discussions and findings

### 6.1. Findings

The paper examined AI-based technologies in the effective operation of the public administration system. The study covers use of AI in the Top areas of the public administration systems (Part-4). A reviewed of the literatures available in international research databases, 60 articles within the scope of the study out of a total of 141 studies. The results show a growing trend of interest in use of

AI-based technologies in public services, with Singapore, Estonia, US, China, UK, UAE, Saudi Arabia, India, Canada, Australia, Japan, Korea, Egypt, Norway, Sweden, Germany, France, Italy as the most active countries.

Moreover, the findings show that, AI technologies are more efficient tools to improve efficiency and digitize public administration system operation because, AI technologies are much better than traditional approach through providing new, fast, secure and convenient digital services.

Analyses show that the key influential factors of AI technologies are the followings: Quality Data; Expertise; Public trust [13].

Despite its potential benefits of AI technologies, the key challenges and risks [14] are the followings:

Key challenges:- AI can be expensive to develop and implement; AI applications raise concerns about data collection, use, and privacy; Protect the security and privacy of data; Inequality that who has access to AI technology will be able to benefit from it more than those who do not; Ensure fairness and transparency; Managing the transition to AI and economic inequality, build trust among patients and clinicians; Use AI responsibly and ethically [15].

The risks:- Infringing on citizens' privacy, clouding the accountability of public decision-makers. Moreover, Job displacement; Skilled workforce requirements; Cyber-security threats

## 6.2. Survey Results

The results of the online survey showed that a total 220 respondents gave the following answers by questions (Q).

Q. Have you heard about AI? Yes (Frequency/Percentage) 216/98.2%; No 4/1.8%.

Q. Do you think AI-based technologies can be an assistant or threat for people and government? Assistant for both 178/80.9%; Threat for both 8/3.6%; Neutral 34/15.5%.

Q. Do you think there is a need for clear legislation and strict regulation for the use of AI in public administration system? Yes 187/85%; No 23/10.5%; Neutral 10/4.5%.

Q. AI technologies (chatbots, virtual assistants) support digitization of public administration and increase service quality for citizen. Yes 171/78.1%; No 3/1.4%; Neutral 45/20.5%.

Q. Government (public organizations) needs to prioritize training and up skilling (their employees) citizens in AI technologies. Yes 196/88.7%; No 7/3.2%; Neutral 19/8.6%.

Q. Using AI technologies bring more benefits or high risk in digitalization of the public administration system. More benefit 124/56.4%; High risk 6/2.7%; Creation human and AI effective cooperation method 159/72.3%.

Q. In which public sector will be most effective to apply AI first? Public administration and public service 178/80.5%;

Economy and finance (industry, banking, telecommunication) 155/70.1%; Education (science and research) 99/44.8%.

Q. For implementation of AI is important to learn international best practices, policy and strategies. Yes 195/88.6%; No 4/1.8%; Maybe 24/10.9%.

Q. Do you think benefits of implementation of AI in Public Administration system? Efficiency 199/90.5%, Digitalization of Public administration 151/68.6%, Productivity 123/55.9%, Transparency and accountability 111/50.5%, Data security 107/48.6%, Trust 75/34.1%.

Q. Do you think disadvantages of implementation of AI in Public Administration? Human replacement 153/69.2%, High costs 147/66.5%, Cyber security threats 166/75.1%, Ethical issues 144/65.2%, Automated weapons 147/66.5% and etc.

Q. The qualified civil servants are the key factor for integration of AI in effective operation of public administration systems. Yes 129/58.9%; No 5/2.3%; Maybe 97/44.3%.

## Considerations

Governments need to develop appropriate ethical policies and regulations to address the challenges and risks associated with AI benefits. This includes (1) investing in education and training programs to prepare the workforce for the changing new job market; (2) developing ethical guidelines for AI development and deployment; (3) implementing regulations to protect privacy and data security; (4) ensuring accountability of AI in digitalization and decision-making processes of the public administration systems.

## 7. Conclusions

In this paper, we analyzed the use of AI-based technologies in digitalization of the public administration system through the DPAS-AI approach. Analyses showed that, the use of AI technologies in digitalization of public administration system hold great potential to improve the quality, digital and convenient public services delivery, promote more efficient and citizen-centric services, and enhance overall governance digitalization processes. The results showed that the opportunity for the use of AI-based technologies in digitalization of the public administration system is still in their early step. If we compare it with business administration, we also suggest a game-changing process and decentralization some public sectors to citizen.

The contributions are: (1) AI-based technologies should be adopted for the right reasons and they should solve previously unsolved problems, not new ones we create. (2) DPAS-AI as a new approach suggests use of AI-based technologies in modern public administration system on

digitalization; (3) the possibilities, challenges of the use of AI-based technologies in digitalization of public administration system based on international practices were analyzed for the future research.

Recommendations for developing countries (include Uzbekistan):

1. Establish a clear AI strategy: Define the organization's goals for AI adoption and align them with its overall strategy.
2. Build a strong data foundation: Ensure the availability of high-quality, relevant data to train and validate AI models.
3. Invest in AI talent and expertise: Recruit and retain skilled AI professionals, including data scientists, machine learning engineers, and AI ethicists.
4. Protect privacy and security: Implement strong data privacy and security measures to protect sensitive information used in AI systems.
5. research grants, establishing AI research centers, and providing tax breaks for companies that invests in AI.
6. This includes developing clear guidelines, legislative, judicial and executive systems for the use of AI technologies.
7. This includes developing local expertise in AI research, data collection, and software development. international AI forums and initiatives.

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