











“The use of artificial intelligence in public administration: Bibliometric analysis”

AUTHORS

Ihor Rekunenکو 

Iana Kobushko 

Oleksii Dzydzyguri 

Inna Balahurovska 

Oksana Yurynets 
Oleksandr Zhuk 

ARTICLE INFO

Ihor Rekunenکو, Iana Kobushko, Oleksii Dzydzyguri, Inna Balahurovska, Oksana Yurynets and Oleksandr Zhuk (2025). The use of artificial intelligence in public administration: Bibliometric analysis. *Problems and Perspectives in Management*, 23(1), 209-224. doi:[10.21511/ppm.23\(1\).2025.16](https://doi.org/10.21511/ppm.23(1).2025.16)

DOI [http://dx.doi.org/10.21511/ppm.23\(1\).2025.16](http://dx.doi.org/10.21511/ppm.23(1).2025.16)

RELEASED ON Wednesday, 12 February 2025

RECEIVED ON Friday, 08 November 2024

ACCEPTED ON Thursday, 23 January 2025

LICENSE



This work is licensed under a [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/)

JOURNAL

"Problems and Perspectives in Management"

ISSN PRINT

1727-7051

ISSN ONLINE

1810-5467

PUBLISHER

LLC “Consulting Publishing Company “Business Perspectives”

FOUNDER

LLC “Consulting Publishing Company “Business Perspectives”



NUMBER OF REFERENCES

50



NUMBER OF FIGURES

6



NUMBER OF TABLES

2

© The author(s) 2025. This publication is an open access article.



BUSINESS PERSPECTIVES



LLC "CPC "Business Perspectives"
Hryhorii Skovoroda lane, 10,
Sumy, 40022, Ukraine
www.businessperspectives.org

Received on: 8th of November, 2024

Accepted on: 23rd of January, 2025

Published on: 12th of February, 2025

© Ihor Rekenenko, Iana Kobushko, Oleksii Dzydyzguri, Inna Balahurovska, Oksana Yurynets, Oleksandr Zhuk, 2025

Ihor Rekenenko, Doctor of Economic Sciences, Professor, Head of Oleg Balatskyi Department of Management, Sumy State University, Ukraine. (Corresponding author)

Iana Kobushko, Ph.D. in Economics, Associate Professor, Senior Lecturer, Oleg Balatskyi Department of Management, Sumy State University, Ukraine.

Oleksii Dzydyzguri, Ph.D. Student, Academic and Research Institute of Business, Economics and Management, Sumy State University, Ukraine.

Inna Balahurovska, Ph.D. Student, Academic and Research Institute of Business, Economics and Management, Sumy State University, Ukraine; Ph.D. Student, Faculty of Organization and Management Department of Applied Social Sciences, Silesian University of Technology, Poland.

Oksana Yurynets, Doctor of Economic Sciences, Professor, Department of Foreign Economic and Customs Activities, Lviv Polytechnic National University, Ukraine.

Oleksandr Zhuk, Ph.D. Student, Institute of Economics and Management, Lviv Polytechnic National University, Ukraine.



This is an Open Access article, distributed under the terms of the [Creative Commons Attribution 4.0 International license](https://creativecommons.org/licenses/by/4.0/), which permits unrestricted re-use, distribution, and reproduction in any medium, provided the original work is properly cited.

Conflict of interest statement:

Author(s) reported no conflict of interest

Ihor Rekenenko (Ukraine), Iana Kobushko (Ukraine), Oleksii Dzydyzguri (Ukraine), Inna Balahurovska (Ukraine, Poland), Oksana Yurynets (Ukraine), Oleksandr Zhuk (Ukraine)

THE USE OF ARTIFICIAL INTELLIGENCE IN PUBLIC ADMINISTRATION: BIBLIOMETRIC ANALYSIS

Abstract

Artificial intelligence in public administration is critical for the modernization of the public sector and adaptation to the challenges of modern society. The paper analyzes studies dedicated to the impact of artificial intelligence on the efficiency, innovation, and transparency of management processes in the public sector using meta- and bibliometric analysis. The goal is to identify the main areas and keywords that highlight theoretical and practical aspects of artificial intelligence in public administration. In total, 879 scientific articles were analyzed, of which 598 works are devoted to artificial intelligence. Dynamic time analysis revealed a significant surge in scientific interest in artificial intelligence in public administration: from 2010 to 2019, 135 publications were devoted to this issue, and from 2020 to 2024, 421. Bibliographic maps of keywords and publication maps showed the main thematic areas of research on artificial intelligence: the application of AI in public administration and the public sector, decision-making in public administration, data management and digital technologies in public administration, and the strategic use of AI to forecast socio-economic trends.

The obtained data became the basis for expanding the scientific and practical potential of using artificial intelligence in public administration. The main areas of future research will concern the regulation of ethical issues to ensure the trust of citizens, the development of a regulatory framework and standards, increasing the efficiency of public services, the integration of artificial intelligence into strategic planning, and the use of artificial intelligence to achieve sustainable development goals.

Keywords

artificial intelligence, government, public administration, technology, transparency

JEL Classification

H83, C88, O38, O33

INTRODUCTION

The use of artificial intelligence in various fields has been an actively researched issue in the scientific literature over the past 14 years. During 2010–2024, 556 studies were conducted, which is 93% of the total number of publications on this topic, indexed by the Scopus database.

Artificial intelligence (AI) is a tool that ensures the innovation and optimization of public administration processes to improve the quality, transparency, and accessibility of services to the population. AI is fundamentally changing the philosophy and methods of interaction between government and citizens, minimizing the impact of the human factor and the number of errors.

The transparency of processes is an influential advantage of using AI in public administration. AI plays an important role in governments' making informed decisions, which are based on the analysis of large

amounts of data and the study of trends and problems in society. With the help of analytical tools based on AI, governments monitor and analyze spending and identify deviations and possible cases of corruption. They can also develop effective policies focused on the population's needs (Ariga, 2021; Robinson & Dilkina, 2018). This is especially critical in conditions of constantly changing economic and social circumstances.

The implementation of AI in public administration has some unregulated aspects, in particular ethics, data protection, and information confidentiality. The use of AI requires processing large volumes of data, which can create risks of information leakage and misuse of personal data. Therefore, it is necessary to ensure adequate data protection and develop appropriate legislative and regulatory acts regulating the use of AI in public administration. However, the advantages of using AI outweigh the disadvantages. The active implementation of AI in public administration is necessary to modernize the work of state institutions and improve the quality of services provided to citizens.

1. LITERATURE REVIEW

A significant number of modern studies on the application of artificial intelligence in various spheres of public life offer innovative solutions for public administration. Madan and Ashok (2022) systematized approaches to the implementation of AI in public administration and identified the main areas of its application. Barodi and Lalaoui (2025) emphasize the importance of implementing AI in the public sector. Sheikh et al. (2021) studied the impact of AI-based innovations on healthcare systems. AI can not only improve diagnostic and therapeutic processes but also ensure equal access to medical services. McClure et al. (2020) studied the role of AI in environmental monitoring, in particular, the use of technologies to analyze data on the state of the environment. Kankanhalli et al. (2019) analyzed the integration of AI for the development of smart governance. Such technologies allow for automating data collection processes, reducing costs, and improving the quality of real-time decision-making. Sharma et al. (2021) identified the main problems and challenges that government agencies face when implementing AI. Gooneratne et al. (2020) examined the use of AI in energy production and management.

