relevant results and theoretical developments
of science and research

13
2023
issue 1, special XXXIV.

AD ALTA

Journal of Interdisciplinary Research

AD ALTA: Journal of Interdisciplinary Research
Double-Blind Peer-Reviewed
Volume 13, Issue 1, Special Issue XXXIV., 2023
Number of regular issues per year: 2

MAGNANIMITAS Assn.

AD ALTA: JOURNAL OF INTERDISCIPLINARY RESEARCH

SPECIAL ISSUE NO.: 13/01/XXXIV. (VOLUME 13, ISSUE 1, SPECIAL ISSUE XXXIV.)

ADDRESS: CESKOSLOVENSKE ARMADY 300, 500 03, HRADEC KRALOVE, THE CZECH REPUBLIC, TEL.: 498 651 292, EMAIL: INFO@MAGNANIMITAS.CZ

ISSN 1804-7890, ISSN 2464-6733 (ONLINE)
AD ALTA IS A PEER-REVIEWED JOURNAL OF INTERNATIONAL SCOPE.
2 ISSUES PER VOLUME AND SPECIAL ISSUES.

AD ALTA: JOURNAL OF INTERDISCIPLINARY RESEARCH USES THE RIV BRANCH GROUPS AND BRANCHES, BUT THE JOURNAL IS NOT A PART OF RIV. THE RIV IS ONE OF PARTS OF THE R&D INFORMATION SYSTEM. THE RIV HAS COLLECTED AN INFORMATION ABOUT RESULTS OF R&D LONG-TERM INTENTIONS AND R&D PROJECTS SUPPORTED BY DIFFERENT STATE AND OTHER PUBLIC BUDGETS, ACCORDING TO THE R&D ACT [CODE NUMBER 130/2002], THE CZECH REPUBLIC.

A SOCIAL SCIENCES
B PHYSICS AND MATHEMATICS
C CHEMISTRY
D EARTH SCIENCE
E BIOLOGICAL SCIENCES
F MEDICAL SCIENCES
G AGRICULTURE
I INFORMATICS
J INDUSTRY
K MILITARISM

TABLE OF CONTENTS (BY BRANCH GROUPS)

A SOCIAL SCIENCES

J INDUSTRY

A SOCIAL SCIENCES

AA	PHILOSOPHY AND RELIGION
AB	HISTORY
AC	ARCHAEOLOGY, ANTHROPOLOGY, ETHNOLOGY
AD	POLITICAL SCIENCES
AE	MANAGEMENT, ADMINISTRATION AND CLERICAL WORK
AF	DOCUMENTATION, LIBRARIANSHIP, WORK WITH INFORMATION
AG	LEGAL SCIENCES
AH	ECONOMICS
AI	LINGUISTICS
AJ	LITERATURE, MASS MEDIA, AUDIO-VISUAL ACTIVITIES
AK	SPORT AND LEISURE TIME ACTIVITIES
AL	ART, ARCHITECTURE, CULTURAL HERITAGE
AM	PEDAGOGY AND EDUCATION
AN	PSYCHOLOGY
AO	SOCIOLOGY, DEMOGRAPHY
AP	MUNICIPAL, REGIONAL AND TRANSPORTATION PLANNING
AQ	SAFETY AND HEALTH PROTECTION, SAFETY IN OPERATING MACHINERY

ARTIFICIAL INTELLIGENCE AS A TOOL OF PUBLIC MANAGEMENT OF SOCIO-ECONOMIC DEVELOPMENT: ECONOMIC SYSTEMS, SMART INFRASTRUCTURE, DIGITAL SYSTEMS OF BUSINESS ANALYTICS AND TRANSFERS

[a]MARTA KARPA, [b]TARAS KITSAK, [c]OLHA DOMSHA, [d]OLHA ZHUK, [e]LIUDMYLA AKIMOVA, [f]OLEKSANDR AKIMOV

[a]Hryhorii Skovoroda University in Pereiaslav, 30, Sukhomlynskoho Str., 08400, Pereiaslav, Ukraine
[b,c]Lviv Polytechnic National University, 12, Bandery Str., 79000, Lviv, Ukraine
[d]Vasyl Stefanyk Precarpathian National University, 57, Shevchenka Str., 76000, Ivano-Frankivsk, Ukraine
[e]National University of Water and Environmental Engineering, 11, Soborna Str., 33000, Rivne, Ukraine
[f]Shupyk National Healthcare University of Ukraine, 9, Dorohozhitskaya Str., 04112, Kyiv, Ukraine
e-mail: [a]marta.karpaa@ukr.net, [b]taras_kitsaak@ukr.net, [c]olya.domshaa@ukr.net, [d]olhaa.zhuk@pnu.edu.ua, [e]l_akimova@ukr.net, [f]1970aaa@ukr.net

Abstract: The article considers the modern development of public administration in its connection with the use of digital technologies in order to increase the effectiveness of the activities of government bodies, their focus on the needs of the population, expand the possibility of implementing the social functions of the state, openness of decision-making processes and civil control of management activities. It is shown that on the basis of digitalization and, in particular, application of artificial intelligence solutions, the content of public administration, individual procedures and stages of the management cycle, as well as state functions are changing. The best practices of using artificial intelligence in digital public administration systems of various countries are considered, the possibilities of using smart solutions in systems of sustainable development of territories, in analytics and intergovernmental transfers within the framework of regional development are described.

Keywords: public management; artificial intelligence; digital transformation; smart city; digital management.

1 Introduction

The paradigms of the new information world dictate their requirements for the mechanism of state administration. On the basis of digitalization, the content of public administration, individual procedures and stages of the management cycle, and state functions are changing.

The digital transformations made during the creation of e-government become the basis for the digitization of public services at all stages - from requesting services to their execution. The UK Government's Digital Efficiency Report shows that digital transactions are 20 times cheaper than telephone transactions, 30 times cheaper than postal transactions, and 50 times cheaper than face-to-face transactions. These savings are seen as an opportunity to improve efficiency and reduce the cost of public services in the UK. In turn, this can eliminate the need to fulfill the task of reducing budget expenditures by reducing or limiting the availability of these services for the population [13, 23].

Unlike the initial stage of digitalization, the implementation of Industry 4.0 technologies involves the passage of four stages that provide observation (visibility), understanding, preparedness and self-optimization of processes. While in many European countries, for example in Germany, digital transformation is considered primarily in relation to industry, in Japan the impact of digitalization on society as a whole comes to the fore with the use of the Society 5.0 program, for the construction of which, according to Japanese society, it is necessary to overcome several main barriers ("walls") [40].

Regardless of the way typical areas in which governments are involved are organized, such as public health, transportation, public infrastructure, police and defense, citizen services, or their regulation, their functioning can be addressed with digital solutions. For example, some services can be provided by default, that is, without the application of citizens and finding out who is entitled to what benefits and when [6, 24].