Artificial intelligence opens up new possibilities for predicting economic and social trends. Chen et al. (2021) demonstrate how algorithms can assess the level of energy efficiency in regions. Goshovska and Kravchuk (2024) showed that AI is used to develop economic strategies that meet the modern challenges of globalization. Scientists have investigated the impact of AI on statistical fore-

casting (Kolková & Ključnikov, 2022) and bankruptcy prediction (Letkovsky et al., 2023). Bullock (2019) emphasizes the role of automation in socio-economic planning. Robinson and Dilkina (2018) applied machine learning algorithms to model migration processes, which can be useful for developing policies on population mobility. Savaget et al. (2018) made a significant contribution to the study of the impact of AI on political participation. The study proved that digital platforms based on AI can stimulate civic engagement. Hartmann and Wenzelburger (2021) focused on the analysis of algorithms that help make complex political decisions, particularly in criminal justice.

Artificial intelligence helps detect corruption and prevent public sector wrongdoing risks. With its ability to analyze large amounts of data and detect corrupt processes, AI is becoming a powerful tool for ensuring transparency and ethics in public administration. Cortis and Davis (2021) demonstrate the practical application of AI in detecting corruption schemes. Using machine learning algorithms, researchers identified suspicious financial transactions and relationships that may indicate violations. Floridi et al. (2018) focus on the ethical issues of using AI, which is crucial in the fight against corruption.

Artificial intelligence is becoming a powerful tool in effective resource management, allowing for improved planning, process optimization, and cost reduction in various public administration sectors. Ostapiuk (2024) examines the role of AI in public sector management in Ukraine and emphasizes the technological potential to improve decision-

making. Brunetti et al. (2020) focus on the challenges of digital transformation, which include the need to adapt to new technologies, modernize existing systems, and train personnel. Giuffrida et al. (2022) provide an overview of machine learning in logistics. This approach demonstrates how optimizing transportation and supply chains can help reduce costs and improve resource management. Izumi et al. (2019) explore the use of innovation for risk management. They show how AI can predict emergencies and develop preventive measures to minimize their impact on management processes. In the healthcare sector, Landa et al. (2018) and Longaray et al. (2018) examine the optimization of resource management in hospitals. Landa et al. (2018) propose a multi-criteria approach to hospital bed management that takes into account patient needs and responds quickly to urgent problems. Longaray et al. (2018), in turn, focus on the assessment of logistics processes in public hospitals and demonstrate how AI can provide greater efficiency and equitable resource allocation.

Using artificial intelligence in public administration improves the efficiency and quality of service provision to citizens. AI-based tools, such as chatbots and digital assistants, ensure effective communication between government institutions and the population and optimize internal processes (Androutopoulou et al., 2019; Alshahrani et al., 2021). Neumann et al. (2022) focus on the implementation of AI in government institutions and emphasize the importance of strategic planning to ensure the integration of technologies. Gesk and Leyer (2022) study citizens' perceptions of AI in public services. To increase public trust, it is necessary to consider ethical aspects and ensure transparency of algorithms. Maedche et al. (2019) analyze the use of AI-based digital assistants and note that such technologies can significantly facilitate interaction with government systems.

The development of artificial intelligence technologies plays an important role in the creation of smart cities. Chew et al. (2020) draw attention to the use of 5G technologies in smart city infrastructure. Rajput et al. (2022) investigate the application of AI for automatic vehicle identification and traffic flow management in conditions of intense urban traffic. Trebyk (2021) considers digital transformations of city administrations

to increase their efficiency. Panagiotopoulos and Dimitrakopoulos (2018) demonstrate that citizens have a positive attitude toward autonomous transport technologies, provided that they are safe and environmentally friendly. Nubert et al. (2018) propose the use of neural networks for traffic analysis.

Artificial intelligence technologies contribute to achieving sustainable development goals. Goralski and Tan (2020) argue that through forecasting and big data analysis, AI allows for the creation of strategies aimed at the long-term conservation of natural resources. Gupta et al. (2020) developed a digital sustainability matrix that demonstrates how integrating AI into digital infrastructure contributes to achieving sustainable development goals. Hoosain et al. (2020) emphasize that integrating technology into public administration allows for implementing sustainable solutions in various sectors, particularly in energy, transport, and environmental protection. Moss et al. (2019) presented a methodology for assessing knowledge to support climate action, which is based on the integration of AI into management processes.

Bibliometric analysis methods are widely used to identify current trends, directions, and gaps. Lawelai et al. (2023) conducted a bibliometric analysis of the use of artificial intelligence in public services and highlighted the main scientific trends of collaboration between researchers. Di Vaio et al. (2022) focused on the interaction of AI with decision-making processes in the public sector and analyzed the effectiveness of data and innovative approaches. Lee (2024) identified current trends and prospects for research in the field of AI and public administration over a ten-year period using a bibliometric approach. Güney and Ala (2024) analyzed publications on the use of AI for risk management in the public sector. Didin et al. (2024) examined the role of e-government in public services and described the importance of transparency and management efficiency.

Modern research confirms the significant potential of artificial intelligence in various aspects of public administration. Artificial intelligence is a powerful tool for transforming public administration, ensuring intelligent automation of processes, high-quality services, sustainable development approaches, and interaction between the state and citizens.

Following the literature review, this study aims to identify key areas of research and define keywords and topics in scientific work that reveal theoretical and practical aspects of the use of artificial intelligence in public administration using a bibliometric approach.

2. METHODS

The Scopus database was used to achieve the research goal. The VOSviewer software package was used for data analysis, clustering, and visualization of the results. The main keywords for the search were “artificial intelligence,” “AI,” “public administration,” “government management,” “public sector,” and “use case.” Figure 1 summarizes the methodology.

The first stage was to define a research design that focuses on the analysis of the use of artificial intelligence in public administration. Bibliometric and meta-analytic tools were used, including the built-in tools of the Scopus database and the Bibliometrix software. The main source of data was the Scopus database, and the study period covers a general analysis for the years 1980–2024 with a more detailed focus on the periods 2018–2024 and 2020–2024.

In the second stage, a search query was formulated that included key terms such as “Artificial Intelligence,” “AI,” “Artificial Intelligence Governance,” “Public Administration,” “Public Management,” “Government Management,” “Public Sector,” “Government Policy,” “Public Policy,” “Digital Transformation,” “Digital Government,” and “Open Government.”

The third stage involves processing the obtained data, which includes a dynamic analysis of publications and citations and a structural analysis of topics, authors, countries, and institutions. The study also includes the construction of maps of cooperation between countries and institutions, maps of thematic evolution, as well as key, cluster, and sectoral analysis, which allows for identifying the main trends and relationships in the field of artificial intelligence for public administration.