While in terms of civic experience the role of digital transformation is becoming apparent in areas such as e-government and digital identity programs, in many other areas transparency, efficiency, and coordination are key to the digitization of processes and project management.

Thus, the first driver of digital transformation in government and the public sector is cost savings and greater transparency. The second digital driver is meeting the needs of a "digital" citizen and improving the quality of service for citizens. The demands of the population are increasing every day, and the priority task of the government is to improve the provision of quality public services that meet the needs of citizens. Thus, governments around the world are under double pressure.

In this landscape, there is increasing efficiency and transparency, improving and harmonizing processes, smart government and smart cities, attracting new investors, bridging the digital divide. Moreover, transformation of public transactional services, data-driven governance, better access to and management of information, increasing citizen satisfaction and trust, the needs of rapidly changing demographics, and balancing costs while optimizing efficiency are all playing a role in the ongoing digitization and digital transformation of government and the public sector – all this should be taken into consideration.

"Digital by default" means "digital in essence", with no alternative when there is no "paper" counterpart. Today, the main requirement in building digital government is to explore the possibilities of full moving from paper documents to records in authoritative databases. In this regard, the problem of data confidentiality and the reliability of the information being processed is of particular relevance. In its solution, it is very expedient to use the technology of distributed data storage - blockchain, the implementation of which will solve two key problems: saving the history of changes and guaranteeing the authenticity of the entered data, as well as the identity of the data for all participants in the decentralized platform.

The creation of a national blockchain system will allow creating a full-fledged platform for digital government, consisting of trusted basic information resources, personal identifiers of citizens and government bodies. The basis of this initiative can be already successfully proven existing basic components of the e-government infrastructure, such as a single portal of public services and municipal services, a federal register of public services, a unified identification and authentication system, a system of interdepartmental electronic interaction, a unified system of regulatory and reference information and state information system on state and municipal payments [2-5]. The main goal of implementing public administration digitalization projects is to streamline and integrate work and production processes, effectively manage data and information, improve the efficiency of online public service delivery, and expand communication channels to engage and empower people.

In a rapidly changing digital environment, the state has to build a complex system of communications and feedback loops with citizens. However, the digital worlds of government and citizens remain relatively isolated from each other: the state may lag behind current trends in the development of digital technologies, and society may underestimate the problems of protecting digital sovereignty.

In the era of cloud computing, big data and social media, a digital governance model (DGM) is emerging, in which digital technologies occupy a central position in public administration and bring organizational cultures that have been formed outside the government sphere under the influence of Internet information technologies. Combining the principles of anarchism and cyber-utopianism from the early years of the

Internet, as well as the principles that underlie the movements to protect open data and digital rights of citizens, the digital governance model serves as a basis for developing practical recommendations in the field of public administration, as well as public decision-making in an increasingly large and complex world of digital technologies [40].

The study of the problems of digitalization of public administration, the introduction of digital technologies in the administrative practice of the bureaucracy is presented in a significant number of scientists' works. However, an analysis of the literature on this topic showed that, despite a lot of scientific research, there are practically no works devoted to the formation of a digital management model in the context of the spread of open and big data technologies in public administration sector. Meanwhile, in recent years, researchers and practitioners have been investing in the technological capabilities of artificial intelligence to process large amounts of government data. At the same time, artificial intelligence is usually defined as an interdisciplinary field of research that opens up many new opportunities.

The value potential of artificial intelligence (AI) is also becoming increasingly important in the context of public administration [64, p. 17]. Thus, China and the United States have recognized the value of artificial intelligence. The Chinese government has demonstrated exceptional determination to catch up with the Western world in the development of AI in the nearest three years [28, p. 68]. The Council of the People's Republic of China issued a guide to the development of artificial intelligence, which set the goal of becoming a global innovator in this field with a total investment of 1 trillion yuan (147.8 billion dollars) by 2030 [16].

At the same time, despite efforts made and increased investment in artificial intelligence research, there is still not much discussion of its use in the public sector. Thus, compared to business areas, the use of artificial intelligence in public administration is still in its infancy.

The potential benefits of artificial intelligence technologies are enormous, but the risks arising from their use are no less great. Meanwhile, in connection with the development of AI, the possibility of its implementation in public administration is becoming increasingly more real - in particular, in economic systems, smart infrastructure, analytics systems, etc. Under these conditions, an in-depth, systematic and even interdisciplinary study of the state of the art, prospects, and implications of AI application in public management acquires crucial relevance.

2 Materials and Methods

The study used general scientific and special methods of cognition, the concept of the formation of a digital economy, information and resource support for state and municipal government, electronic digital support for the processes of public-private interaction, theoretical and applied developments of scientists in the field of theory and methodology of country socio-economic development, digital economics, public administration, the use of human capital and ICT, which made it possible to form key provisions adequate to the goals and objectives of the study based on a systematic approach, methods of analysis and synthesis, generalization, formalization, functional-structural comparison, inductive and deductive methods.

The concept of the study is based on the author's hypothesis that the integrated implementation of tools for digital transformation of public administration using AI based on the formation of the digital mentality of the population and the maturity of the business community will allow achieving high rates of growth and development of socio-economic processes through the implementation of management of interaction with stakeholders of the economy' electronic development and meeting the public needs of the population [7-9].

3 Results and Discussion

The modern digital age in the development of public administration is based on a number of management models that emerged at the turn of the 19th and 20th centuries. As the first of these, the Weberian model can be considered, built around the management of large government structures with a rigid hierarchy and the use of predominantly printed media. This model underlay the "state administration of the progressive era" - the Western managerial model of the late 19th - early 20th century, characterized by the idealization of the civil service, its isolation from the general labor market and the development of sets of general rules that limited and regulated the managerial functions of civil servants [15]. In this model, the role of information technology was minimal (the transmission of text data through the state courier service was supplemented by the use of telegraph and telephone lines), while even the initial modernization of administrative operations, the formation of the first databases, catalogs and file cabinets, mainly led to the strengthening of the bureaucracy' role.

From the 1980s until the early 2000s, the New Public Management (NPM) model as an approach to public administration reform began to dominate in the countries of the Anglo-American organizational culture [43, 47]. Supporters of the NPM placed particular emphasis on the importance of competition, which contributes to the emergence of alternative producers in the market for public services, stimulates the practice of outsourcing in their production, supports not only the formation of strategic thinking among producers, but also the formation of relevant markets, the reduction of the role of state institutions, privatization and pegged financing tied to the end consumer. In many countries, such requirements of the NPM model as the separation of large government departments, increased competition in the public sector and market incentives for civil servants have been implemented in practice. In this model, digital technologies were of auxiliary importance, since their initial application was aimed mainly at improving such indicators of the provision of public services as cost-effectiveness and speed of information transfer.