3. RESULTS AND DISCUSSION

Table 1 shows the analysis of scientific publications on the use of artificial intelligence in public administration in the Scopus database. The first scientific publication in which the term “artificial intelligence” appeared in combination with the term “public administration” was published in

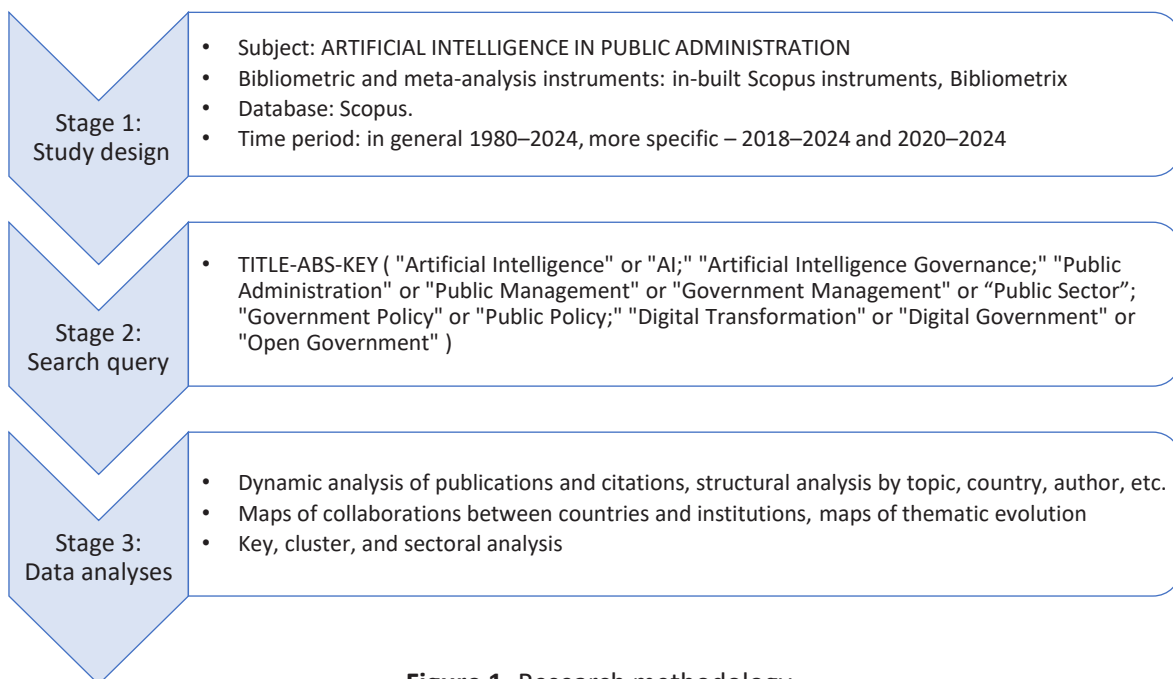


Figure 1. Research methodology

Table 1. Number of publications on the topic of artificial intelligence in public administration in the Scopus database (1980–2024)

Years	Number of publications with terms in the text	Number of publications with terms in the abstract	Number of publications with terms in the title
1980–1989	3	1	0
1990–1999	12	1	1
2000–2009	27	3	0
2010–2019	135	32	7
2020–2024	421	255	43

1986. The article was devoted to the general process of modeling an expert system for the ethical management of an organization (Counelis, 1986). The number of publications in which the terms “artificial intelligence” and “public administration” appear is 598, of which 292 are in the abstract and 51 in the titles of articles.

Table 1 shows the dynamics of publications in the Scopus database that mention the keywords “artificial intelligence” and “public administration.” The data are presented from 1980 to 2024, with a division into those where the keywords are mentioned in the text and abstracts and those where they are part of the title. From 1980 to 1989, only three publications mentioned these terms in the text and none where they appeared in the title. In the following decade (1990–1999), the number of such publications remained minimal, with one mention in the abstract and one in the title. A significant increase in interest in the topic began after 2010. From 2010 to 2019, the number of publications containing keywords in the text reached 135, of which seven included them in the title. The largest increase is observed in the period 2020–2024: 421 publications with mentions in the text, of which 43 have these terms in the titles and 255 in the abstracts.

These statistics indicate a rapid increase in researchers’ interest in using artificial intelligence in public administration, especially after 2020. This may be due to the growing role of digital technologies in public life and governance.

Eighteen main keywords that characterize the use of artificial intelligence in public administration were selected. These included commonly used terms for artificial intelligence (“artificial intelligence” or “AI”) and terms for public administration (“public administration” or “government management”). The keywords were analyzed according to the frequency of their mention in scientific publications and by determining the context in which they were used (Table 2). This showed which aspects of the application of AI are the most researched and which topics attract the most attention in the scientific community.

Taking into account the frequency of mentions and the context, the main research clusters were formed, each of which unites publications devoted to a particular topic or area of research (Figure 2). Clustering makes it possible not only to structure the existing knowledge but also to identify connections between different topics that may be important for the further development of research

Table 2. Frequency of keywords related to the topic artificial intelligence in public administration in Scopus publications for 2020–2023

Frequency of use	Keywords
200+	Artificial intelligence, public administration
160-199	Decision making, digital transformation, big data
120-159	Governance, sustainability, machine learning
90-119	Data analytics, cybersecurity, innovation
70-89	Information systems, smart city, blockchain
50-69	Digital government, public policy, E-government, leadership
40-49	Systematic review, automation, digital economy, transparency
30-39	Industrial revolution, strategic planning, economic development, higher education
26-29	Competitiveness, data management, ethics, case study

in this area. For this purpose, the indicator “total link strength” (TLS) was used, which reflects the total strength of all connections of a certain cluster with other clusters in the network.

Each of the formed clusters reflects a specific area of research in the field of using AI in public administration. The red cluster unites research focused on the use of AI in public administration and the public sector. This cluster includes keywords such as “AI” (1460 TLS), “government management” (998 TLS), “public sector” (1656 TLS), and “use case” (774 TLS). These terms are often found together, which indicates a close relationship between topics related to the use of AI to optimize administrative processes, increase the efficiency of public services and improve the interaction between government and citizens.

The yellow cluster combines the keywords “public administration” (1311 TLS), “public policy” (257 TLS), and “decision-making” (140 TLS).

The blue cluster is about data management and digital technologies in public administration, with the keywords “data management,” “digital technologies,” “cybersecurity,” and “privacy.”

This cluster reflects the growing attention of scholars to issues of data security and privacy in the context of AI use and to the role of digital technologies in the transformation of public processes.

The ethics and governance cluster, in red, includes keywords such as “ethics,” “governance,” “public policy,” and “transparency.” These clusters are closely related to AI and emphasize the importance of developing ethical standards and policy frameworks for the use of AI in public administration, as well as ensuring transparency and accountability in government decision-making.

The clusters that focus on strategic management and innovation in the public sector are worth noting. Keywords in the blue cluster include “machine learning” (352 TLS) and “deep learning” (129 TLS). The research examines the strategic use of AI to predict socio-economic trends, optimize resources, and improve the quality of public services.