Since the early 2000s, a new management model has begun to spread around the world, with digital technologies at the center. The transition from the NPM to the digital governance model is not a simple change, but rather a radical turn within the general boundaries of social modernization, which became possible along with the development of the Internet and the qualitative immersion of social processes in the Internet space. It should be noted that the digital management model mainly dealt with such topics as:

1) The reintegration of bureaucratic structures with the simultaneous building of horizontal links both within government departments and levels of government, and with their external environment. Such reintegration took place at a new technological level through the creation by the central government of new administrative mechanisms that reduce costs and diminish redundant and duplicative functions of certain administrative institutions, as well as by simplifying the organization of public administration based on the unification and standardization of the work of its constituent elements;
2) The organization of public administration in the spirit of holism, focused on the needs of the population and the practice of providing public services, has become an attempt to redesign end-to-end services from the point of view of the consumer, create such integrated tools as one-stop-shop services or electronic queues, modernize or increase the operational flexibility of government structures, which in real time can solve the tasks and respond to emerging deviations from the specified indicators;
3) The digitization of public administration, both in terms of full coverage of government departments, and in terms of the widespread introduction of e-delivery of services, where possible - through centralized online public

procurement or new forms of automation focused on zero-touch technologies that do not require intervention of humans. Digitization is also a key stimulus for a radical "unloading" of public administration and the transfer of redundant functions to public and commercial structures [25]. As a result of the development of such a technocratic administration, a transition to more open public administration and regimes of access to public information becomes possible.

The development of digital management at the present stage is a complex and multi-level process, the consideration of which goes beyond the purely technological aspect of the DGM. Digital governance becomes possible thanks to the digitalization of society as a cultural adaptation to key technological advances, the digitalization of the state apparatus and its reintegration at the organizational and financial, as well as budgetary levels, the convergence of the processes of production and consumption of public services in the "state-citizen" chain, where the manufacturer provides constant feedback with a consumer-client.

The overall digitalization process involves the free flow of information from government to the public and third parties such as civil society organizations and the media, as well as from the public and third parties to governments, and is at the heart of well-functioning open governments successfully moving forward on the path of digital transformation.

The analysis highlights the following key principles and main elements of the digital government architecture and the principles of digital government service delivery:

- Numeric by default
- Platform independent and mobile-first
- User-centric service design
- Digital from start to finish
- Government as a platform

Essential elements of Digital Government include the following:

- Single portal
- Single data for sharing in public sector
- Inter-agency shared services
- Government shared infrastructure
- Improved sensor networks and analytics
- Cyber security and privacy

It should be noted that when implementing e-government, technological and communicative components are distinguished. The technological component in management is associated with informatization processes, with an emphasis on the use of ICT in management as an auxiliary tool [19-21]. The communicative component is expressed in the active introduction of ICT in public administration in order to create a transparent information environment, increase the openness of public authorities, enable more effective interaction between the authorities and the population, the formation and strengthening of e-democracy.

The leaders of e-government (Denmark, Great Britain, etc.), overcoming negative factors, are currently already moving from e-government to digital government, which implies the transfer of public services to a digital format from the moment a service is requested to their execution, relying mainly on data, and not on documents [42].

In other words, all management processes are being transformed based on the "digital by default" principle. For example, the Danish government's "good basic data" strategy considers reuse of data to be fundamental for the effective performance of public authorities' tasks, as well as a significant contribution to the modernization of the public sector [27]. This is expressed not only in providing high-quality services to citizens and organizations while sharing previously entered data by departments in the process of considering applications, but also frees civil servants from repetitive routine operations and procedures. Since 2004, Denmark has been actively investing in the digitalization of government bodies. Since 2015, the interaction of citizens and businesses with government agencies has been carried out only via the Internet. Authorities at the level of the country and municipalities are connected in a single network, which allows interacting with all departments, with the use of a single personal account [43]. As noted by the Danes themselves, if one needs to pay taxes, report a bike theft, or make an appointment with the public health service in Denmark, it is possible to do it all from own computer. Every public authority or public official can be accessed online, and every citizen has a certain digital signature for "signing" important documents [16].

Another leader in the implementation of e-government is the UK, which presented in 2017 a new Digital Strategy for the development of seven areas of the "leading digital economy" in the world, where one of the areas is "digital government". According to the Government Transformation Strategy, the next stage of the digital transformation of the "digital government" (hereinafter, transformation means the "transformation" of public administration and the provision of public services) consists of three components that together form the framework of this strategy [11]:

1) Transformation of digital services in the public sector, focused on all users and wherever possible;
2) A complete transformation of the department, by digitally transforming the way it delivers its services, which would leadto more flexible management, better service to citizens across all channels, and increased efficiency;
3) Internal transformation of the government, which will not necessarily affect public services externally, but is important to increase the level of interagency cooperation, through the transformation of internal management.

In the UK Government Transformation Strategy, there are five main goals for its implementation (achievement):

1) Delivering world-class digital services and transforming the way of government' work, from the front end to the back office, in a modern and efficient way;
2) Development of high ICT skills and increase of Internet culture in civil society and business;
3) Creation of new digital tools and simplification of procedures in the public sector, increasing the efficiency of civil servants;
4) Better use of data not only to ensure transparency, but also to enable the transformation of the public and private sectors;
5) Creation, operation, iteration, and implementation of effective common platforms (foundations) of digital government and the use of reusable business opportunities to accelerate transformation, based on common open standards, templates [70].

The digital government in France is based on digital platforms that collect public opinion data and there are even consultations with the public, as well as potential crime zones are identified and predictive justice based on AI is developed [1].

One country that has recently taken more strategic initiatives and actions in the area of digitization and digital transformation is Australia. The country opened a Digital Transformation Office in 2015 to create a unified digital identity that allows citizens to digitally access public services with a single login process, but only 41% of public sector leaders surveyed are satisfied with their organization's current response on digital trends [26].

In the US, the United States Digital Service is expected to change the way the federal government works with citizens. Obviously, this is a big task for a large country with a rather slow IT transformation, but among the initiatives of the program to improve access to government information, there is Healthcare.gov website and modernization of the immigration system [29-32].

AI is able to assist in the provision of public services to citizens by providing timely and appropriate answers to citizens'

questions. For example, one can develop an application that is an interactive chatbot with which citizens can receive advice and consultations on various issues. A bot endowed with artificial intelligence is able to find in its knowledge base a suitable solution or answer for the situation in which a person finds himself. In case of non-standard situations, it searches for the necessary information, analyzes it and compares it to propose the optimal solution. Also, based on machine learning, the innovation detects and predicts the needs of individuals and populations, and is able to develop a plan for the rational use of resources [34-37]. Artificial intelligence technologies can eliminate criminal conspiracies and expose fraud in public service. As a result, a gradual decrease in corruption in the public administration system is possible. In order to implement this innovation, it is necessary to digitize the entire array of data that is collected and used in public administration, automate this process and increase the degree of data processing using AI technologies. This will lead to an increase in the quality of state bodies' work. Thus, AI in public administration is capable of:

- Solving the problems of civil servants;
- Providing public services to citizens and organizations;
- Reducing the likelihood of successful organization of criminal conspiracies;
- Improving digital security;
- Reducing the level of corruption.