Figure 3 shows how publications on artificial intelligence are distributed by field of knowledge. Based on the analysis of Scopus data, a diagram was constructed that illustrates the number of

Source: VOSviewer version 1.6.20.

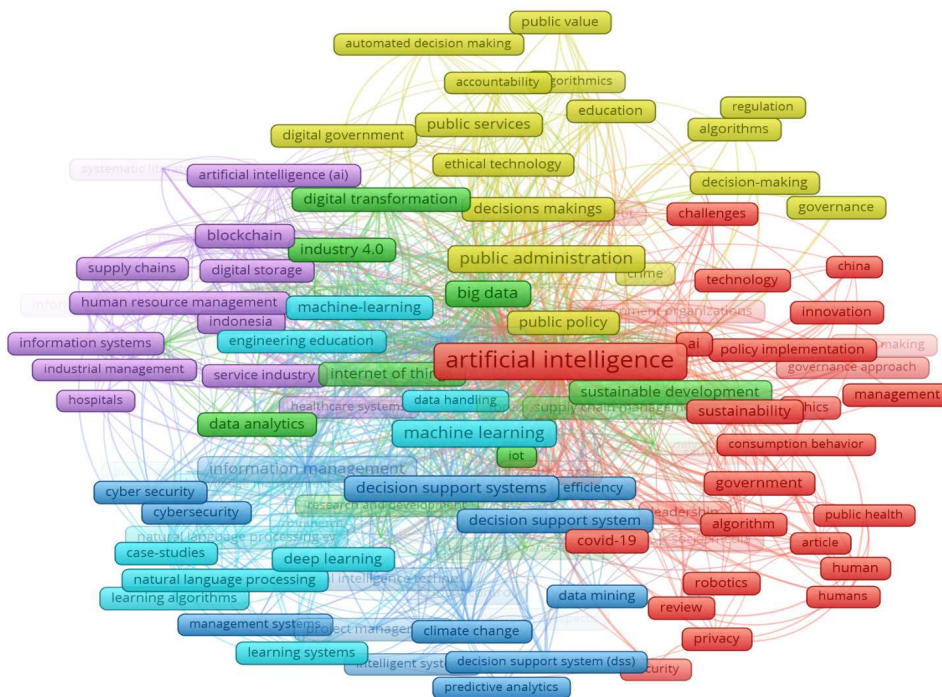


Figure 2. Scientific bibliography of the keywords “artificial intelligence,” “public administration,” and “state administration” for 2018–2024

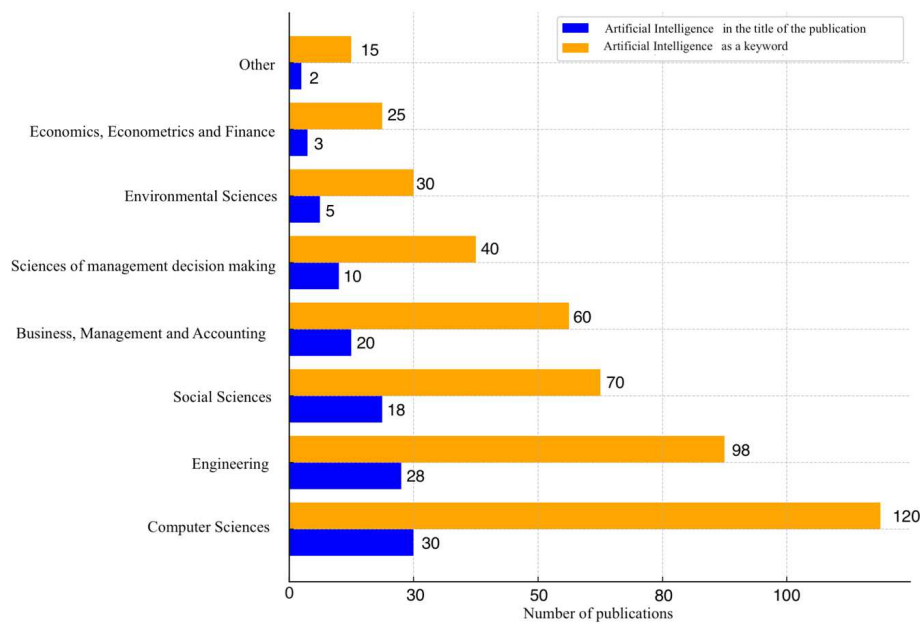


Figure 3. Distribution of publications by field of knowledge using the term “artificial intelligence” in titles and keywords

publications in which “artificial intelligence” is mentioned in the title or specified as a keyword.

The result is a distribution of relevant research by the following fields:

- computer science takes the leading position with the largest number of publications: 120 articles where “artificial intelligence” is the keyword and 30 articles where this topic appears in the title;
- engineering takes the second place (98 publications containing the keyword “artificial intelligence,” 28 articles with this topic in the title);
- social sciences (70 publications with the keyword “artificial intelligence” and 18 articles where AI is mentioned in the title);
- business, management, and accounting (60 publications where “artificial intelligence” is the keyword and 20 articles indicating this topic in the title);
- sciences of management decision-making have 40 publications with the keyword and 100 articles with the relevant topic in the title;

- environmental sciences and economics, econometrics, and finance show moderate interest, with 55 and 5 articles where “artificial intelligence” is mentioned as a keyword.

The “other” category includes areas with fewer publications, but they also contribute to the development of this topic.

For the inter-cluster analysis, a significant number of intersections between individual keywords were found, which emphasizes the importance of a comprehensive study of the use of AI in public administration. These intersections demonstrate that the study of artificial intelligence cannot be limited to individual aspects but requires an integrated approach that takes into account multiple relationships between different topics and areas.

One of the most apparent intersections is the relationship between keywords related to the efficiency of public service management and ethical issues. Thus, the implementation of AI to optimize administrative processes is inextricably linked to the need to ensure the confidentiality and security of citizens’ data. This requires not only technical solutions but also the development of clear ethical standards and a regulatory framework that administers such technologies.

The next step in the bibliometric analysis is to identify evolutionary changes in research on key concepts related to AI in public administration and their relationship with other scientific concepts during 2018–2024 (Figure 4).

From 2018 to 2020, research focused on the initial stages of AI implementation in public administration. The main attention was paid to theoretical aspects and possibilities of using AI to automate administrative processes. Key concepts of this stage were “automation,” “data analysis,” and “digital transformation.” During this period, a lot of research was also conducted on ethical aspects, in particular, privacy and cybersecurity, that arose as a result of the introduction of new technologies.

In 2021–2022, there was a significant increase in the practical use of AI in the public sector. The main emphasis was placed on the implementation of specific projects in the field of smart cities, automated resource management, and the use of AI for decision-making based on large volumes of data. Key concepts include “smart cities,” “decision support systems,” “big data,” and “governance.” A vital aspect during this period was the study of the legislative framework governing the implementation of AI in the public sector, which is reflected in the increase in publications related to regulatory and ethical standards.

In recent years, a focus on the integration of AI into long-term strategies of public administration and public policies has been characteristic. Studies widely assess the impact of AI on changing management paradigms and on citizens’ trust in government institutions. Key concepts include “strategic management,” “public trust,” “transparency,” and “policy development.” During this period, there has also been an increasing interest in studying the impact of AI on global social and economic trends, which is confirmed by the growing number of publications that explore the relationship between technological innovations and social changes.

The relationship between research on AI in public administration and other current scientific issues is becoming increasingly evident with the development of innovative technologies. The closest connections are observed in computer science, infor-

matics, law, sociology, and economics. From 2018 to 2020, the primary connections were between research in the field of informatics (especially in the field of data analysis and machine learning) and public administration. However, since 2021, research has combined the legal aspects of regulating the implementation of AI and management aspects. In 2023–2024, research offers economic models and forecasts using AI, as well as their impact on policy and management at the global level.

A significant evolution in the focus of scientific research is taking place from theoretical research and analysis of the AI potential in 2018 to concrete applied research in 2024 (Figure 4). This change reflects the growing role of AI in public administration and its comprehensive impact on various social spheres. Over time, research increasingly focuses on interdisciplinary approaches that combine technological innovations with social, legal, and economic issues. This demonstrates the importance of a comprehensive approach to studying the impact of AI on public administration.

The evolutionary-temporal analysis shows that research in AI in public administration has gone from initial theoretical concepts to concrete applied solutions that are already being implemented in practice. The key concepts that emerged in the initial stages have developed into more complex and integrated concepts that now encompass not only technological aspects but also social, legal, and economic issues.

Visualizing the geographical distribution of AI research over time makes it possible to assess how scientific approaches have developed in different countries and regions during 2018–2024 (Figure 5). Twenty-four countries were selected that are most actively engaged in the study of individual interconnected scientific concepts. Six main clusters of countries were identified that can be considered the main centers of research on the use of AI in public administration. Figure 5 shows the grouping of countries and the connections between them, using the following colors: red (Estonia, Finland, France, Germany, Ireland, Italy, and the Netherlands), green (Australia, China, Denmark, Greece, Singapore, and South Africa), blue (India, Mexico, Saudi Arabia, and the UAE), yellow (Brazil, Spain, and Switzerland), purple

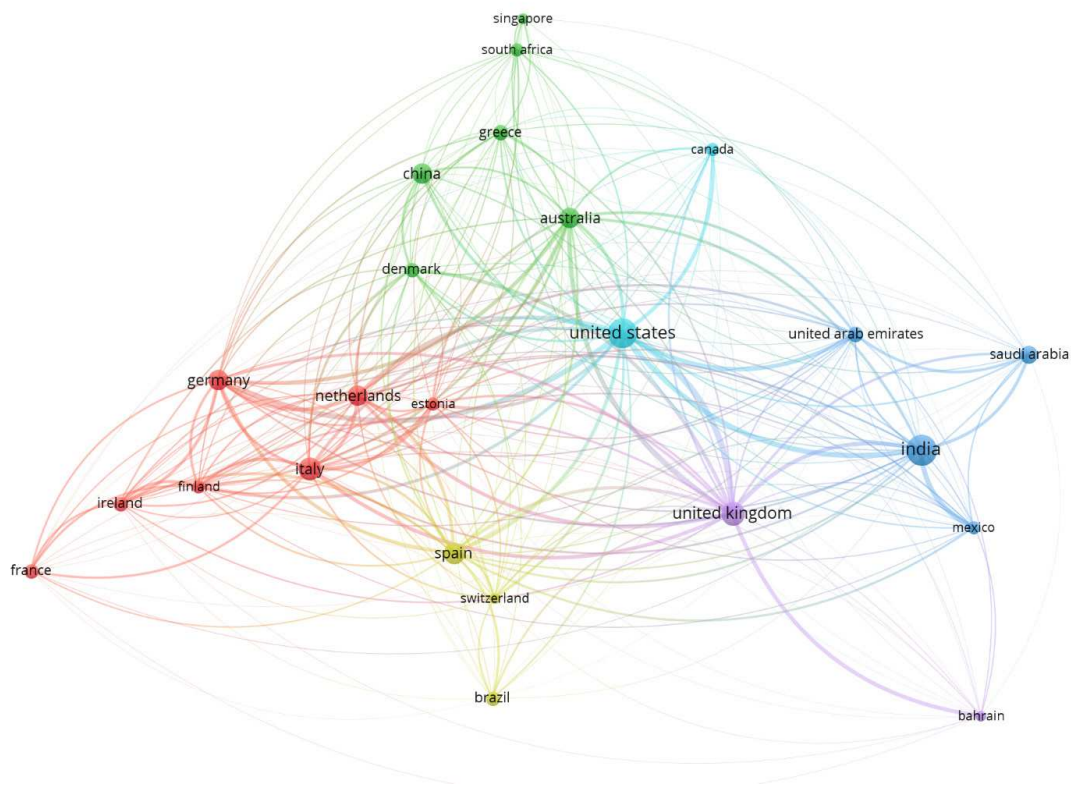


Figure 5. Geographic map of scientific research on the concepts of “artificial intelligence,” “public administration,” and “state administration” for 2020–2024

(Great Britain and Bahrain), and light blue (the USA and Canada).

The United States of America is the leader in the study of artificial intelligence use in public administration. The second country is the United Kingdom, which greatly contributes to developing research on this topic. Other significant groups of countries but less involved in studying the problem under consideration are India, Mexico, Saudi Arabia, the UAE, Estonia, Finland, France, Germany, Ireland, Italy, and the Netherlands.

The distribution of countries by clusters does not mean that they operate exclusively within their groups. They actively intersect with other countries in scientific research on this issue. Influential countries, such as the United States and the United Kingdom, are widely connected with less influential countries within the sample. Estonia, Finland, France, Greece, and China are also doing a lot of research on the use of AI in public administration.

A spatial-temporal visualization of the geographical map related to the research on the concepts of “artificial intelligence,” “public administration,” and “state administration” demonstrates how research in different countries gained momentum during 2020–2024 (Figure 6). The map shows which countries became leaders at certain stages and how the intensity of research on specific concepts changed over time. Color coding from purple to yellow was used to reflect the intensity of research, where purple indicates countries with early publications and yellow indicates countries with recent publications.

In 2020–2021, research activity was concentrated in Singapore, Estonia, and China. These countries made significant contributions to the initial research on AI in public administration, which is reflected in the map by significant concentrated areas of activity.

In 2021–2022, research began to spread actively in Europe, in particular in the UK and Germany, as well as in the USA and India. The focus was on ethical aspects and regulatory regulation of the use of AI.