AI-based technologies are gradually becoming an integral part of the infrastructure of "smart" cities, as they help reduce waste, lower energy consumption, improve road traffic and increase safety. Some of the world's largest megacities are already synonymous with the term "smart" cities; among them, there are Barcelona, Seoul, London, and others. Large and small cities of the world are increasingly starting to invest in various smart city technologies in order to create better living conditions for their citizens, while betting on a comfortable, sustainable, and safe urban environment with climate neutral indicators, forming a new paradigm of the ecosystem of cities of the future [38, 39]. The working principle of AI consists in combining a large volume of data with the capabilities of fast, iterative (repeated) processing and intelligent algorithms, which allows programs to automatically learn based on patterns and features contained in various data.

In the economic sector, there is an opportunity to introduce AI in the field of finance. In this area, the use of innovative technology will help improve customer service, calculate the return on investment, and eliminate corruption offences [41]. In addition, AI systems are used to collect and analyze data for the purpose of market research.

In a digitally transformed world, the complex topic (in solutions oriented on people and social impacts), such as Smart Cities is the most infrastructure-rich one. Cities have reached tipping points on many issues: poor governance and weak institutions (the first perceived barrier to prosperity); inadequate infrastructure; growing social inequality; places to live are required; growing crime; growing environmental problems (about 75% of the use of natural resources go into emissions, and cities are the main consumer of natural resources and the main polluter of the planet); new and pervasive risks for cities (violations in cybersecurity, terrorism, securitization, diseases and pandemics, etc.) [1, 22]. Infrastructure plays a key role in solving many of these problems.

Engineering, managing, maintaining, and upgrading infrastructure requires fresh thinking to minimize the use of materials, energy, and labor while maintaining sustainability [44-46]. There is a compelling argument for using sensitivity analysis and data to provide smarter, more proactive management decision-making for the infrastructure. AI-based smart infrastructures can help with this.

The general global trend in the development of AI technologies for smart cities is clearly shown in Figure 1 below.

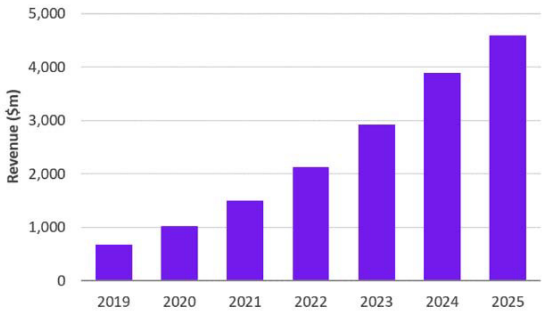

Figure 1. Global smart city AI software revenue

"The arrival of 4G and 5G wireless data technologies are making it easier to collect and manage data, promoting the migration of smart city AI software to the online realm. AI allows data to be analysed more deeply than ever before" [63].

Smart city infrastructure is the organization of the city infrastructure management process using electronic systems. Modern equipment must be adaptable to human presence and meet high energy efficiency standards. Elements of the Internet of Things (IoT) must provide the ability to manage systems online and receive timely information about all malfunctions, failures, etc.

To collect, summarize, and implement infrastructure solutions in the digital economy of the country, for example, in the UK, in fact, the national Cambridge Center for Intellectual Infrastructure and Construction (CSIC) has been created. Funded by Engineering and Physical Sciences Research Council (EPSRC), Innovate UK and industry, CSIC aims to transform the future of infrastructure through smarter information that informs better decision making.

Designing urban change to meet infrastructure maintenance needs requires close collaboration. In particular, BIM and GIS encompass 3D visualization, which greatly helps to understand the impact of events, allowing making key decisions with a greater degree of confidence. They also provide a greater degree of accessibility to information for affected communities to monitor potential impacts and provide information during the planning phase, which gives a much greater chance for successful outcomes [50, 59].

The growing shortage of resources required a gradual transition to controlled flows, but today the next step is needed - the transition to intelligent systems. At this stage, it is necessary to introduce intelligent systems at the manufacturer, the transmission network, and the consumer, as well as at the coordinating center of a separate resource, the general coordinating center of the infrastructure [48, 49]. Recently, the concept of intelligent systems Smart Grid has been actively developing. This concept is considered as a combination of technological, organizational, and economic solutions in building the energy systems of the future. Within the framework of this concept, elements of adaptation, automation, monitoring, and optimization are combined based on modern information, telecommunication, and Internet technologies [18]. These are "smart" meters, local monitoring and regulation systems, intelligent information processing systems, human-machine decision-making systems. In fact, the introduction of this system means the involvement of the city's energy infrastructure in the sixth technological order - information and communication technologies. The action of the Smart Grid covers generating sources, backbone and local networks, consumers, information and control systems [43]. In the USA, Canada, and leading European countries, the Smart Grid concept has turned into national programs for the creation of modern high-tech energy sector, supported by the state. The main goals of these programs are to increase the competitiveness of the national economy, reduce the energy intensity of products and services, reduce

dependence on energy imports, and improve the quality of life of the population.

The main features of the Smart Grid network include the following:

- Providing the level of energy supply;
- Encouraging the consumer to participate in the operation of the network, taking into account the needs and capabilities of the network;
- Organization of equipment operation;
- Ability to prevent accidents;
- Ability to self-repair;
- Selection of optimal options for functioning;
- Automatic selection of solutions in case of failures;
- Adaptation of energy supply regimes to natural conditions.

Governments, industries, and utilities around the world are increasing their financial investment in the promising Smart Grid project. The United States has developed a program for the modernization of energy systems based on the Smart Grid, aimed at providing energy resources in the required volumes anywhere, taking into account access to an environmentally friendly and reliable energy source. Its tasks are: designing of national backbone networks; designing of regional and local networks [69, 70]. In the USA, European countries, China, depending on the organization of the developer, the following terminology is used: Future Grid, Empowered Grid, Wise Grid, Modern Grid, IntelliGrid. One way or another, Smart Grid is an energy infrastructure that integrates energy subsystems, communication networks, databases, and business process management [51-55]. Within the framework of the Smart Grid concept, the variety of requirements of all interested parties (the state, consumers, regulators, energy companies, sales and utility organizations, owners, equipment manufacturers, etc.) is reduced to a group of so-called key requirements (values) of the new electric power industry.