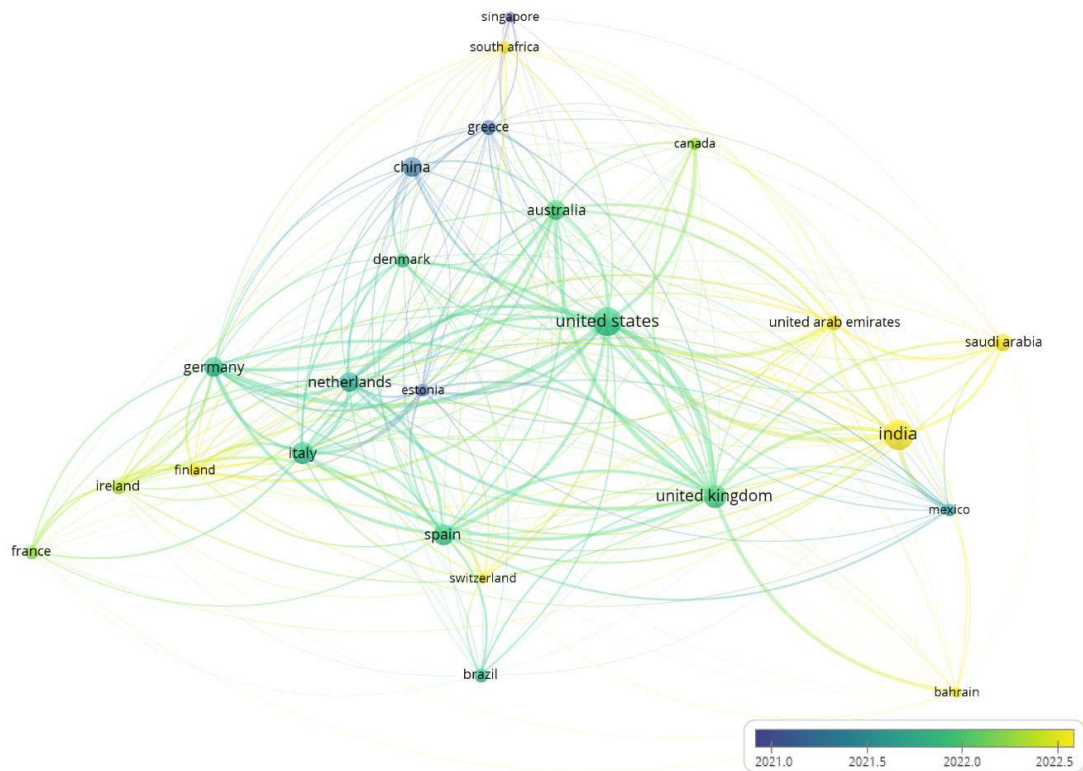


Figure 6. Geographic map of the spatio-temporal dimension of scientific research on the concepts of “artificial intelligence,” “public administration,” and “state administration” for 2020–2024

In 2021–2022, research began to spread actively in Europe, in particular, in the UK and Germany, as well as in the USA and India. The focus was on ethical aspects and regulatory regulation of the use of AI.

In recent years, research activity has increased in other regions, such as Canada, Australia, and partly Latin America, the UAE, and Saudi Arabia, which indicates a global interest in AI in public administration.

The visualization also shows how scientific priorities have changed over time. For example, at the beginning of the period, research was more focused on fundamental aspects of AI and its potential applications in public administration. Over time, the focus shifted to specific applied research related to the real implementation of AI technologies. The dominance of certain scientific concepts in certain regions suggests that different countries had different focuses depending on their social, political, and economic conditions.

The map also illustrates how international ties in the field of AI research in public administration have

strengthened. For example, close cooperation between academic institutions in the United States and the European Union became more visible in 2021–2022, when the first joint projects on the ethical aspects of the use of AI appeared. In 2023–2024, there is a trend toward increasing collaborations between Asian countries, which indicates the growing role of this region in the development of AI and its use in public administration.

Visualizing the spatio-temporal dimension of research has shown that AI is becoming a global topic of interest to scientists in different parts of the world. The dynamics of research indicate that in recent years, significant progress has been made in the development and implementation of AI technologies in the public sector. The greatest activity is observed in the USA, Great Britain, the European Union (especially in Germany, Italy, and the Netherlands), Canada, and India. These countries continue to play a key role in the development of this topic.

Given the growing role of artificial intelligence in the transformation of modern public administration,

this study outlines the main areas of future research that can contribute to expanding the scientific and practical potential of AI in this area.

The first area is ethical aspects and ensuring public trust. Improving the principles of transparency, accountability, and fairness in the use of AI algorithms and developing tools for monitoring decision-making using AI technology will contribute to building public trust in state institutions by paying special attention to the protection of personal data and preventing discriminatory practices.

The second is legal regulation and standardization. The integration of AI into state processes requires an effective regulatory framework. Research in this area can focus on analyzing existing regulatory practices and developing new approaches that will ensure the balanced development of innovations and the safety of citizens (de Almeida et al., 2021). In particular, the issue of creating international standards for the use of AI in the public sector is of interest. This will contribute to unifying approaches to its use in different countries.

The third is improving the efficiency of public services. AI has significant potential to automate administrative processes, reduce costs, and improve the quality of service provision for citizens (Henman, 2020). Research can focus on using chatbots, analytical platforms for processing citizen requests, and developing predictive models for managing public resources. In addition, the impact of these technologies on reducing the bureaucratic burden should be studied.

The fourth is integrating AI into strategic planning. The use of AI to predict socio-economic trends and support strategic decision-making is another promising area. AI algorithms can analyze large amounts of data to identify long-term trends that affect public needs. Such approaches will increase the accuracy of planning and adaptation of public policies to changing conditions.

The fifth is the use of AI to achieve sustainable development goals. Integrating AI technologies into public administration can contribute to achieving sustainable development goals (Nosratabadi et al., 2020). Research can study the application of AI to energy resource management, reducing carbon

dioxide emissions, optimizing urban transport systems, and protecting the environment. For example, the development of smart grids to monitor environmental conditions and predict the effects of climate change can become the basis for effective policies.

The sixth is crisis management and emergencies. AI can be used to analyze data in real time to predict and manage crises such as natural disasters, pandemics, or manufactured accidents (Cao, 2023). Future research should explore the possibilities of implementing such technologies to respond quickly to emergencies and develop preventive measures that reduce their negative impact.

Next, there is the social impact of AI. An essential area of research is assessing the social impact of AI on civic engagement and trust in government (Liu et al., 2023). The use of digital platforms based on AI can stimulate citizen participation in decision-making and increase the transparency of state processes. Research in this area can contribute to the development of mechanisms that support dialogue between government and society.

The eighth is introducing innovations in smart cities. The development of the smart city concept, based on AI technologies, requires a deeper scientific analysis. Studying the application of machine learning algorithms to manage traffic flows, energy supply, and urban infrastructure will significantly improve citizens' quality of life.

Finally, inclusivity and accessibility are worth noting. Particular attention should be paid to studying how AI can promote inclusiveness in public administration, ensuring access to services for all categories of the population, including people with disabilities (Schmager et al., 2024). Research can focus on the development of interfaces and platforms that are convenient and understandable for different users.

The development of these research areas will make it possible to create a more efficient, transparent, and sustainable public administration system that can respond to the challenges of the modern world. The integration of AI into the public sector should be based on an interdisciplinary approach that combines technical, social, and ethical aspects.

CONCLUSION

The paper aimed to identify key areas of research on the use of AI and analyze keywords and topics in scientific publications that reveal theoretical and practical aspects of the use of artificial intelligence in public administration.

The study shows the main trends in research activities on the use of artificial intelligence in public administration using meta- and bibliometric analysis. To achieve the goal, a quantitative and qualitative analysis of scientific publications in the Scopus database was conducted. Based on the selection and filtering of the obtained results, data on publications cited in the Scopus database on artificial intelligence in public administration were summarized. From 1980 to 2024, a significant increase in the number of scientific publications related to the topic of AI in public administration was recorded. A particularly intensive increase was observed in 2010–2019 (135 publications) and 2020–2024 (421 publications).

The analysis of scientific publications confirmed the interdisciplinary nature of research, which reflects the growing role of digital technologies. There has been a significant shift in focus from research on artificial intelligence as a technology to its application in specific areas. The most frequently mentioned terms are “artificial intelligence,” “public administration,” “big data,” “governance,” and “sustainability.” This indicates that research is focused on innovative solutions for the efficiency of public administration.

The highest number of studies is concentrated in computer science, engineering, social sciences, and business, which confirms the interdisciplinary nature of this topic. The leaders in AI research in public administration are the USA, Great Britain, Germany, Italy, China, and the Netherlands.

Thematic analysis confirms the focus of research on the use of AI in public administration and public sector, decision-making in public administration, data management and digital technologies in public administration, and strategic use of AI to forecast socio-economic trends.

The prospect of further research in this area is the study of ethical approaches to building public trust in using AI and developing a regulatory framework and standards for achieving sustainable development goals.

AUTHOR CONTRIBUTIONS

Conceptualization: Ihor Rekunenکو, Iana Kobushko, Oleksii Dzydzyguri, Inna Balahurovska.

Data curation: Iana Kobushko, Oleksii Dzydzyguri, Oksana Yurynets, Oleksandr Zhuk.

Formal analysis: Ihor Rekunenکو, Iana Kobushko, Oleksii Dzydzyguri, Inna Balahurovska.

Investigation: Ihor Rekunenکو, Iana Kobushko, Oleksii Dzydzyguri, Inna Balahurovska.

Methodology: Ihor Rekunenکو, Iana Kobushko, Oleksii Dzydzyguri, Inna Balahurovska.

Project administration: Ihor Rekunenکو, Iana Kobushko, Oksana Yurynets, Oleksandr Zhuk.

Supervision: Ihor Rekunenکو, Iana Kobushko.

Validation: Oleksii Dzydzyguri, Oksana Yurynets, Oleksandr Zhuk.

Visualization: Oleksii Dzydzyguri, Oksana Yurynets, Oleksandr Zhuk.

Writing – original draft: Ihor Rekunenکو, Iana Kobushko, Oleksii Dzydzyguri, Inna Balahurovska.

Writing – review & editing: Iana Kobushko, Oleksii Dzydzyguri, Inna Balahurovska, Oksana Yurynets, Oleksandr Zhuk.

ACKNOWLEDGMENT

The analysis was carried out within the framework of the implementation of the perspective plan for the development of the scientific area “Social Sciences” of Sumy State University, number d/r 0121U112685.

REFERENCES

1. Alshahrani, A., Dennehy, D., & Mäntymäki, M. (2021). An attention-based view of AI assimilation in public sector organizations: The case of Saudi Arabia. *Government Information Quarterly*, 39(4), Article 101617. <https://doi.org/10.1016/j.giq.2021.101617>
2. Androustopoulos, A., Karacapilidis, N., Loukis, E., & Charalabidis, Y. (2019). Transforming the communication between citizens and government through AI-guided chatbots. *Government Information Quarterly*, 36(2), 358-367. <https://doi.org/10.1016/j.giq.2018.10.001>
3. Ariga, T. (2021). *Artificial intelligence: An accountability framework for federal agencies and other entities*. GAO. Retrieved from <https://www.gao.gov/assets/gao-21-519sp.pdf>
4. Barodi, M., & Lalaoui, S. (2025). Civil servants' readiness for AI adoption: The role of change management in Morocco's public sector. *Problems and Perspectives in Management*, 23(1), 63-75. [https://doi.org/10.21511/ppm.23\(1\).2025.05](https://doi.org/10.21511/ppm.23(1).2025.05)
5. Brunetti, F., Matt, D. T., Bonfanti, A., De Longhi, A., Pedrini, G., & Orzes, G. (2020). Digital transformation challenges: Strategies emerging from a multi-stakeholder approach. *The TQM Journal*, 32(4), 697-724. <https://doi.org/10.1108/tqm-12-2019-0309>
6. Bullock, J. B. (2019). Artificial intelligence, discretion, and bureaucracy. *The American Review of Public Administration*, 49(7), 751-761. <https://doi.org/10.1177/0275074019856123>
7. Cao, L. (2023). AI and data science for smart emergency, crisis and disaster resilience. *International Journal of Data Science and Analytics*, 15(3), 231-246. <https://doi.org/10.1007/s41060-023-00393-w>
8. Chen, C., Hu, Y., Karuppiah, M., & Kumar, P. M. (2021). Artificial intelligence on economic evaluation of energy efficiency and renewable energy technologies. *Sustainable Energy Technologies and Assessments*, 47, Article 101358. <https://doi.org/10.1016/j.seta.2021.101358>
9. Chew, M. Y. L., Teo, E. A. L., Shah, K. W., Kumar, V., & Hussein, G. F. (2020). Evaluating the roadmap of 5G technology implementation for smart building and facilities management in Singapore. *Sustainability*, 12(24), Article 10259. <https://doi.org/10.3390/su122410259>
10. Cortis, K., & Davis, B. (2021). Over a decade of social opinion mining: A systematic review. *Artificial Intelligence Review*, 54(7), 4873-4965. <https://doi.org/10.1007/s10462-021-10030-2>
11. Counelis, J. S. (1986). On a generic modeling process of an expert system for ethical organizational administration. *Cybernetics and Systems*, 17(2-3), 151-167. <https://doi.org/10.1080/01969728608927437>
12. de Almeida, P. G. R., dos Santos, C. D., & Farias, J. S. (2021). Artificial intelligence regulation: A framework for governance. *Ethics and Information Technology*, 23, 505-525. <https://doi.org/10.1007/s10676-021-09593-z>
13. Di Vaio, A., Hassan, R., & Alavoine, C. (2022). Data intelligence and analytics: A bibliometric analysis of human-Artificial intelligence in public sector decision-making effectiveness. *Technological Forecasting and Social Change*, 174, Article 121201. <https://doi.org/10.1016/j.techfore.2021.121201>
14. Didin, D., Akib, H., Haedar, A. W., & Yandra, A. (2024). The role of e-government in public services: A bibliometric analysis. *Journal of Contemporary Governance and Public Policy*, 5(2), 111-134. <https://doi.org/10.46507/jcgpp.v5i2.466>
15. Floridi, L., Cowls, J., Beltrametti, M., Chatila, R., Chazerand, P., Dignum, V., Luetge, C., Madelin, R., Pagallo, U., Rossi, F., Schafer, B., Valcke, P., & Vayena, E. (2018). AI4People – An ethical framework for a good AI society: Opportunities, risks, principles, and recommendations. *Minds and Machines*, 28(4), 689-707. <https://doi.org/10.1007/s11023-018-9482-5>
16. Gesk, T. S., & Leyer, M. (2022). Artificial intelligence in public services: When and why citizens accept its usage. *Government Information Quarterly*, 39(3), Article 101704. <https://doi.org/10.1016/j.giq.2022.101704>
17. Giuffrida, N., Fajardo-Calderin, J., Masegosa, A. D., Werner, F., Steudter, M., & Pilla, F. (2022). Optimization and machine learning applied to last-mile logistics: A review. *Sustainability*, 14(9), Article 5329. <https://doi.org/10.3390/su14095329>
18. Gooneratne, C. P., Magana-Mora, A., Contreras Otalvora, W., Af-fleck, M., Singh, P., Zhan, G. D., & Moellendick, T. E. (2020). Drilling in the fourth industrial revolution – Vision and challenges. *IEEE Engineering Management Review*, 48(4), 144-159. Retrieved from <https://ieeexplore.ieee.org/document/9109683>
19. Goralski, M. A., & Tan, T. K. (2020). Artificial intelligence and sustainable development. *The International Journal of Management Education*, 18(1), Article 100330. <https://doi.org/10.1016/j.ijme.2019.100330>
20. Goshovska, V., & Kravchuk, O. (2024). Shtuchnyi intelekt v publichnomu upravlinni: Vektory suchasnykh doslidzhen [Artificial intelligence in public administration: Vectors of modern research]. *National Interests of Ukraine*, 2(2). (In Ukrainian). [https://doi.org/10.52058/3041-1793-2024-2\(2\)-362-369](https://doi.org/10.52058/3041-1793-2024-2(2)-362-369)
21. Güney, C., & Ala, T. (2024). The insights of publications in the field of artificial intelligence (ai)-based risk management in public sector: A bibliometric overview. *EDPACS*, 69(1), 41-68. <https://doi.org/10.1080/07366981.2024.2312002>
22. Gupta, S., Motlagh, M., & Rhyner, J. (2020). The digitalization sustainability matrix: A participa-