A good example of the application of new technologies is the Smart Grid Gotland project, aimed at developing a strategy for the creation and operation of large-scale smart grids with a large share of intermittent wind energy in the total energy mix, implemented on the island of Gotland in Sweden. This is an important step and one of the key elements in the development of a modern sustainable economy, which can be implemented throughout Sweden and around the world [33]. Over time, this project could serve as an international model for smart grids.

At the moment, a wide system of standards and requirements for functions, elements, devices, and interaction system of the Smart Grid is being formed in the USA and Europe [56-58]. The use of artificial intelligence will reduce losses, improve power quality, reduce the overall cost of power distribution, etc.

China has become a world leader in the development of smart cities that use embedded sensors, measuring devices, cameras and other monitoring technologies with big data processing and artificial intelligence analysis to manage cities and public spaces. In China, there are almost 800 pilot programs (active and planned), which is more than half of the total number of all programs operating in the smart cities of the world [17].

According to the China Smart Cities Index 2020 compiled by the Sydney Business School, which is based on an assessment of the use of artificial intelligence for urban development, the top 10 Chinese "smart" cities are: Beijing, Shanghai, Nanjing, Guangzhou, Shenzhen, Hangzhou, Wuhan, Harbin, Xi'an, Chengdu, and Shenyang. The assessment of cities was carried out according to the following groups of indicators: entrepreneurship - 40% impact (enterprises are both users and innovators in the field of AI, as well as suppliers of AI to the population); AI research – 30% (research and development of Chinese universities, research institutes and high-tech enterprises play a key role in stimulating commercial innovation); AI infrastructure – 20% (key Chinese cities are building up AI infrastructure to create a favorable environment for further innovation in the industry); local government - 10% (local governments in China use the capabilities of technology firms to create platforms for the purpose of providing services by public bodies).

It is obvious that the further scaling and adequate application of artificial intelligence technologies for the development of smart city ecosystems will require representatives of government, business, science, and the public sector to unite in sustainable collaborations built on the principles of openness, parity, and accountability [60-62].

The development of the digital economy requires a different infrastructure than the infrastructure in the traditional sense, represented by data centers and networks - it is necessary to optimize processes and introduce flexible IT solutions that support the speed of bringing products to market and personalization of offers. Digital platforms should be added to the infrastructure of the digital economy, which can be defined as a software package that allows processing certain types of information, in particular, with the help of artificial intelligence [33]. The platform can be for industrial data, industrial Internet of things, e-government platform, or, the platform can include software for analyzing linguistic information based on artificial intelligence and machine learning technologies, as well as services for creating solutions based on them. Using the analysis of linguistic data, it allows identifying various patterns and trends [65-67]. The need to maintain high-quality statistics, without which it is impossible to conduct an effective economic policy, comes down to the participation of better technologies for collecting and analyzing information, including big data, and in terms of integration with other statistical aggregators that collect a large flow of information.

The main principles of building such models - openness, ease of management and administration, modularity, security - allow achieving the necessary reliability of operation with the optimal ratio of such parameters as cost, performance, and evolutionary development opportunities.

In 2021, Deloitte, in its article "Scaling AI in government," presented the forecast on AI importance for mission outcomes across all levels of government over the next five years (thus, for that moment, up to 2025) (see Figure 2 below) [14].

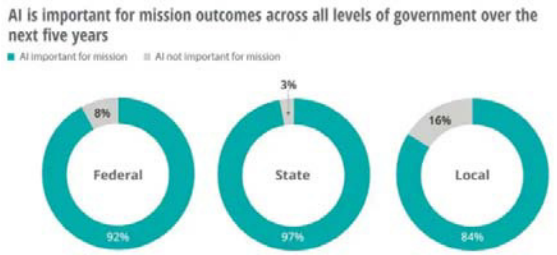

Figure 2. Forecast on AI importance for mission outcomes across all levels of government, 2021-2026

The creation of such systems should be based on conceptually unified integrated system architecture of software and hardware with broad functionality and implies the use of generally accepted standards. Indeed, the information necessary for the development and implementation of adequate political and managerial decisions is sometimes dispersed over a multitude of information funds and databases [68]. In particular, it can be obtained from the systems of defense, law enforcement, other ministries and departments, regional information funds, information banks of enterprises and organizations of various forms of ownership, independent analytical centers, news agencies, etc.

The goals of creating an expert-analytical subsystem (system) can include group intellectual support for such processes as: monitoring and control of the implementation of strategic planning documents; monitoring and control of indicators of socio-economic development and ensuring national security,

monitoring the effectiveness of the activities of participants in strategic planning; development, public discussion, and approval of draft strategic planning documents, information and analytical support for strategic planning participants in solving strategic planning tasks.

Such an information system for strategic planning, built on the basis of AI, will have to solve the following technological problems as [10, 12]:

- Widespread collection of statistical, sociological, expert information, as well as media materials with reference to the details of strategic documents;
- Classification of incoming information to determine the dynamics of public services market segments to ensure the growth of the quality of the latter;
- A comprehensive assessment of the state of implementation of documents, the relevance and causes of problems, key success factors, the effectiveness of the authorities;
- Assistance in the development and justification of effective solutions for the execution of documents using computer modeling and visualization.

To solve such problems, information-analytical and expert-analytical tools of this system will have to be aimed at providing:

- Proactive identification of threats and risks of strategic decisions execution based on the processing of operational and retrospective information;
- Conceptual and simulation modeling of strategic situations to identify the most pressing problems and issues, substantiate projects of strategic decisions;
- Organization of network expertise, holding strategic meetings with the involvement of external experts;
- Determination of such complex impacts on sets of factors and circumstances that will provide the greatest strategic effect, etc.

An increasingly significant component of this system is the mechanism of information-analytical and expert-analytical support for management decisions on the transformation of territories [70]. Unlike traditional management decision support systems, this mechanism should cover a relatively wider range of data types, ensure the synergy of actions of state, regional, municipal, and corporate leaders and specialists, as well as involve various segments of the population in the process of transforming territories.

The integration of artificial intelligence and machine learning into analytical systems is very critical in the field of regional, territorial, and cluster development, as well as in the so-called "points of growth", since often the "leveling policy" used in countries with a high degree of state participation in socio-economic processes (for example, Canada), turns out to be inefficient in the long run and contributes to even greater degradation of problem areas.

It is also important to take into account the political significance of the "leveling ("equalization") policy" that is not conducive to the introduction of investments: budget transfers directed to subsidized regions from the federal center help maintain stability and prevent tension which arose due to the failure of the state to fulfill its obligations on socially significant issues or unfavorable changes in market conditions. In political practice, "equalization" has been in demand historically and today is also used both in the course of implementing financial policy and as "emergency" measures. In the first case, it is about interbudgetary transfers (leveling subsidies), in the second case - about measures to support socially significant enterprises, regardless of their competitiveness (anti-crisis measures to save single-industry towns can be called a classic example). Nevertheless, experience shows that from an economic point of view, "leveling" is a costly, but not the most effective way of development. Systematic subsidies from the federal budget reduce incentives for depressed areas to develop independently and to increase investment attractiveness. However, the development and implementation of such programs continues. In particular, in Canada, for the period up to 2025, rather large public investments are envisaged in the development of aboriginal tourism, while the share of the private sector in investments is expected at the level of 6%, and there is no talk of public-private partnership at all. Meanwhile, artificial intelligence and machine learning technologies would allow deep factor analysis of previous and current "leveling" programs (both national and foreign) and their systemic results, which, in turn, would allow more optimal and long-term oriented decisions to be made.

Thus, in the era of digital transformation of public administration, in order to assess the potential of using digital technologies in public management, the following characteristics of the public administration quality should be considered: the validity of public intervention; effectiveness; efficiency. The possibilities of using digital technologies to further implement results-based management and improve the effectiveness of public administration include: the use of big data and artificial intelligence to generate statistics and use it in public administration in real time; receiving and processing data based on machine-to-machine interaction; using artificial intelligence technologies to analyze data and develop optimal solutions.

Literature:

1. Allam, Z., Dhunny, Z.A. (2019). On big data, artificial intelligence and smart cities. *Cities, 89*, 80-91.
2. Andros, S., Akimov, O., Akimova, L., Chang, S., & Gupta, S. K. (2021). Scenario Analysis of the Expected Integral Economic Effect from an Innovative Project. *Marketing and Management of Innovations* 3, 237-251. DOI: 10.21272/mmi.2021.3-20.
3. Andros, S., Akimova, L., & Butkevich, O. (2020). Innovations in management of banks deposit portfolio: structure of customer deposit. *Marketing and Management of Innovations,* 2, 206-220. DOI: 10.21272/MMI.2020.2-15.
4. Bashtannyk, A., Akimova, L., Kveliashvili, I., Yevdokymov, V., Kotviakovskyi, Y., & Akimov, O. (2021). Legal bases and features of public administration in the budget sphere in Ukraine and foreign countries. *Ad Alta: Journal of interdisciplinary research*, 1(1), XVIII, 63-68.
5. Bashtannyk, V., Novak, A., Tkachenko, I., Terska, S., Akimova, L., & Akimov, O. (2022) Anti-corruption as a component of state policy. *Ad Alta: Journal of interdisciplinary research*, 12(1), XXV, 79-87.
6. Belyakova, O. (2021). Digital transformation of public administration. Proceedings of Conference "Global Challenges and Prospects of the Modern Economic Development", GCPMED 2020, pp. 174-180.
7. Bobrovska O.Y., Lysachok A.V., Kravchenko T.A., Akimova LM., & Akimov O.O. (2021). The current state of investment security in Ukraine in the context of covid-19 and its impact on the financial and economic situation of the state. *Collection of scientific papers Financial and Credit Activity-Problems of Theory and Practice,* 1(36), 233-242. DOI: 10.18371/FCAPTP.V1I36.227770.
8. Bondar, O., Petrenko, G., Khalilov, A., Vahonova, O., Akimova, L., & Akimov, O. (2022) Construction Project Management Based on the Circular Economy. *IJCSNS. International Journal of Computer Science and Network Security.* Vol. 22. No. 9. pp. 630-635. DOI: 10.22937/IJCSNS.2022.22.9.82
9. Borysenko, O., Kitsak, T., Pasichnyi, R., Akimova, L., Karpa, M., & Akimov, O. (2022). Features of the Implementation of Public Authority in the Context of Modern International Security Challenges: Information Component. *IJCSNS. International Journal of Computer Science and Network Security*. Vol. 22. No. 8. pp. 123-128. DOI: 10.22937/IJCSNS.2022.22.8.16
10. Burlacu, S., Popescu, M., Diaconu, A., Sarbu, A. (2021). Digital Public Administration for Sustainable Development. *European Journal of Sustainable Development, 10*(4), 33-40.

11. Campbel, T. (2019). *Artificial intelligence: An overview of state initiatives.* FutureGrasp.
12. Cath, C., Wachter, S., Mittelstadt, B., Taddeo, M., Florid,i L. (2018). Artificial Intelligence and the 'Good Society': The US, EU, and UK Approach. *Science and Engineering Ethics, 24*(2), 505-528.
13. Deloitte (2017). *How much time and money can AI save government?* https://www2.deloitte.com/us/en/insights/focus/cognitive-technologies/artificial-intelligence-government-analysis.html
14. Deloitte (2021). *Scaling AI in government*. https://www2.deloitte.com/uk/en/insights/industry/public-sector/government-ai-survey.html
15. Denysov, O., Litvin, N., Lotariev, A., Yegorova-Gudkova, T., Akimova, L., & Akimov, O. (2021) Management of state financial policy in the context of the Covid-19 pandemic. *Ad Alta: Journal of interdisciplinary research*, 11(2), XX, 52-57.
16. Desouza, K., Dawson, G., & Chenok, D. (2020). Designing, developing, and deploying artificial intelligence systems: Lessons from and for the public sector. *Business Horizons, 63*(2), 205-213.
17. Galloway, C., & Swiatek, L. (2018). Public relations and artificial intelligence: It's not (just) about robots. *Public Relations Review, 44*(5), 734–740.
18. Gasser, U., & Almeida, V. (2017). A Layered Model for AI Governance. *IEEE Internet Computing, 21*(6), 58-62.
19. Gavkalova, N. L. Akimova, L.M, Zilinska, A. S. Lukashev, S.V, Avedyan, L. Y., & Akimov, O. O. (2022). Functioning Of United Territorial Communities And Identification Of Main Problems Of Organizational Support Of Local Budget Management. *Financial and Credit Activity Problems of Theory and Practice*, *2*(43), 107–117. DOI: 10.55643/fcaptp.2.43.2022.3708
20. Gavkalova, N., Akimova, L., Zilinska, A., Avedyan, L., Akimov, O., & Kyrychenko, Y. (2022). Efficiency In The Context Of Ensuring Sustainable Territorial Development. *Financial and Credit Activity Problems of Theory and Practice*, *4*(45), 234–243. https://doi.org/10.55643/fcaptp.4.45.2022.3830.
21. Harafonova, O., Zhosan, G., & Akimova, L. (2017) The substantiation of the strategy of social responsibility of the enterprise with the aim of providing efficiency of its activities. *Marketing and Management of Innovations,* 3, 267 – 279. DOI: 10.21272/MMI.2017.3-25.
22. Herath, H., & Mittal, M. (2022). Adoption of artificial intelligence in smart cities: A comprehensive review. *International Journal of Information Management Data Insights, 2*(1), 100076.
23. Hui, R. (2021). *When Digital Done Right: Leading Digital Transformation in the Public Sector*. Independently published.
24. Jonathan, G. (2020). Digital Transformation in the Public Sector: IT Alignment as a Moderator. ACIS 2020 Proceedings, 95. https://aisel.aisnet.org/acis2020/95
25. Kalyayev, A., Efimov, G., Motornyy, V., Dzianyy, R. & Akimova, L. (2019). *Global Security Governance: Conceptual Approaches and Practical Imperatives. Proceedings of the 33rd International Business Information Management Association Conference, IBIMA 2019*: Education Excellence and Innovation Management through Vision 2020, 10-11 April 2019, Spain, Granada, 4484-4495.
26. Kankanhalli, A., Charalabidis, Y., & Mellouli, S. (2019). IoT and AI for smart government: A research agenda. *Government Information Quarterly, 36*(2), 304-309.x
27. Karpa, M., Akimova, L., Akimov, O., Serohina, N., Oleshko, O., & Lipovska, N. (2021). Public administration as a systemic phenomenon in society. *Ad Alta: Journal of interdisciplinary research*, 11(1), XV, 56-62.
28. Knight, W. (2017). China's AI Awakening: The West Shouldn't Fear China's Artificial-Intelligence Revolution. *Technology Review, 120*(6), 66-72.
29. Koshova, S., Lytvynova, L., Kaliuzhna, S., Akimov, O., & Akimova, L. (2022). Regulatory and Legal Aspects of Information Support for the Provision of Administrative Services in the Field of Public Administration as a Communicative Culture of a Public Servant. *IJCSNS. International Journal of Computer Science and Network Security*, Vol. 22 No. 9 pp. 595-600. DOI: 10.22937/IJCSNS.2022.22.9.77
30. Kryshtanovych, M., Akimova, L., Gavkalova, N., Akimov, O., & Shulga, A. (2022) Modern Technologies for Ensuring Economic Security in the Context of Achieving High Efficiency of Public Administration. *IJCSNS. International Journal of Computer Science and Network Security*. Vol. 22, No. 2, pp. 362-368. DOI: 10.22937/IJCSNS.2022.22.2.42.
31. Kulikov, P., Anin, O., Vahonova, O., Niema, O., Akimov, O., & Akimova, L. (2022). Scientific and Applied Tools for Project Management in a Turbulent Economy with the Use of Digital Technologies. *IJCSNS. International Journal of Computer Science and Network Security*. Vol. 22. No. 9. pp. 601-606. DOI: 10.22937/IJCSNS.2022.22.9.78
32. Lappo, V.V., Soichuk, R.L., & Akimova, L.M. (2022) Digital technologies of support the spiritual development of students. *Information Technologies and Learning Tools,* 2022, Vol 88, No2. Pp. 103-114. DOI: 10.33407/itlt.v88i2.3403.
33. Larsson, A., & Teigland, R. (Eds.) (2019). *Digital Transformation and Public Services: Societal Impacts in Sweden and Beyond.* Routledge.
34. Levytska, S., Akimova, L., Pavlov, C., Kupchak, V., & Karpa, M. (2019). The role of accounting in providing sustainable development and national safety of Ukraine. *Financial and credit activity: problems of theory and practice,* 30 (3), 64-70. DOI: 10.18371/FCAPTP.V3I30.179501.
35. Levytska, S.O., Akimova, L.M., Zaiachkivska, O.V., Karpa, M.I., & Gupta, S.K. (2020). Modern analytical instruments for controlling the enterprise financial performance. *Financial and Credit Activity-Problems of Theory and Practice,* 2(33), 314-323. DOI: 10.18371/FCAPTP.V2I33.206967.
36. Liubkina, O., Murovana, T., Magomedova, A., Siskos, E., & Akimova, L. (2019). Financial instruments of stimulating innovative activities of enterprises and its improvements. *Marketing and Management of Innovations,* 4, 336-352. DOI: 10.21272/MMI.2019.4-26.
37. Marchenko, A., Akimova, L., & Akimov, O. (2021) The current state of ensuring the effectiveness of coordination of anticorruption reform. *Ad Alta: Journal of interdisciplinary research*, 11(2), XX, 78-83.
38. Mihus, I., Akimova, L., Akimov O., Laptev, S., Zakharov, O., & Gaman, N. (2021). Influence of corporate governance ratings on assessment of non-financial threats to economic security of joint stock companies. *Financial and Credit Activity: Problems of Theory and Practice*, *6*(41), 223–237. DOI: 10.18371/fcaptp.v6i41.251442.
39. Mihus, I., Akimova, L., Akimov, O., Koval, Y., & Dmitrenko, V. (2020). Improvement of the methodological approach to assessing the impact of public governance on ensuring the economic security of the state. *Financial and Credit Activity-Problems of Theory and Practice,* 4(35), 180-190. DOI: https://doi.org/10.18371/fcaptp.v4i35.221969.
40. Mishra, M. (2020). Digital Transformation of Public Service and Administration. Leibniz Information Centre for Economics, Kiel, Hamburg.
41. Mordvinov, O., Kravchenko, T., Vahonova, O., Bolduiev, M., Romaniuk, N., & Akimov, O. (2021). Innovative tools for public management of the development of territorial communities. *Ad Alta: Journal of interdisciplinary research*, 11(1), XVII, 33-37.
42. Morkhat, P.M., Ponkin, I.V., Markhgeym, MV, et al. (2019). Artificial intelligence versus public administration: Limitations of application. *Humanities & Social Sciences Reviews, 7*(3), 516-520.
43. Noordit, C., & Misuraca, G. (2022). Artificial intelligence for the public sector: Results of landscaping the use of AI in government across the European Union. *Government Information Quarterly, 39*(3), 101714.
44. Novak-Kalyayeva, L., Rachynskyi, A., Bienkowska, D., Karpa, M., & Makovey, J. (2018). Practical potential of theory and methodology of public administration on AHE basis of human rights. *Proceedings of the 32nd International Business Information Management Association Conference, IBIMA 2018 - Vision 2020*: Sustainable Economic Development and Application of Innovation Management from Regional

expansion to Global Growth. 15-16 November 2018, Seville, Spain.
45. Osadcha, O., Akimova, L., & Akimov, O. (2018). Improving accounting management via benchmarking technology. *Financial and Credit Activity-Problems of Theory and Practice,* 1(24), 64-70. DOI: 10.18371/FCAPTP.V1I24.128340.
46. Osadcha, O., Akimova, L., Bashtannyk, V., Kondratska, N., & Fedyna, C. (2020). Formation of the system of financial-information support of environmentally-oriented management of the enterprise. *Financial and credit activity: problems of theory and practice,* 32(1), 434–443. DOI: 10.18371/FCAPTP.V1I32.200606.
47. Osman, I.H., Anouze, A.L., Irani, Z., Lee, H., Medeni, T. D., & Weerakkody, V. (2019). A cognitive analytics management framework for the transformation of electronic government services from users' perspective to create sustainable shared values. *European Journal of Operational Research, 278*(2), 514-532.
48. Reinska, V., Akimova, L., Akimov, O., & Karpa, M. (2018). Tax preferences and their influence on the investment in Ukraine. *Financial and Credit Activity-Problems of Theory and Practice,* 3(26), 91-101. DOI: 10.18371/FCAPTP.V3I26.144117.
49. Rumyk, I., Laptev, S., Seheda, S., Akimova, L., Akimov, O., & Karpa, M. (2021) Financial support and forecasting of food production using economic description modeling methods. *Financial and Credit Activity: Problems of Theory and Practice*, 5(40), 248–262. DOI: 10.18371/fcaptp.v4i35.245098.
50. Santiso, C. (2022, July 6). Artificial intelligence in the public sector: An engine for innovation in government … if we get it right! *OPSI*. https://oecd-opsi.org/blog/ai-an-engine-for-innovation/
51. Serohina, T., Pliushch, R., Pobirchenko, N., Shulga, N., Akimova, L., & Akimov, O. (2022) Pedagogical innovations in public administration and legal aspects: the EU experience. *Ad Alta: Journal of interdisciplinary research*, 12(1), XXV, 7-13.
52. Shestakova, S., Bondar, N., Kravchenko, I., Kuznetcova, M., Akimova, L., & Akimov, O. (2022) Comparative characteristics of social leave: international and foreign experience. *Ad Alta: Journal of interdisciplinary research*, 12(1), XXV, 27-32.
53. Shpektorenko, I., Vasylevska, T., Bashtannyk, A., Piatkivskyi, R., Palamarchuk, T., & Akimov, O. (2021). Legal bases of public administration in the context of European integration of Ukraine: questions of formation of a personnel reserve. *Ad Alta: Journal of interdisciplinary research*, 11(1), XVIII, 76-81.
54. Slomski, Wojciech (2008) Communication of the organization. *Alta Contemporary Economics*. 2 (3), 151-158.
55. Slomski, Wojciech. (2007) Advertisement without Ethical Principles?. *Alta Contemporary Economics*. 1 (4), 89-102.
56. Smyrnova, I., Akimov, O., Krasivskyy, O., Shykerynets, V., Kurovska, I., Hrusheva, A., & Babych, A. (2021). Analysis of The Application of Information and Innovation Experience in The Training of Public Administration Specialists. *IJCSNS. International Journal of Computer Science and Network Security,* 21, 3, March 2021, 120-126.
57. Sukhova, K., Borodin, Y., Tarasenko, T., Komarova, K., Akimova, L., & Akimov, O. (2022) Organizational mechanism of state management of social services in territorial communities. *Ad Alta: Journal of interdisciplinary research*, 12(1), XXVII, 188-192.
58. Sysoieva, I., Poznyakovska, N., Balaziuk, O., Miklukha, O., Akimova, L., & Pohrishchuk, B. (2021). Social innovations in the educational space as a driver of economic development of modern society. *Financial and Credit Activity: Problems of Theory and Practice*, *3*(38), 538–548. DOI: 10.18371/fcaptp.v3i38.237486.
59. Tan, A. (2020, March 18). Opportunities for greater use of AI in smart cities. *Futureiot*. https://futureiot.tech/opportunities-for-greater-use-of-ai-in-smart-cities/
60. Vahonova, O., Tryfonova, O., Bondar, O., Petrukha, N., Kyrychenko, O., & Akimov, O. (2022) Economic justification for strategic decisions to improve the competitiveness of the enterprise. *Ad Alta: Journal of interdisciplinary research*, 12(1), XXVII,198-202.
61. Vasylevska, T. Shevchenko, S. Sydorenko, N. Gradivskyy, V. Akimova, L. & Akimov O. (2022) Development Of Professional Competence Of Public Servants In The Conditions Of Decentralization Of Public Authority. *Ad Alta: Journal of interdisciplinary research*, 12(2), XXIX, 61-66.
62. Venediktov, V., Boiko, V., Kravchenko, I., Tyshchenko, O., Akimova, L., & Akimov, O. (2021) European standards of mediation in civil disputes and their implementation in Ukraine: theory and practice. *Ad Alta: Journal of interdisciplinary research*, 11(2), XXI, 25-29.
63. Volvi, O., Alex, V., Angel, V., Alberto, R. (2022). Artificial intelligence (AI) applied to public management. *Metaverse, 3*(2), 1-8.
64. Wirtz, B., Weyerer, J., & Geyer, C. (2018). Artificial Intelligence and the Public Sector - Applications and Challenges. *International Journal of Public Administration, 42*(7), 1-20.
65. Yakymchuк, A.Y., Akimov, O.O., & Semenova, Y.M. (2017). Investigating key trends of water resources attraction into economic turnover. *Scientific Bulletin of Polissia,* 1(9), P.2, 70-75. DOI: 10.25140/2410-9576-2017-2-1(9)-70-75.
66. Zahorskyi, V., Bobrovskyi, O., Bondarenko, D., Karpa, M., Akimov, O., & Akimova. L. (2022). Ensuring Information Security in the System of Public Management of Sustainable Development of the Region: EU Experience. *IJCSNS. International Journal of Computer Science and Network Security.* Vol. 22, No. 8, pp. 163-168. DOI: 10.22937/IJCSNS.2022.22.8.21
67. Zahorskyi, V., Lipentsev, A., Mazii, N., Bashtannyk, V., & Akimov, O. (2020). Strategic directions of state assistance to enterprises development in Ukraine: managerial and financial aspects. *Financial and Credit Activity-Problems of Theory and Practice,* 2(33), 452-462. DOI: https://doi.org/10.18371/fcaptp.v2i33.207230.
68. Zapara, S., Pronina, O., Lohvinenko, M., Akimova, L., & Akimov, O. (2021) Legal regulation of the land market: European experience and Ukrainian realities. *Ad Alta: Journal of interdisciplinary research*, 11(2), XXI, 18-24.
69. Zheng, Y., Yu, H., Cui, L. et al. (2018). SmartHS: An AI platform for improving government service provision. In 32nd AAAI conference on artificial intelligence. *AAAI: Association for the Advancement of Artificial Intelligence, 36*, 7704-7712.
70. Zuiderwijk, A., Chen, Y., & Salem, F. (2021). Implications of the use of artificial intelligence in public governance: A systematic literature review and a research agenda. *Government Information Quarterly, 38*(3), 101577.

Primary Paper Section: A

Secondary Paper Section: AE, AP