- tory research tool for investigating digitainability. *Sustainability*, 12(21), Article 9283. <https://doi.org/10.3390/su12219283>
23. Hartmann, K., & Wenzelburger, G. (2021). Uncertainty, risk and the use of algorithms in policy decisions: A case study on criminal justice in the USA. *Policy Sciences*, 54(2), 269-287. <https://doi.org/10.1007/s11077-020-09414-y>
 24. Henman, P. (2020). Improving public services using artificial intelligence: Possibilities, pitfalls, governance. *Asia Pacific Journal of Public Administration*, 42(4), 209-221. <https://doi.org/10.1080/23276665.2020.1816188>
 25. Hoosain, M. S., Paul, B. S., & Ramakrishna, S. (2020). The impact of 4IR digital technologies and circular thinking on the United Nations sustainable development goals. *Sustainability*, 12(23), Article 10143. <https://doi.org/10.3390/su122310143>
 26. Izumi, T., Shaw, R., Djalante, R., Ishiwatari, M., & Komino, T. (2019). Disaster risk reduction and innovations. *Progress in Disaster Science*, 2, Article 100033. <https://doi.org/10.1016/j.pdisas.2019.100033>
 27. Kankanhalli, A., Charalabidis, Y., & Mellouli, S. (2019). IoT and AI for smart government: A research agenda. *Government Information Quarterly*, 36(2), 304-309. <https://doi.org/10.1016/j.giq.2019.02.003>
 28. Kolková, A., & Klučnikov, A. (2022). Demand forecasting: AI-based, statistical and hybrid models vs practice-based models – The case of SMEs and large enterprises. *Economics and Sociology*, 15(4), 39-62. <https://doi.org/10.14254/2071-789X.2022/15-4/2>
 29. Landa, P., Sonnessa, M., Tànfani, E., & Testi, A. (2018). Multiobjective bed management considering emergency and elective patient flows. *International Transactions in Operational Research*, 25(1), 91-110. <https://doi.org/10.1111/itor.12360>
 30. Lawelai, H., Iswanto, I., & Raharja, N. M. (2023). Use of artificial intelligence in public services: A bibliometric analysis and visualization. *TEM Journal*, 12(2), 798-807. <https://doi.org/10.18421/TEM122-24>
 31. Lee, S. (2024). Fundamental trends and hot-spots in public governance and artificial intelligence research: A bibliometric study analysis from 2013 to 2023. *CIBDA 2024: 5th International Conference on Computer Information and Big Data Applications*. <https://doi.org/10.1145/3671151.3671290>
 32. Letkovsky, S., Jencova, S., Vasanicova, P., Gavura, S., & Bacik, R. (2023). Predicting bankruptcy using artificial intelligence: The case of the engineering industry. *Economics and Sociology*, 16(4), 178-190. <https://doi.org/10.14254/2071-789X.2023/16-4/8>
 33. Liu, F., Makady, H., Nah, S., & McNealy, J. (2023). When citizens support AI policies: The moderating roles of AI efficacy on AI news, discussion, and literacy. *Journal of Information Technology & Politics*, 21(4), 493-509. <https://doi.org/10.1080/19331681.2023.2294363>
 34. Longaray, A., Ensslin, L., Ensslin, S., Alves, G., Dutra, A., & Munhoz, P. (2018). Using MCDA to evaluate the performance of the logistics process in public hospitals: The case of a Brazilian teaching hospital. *International Transactions in Operational Research*, 25(1), 133-156. <https://doi.org/10.1111/itor.12387>
 35. Madan, R., & Ashok, M. (2022). AI adoption and diffusion in public administration: A systematic literature review and future research agenda. *Government Information Quarterly*, 40(1), Article 101774. <https://doi.org/10.1016/j.giq.2022.101774>
 36. Maedche, A., Legner, C., Benlian, A., Bergeret, B., Gimpel, H., Hess, T., Hinz, O., Morana, S., & Söllner, M. (2019). AI-based digital assistants. *Business & Information Systems Engineering*, 61, 535-544. <https://doi.org/10.1007/s12599-019-00600-8>
 37. McClure, E. C., Sievers, M., Brown, C. J., Buelow, C. A., Ditria, E. M., Hayes, M. A., Pearson, R. M., Tulloch, V. J. D., Unsworth, R. K. F., & Connolly, R. M. (2020). Artificial intelligence meets citizen science to supercharge ecological monitoring. *Patterns*, 1(7), Article 100109. <https://doi.org/10.1016/j.patter.2020.100109>
 38. Moss, R. H., Avery, S., Baja, K., Burkett, M., Chischilly, A. M., Dell, J., Fleming, P. A., Geil, K., Jacobs, K., Jones, A., Knowlton, K., Koh, J., Lemos, M. C., Melillo, J., Pandya, R., Richmond, T. C., Scarlett, L., Snyder, J., ... Zimmerman, R. (2019). Evaluating knowledge to support climate action: A framework for sustained assessment. Report of an independent advisory committee on applied climate assessment. *Weather, Climate, and Society*, 11(3), 465-487. <https://doi.org/10.1175/wcas-d-18-0134.1>
 39. Neumann, O., Guirguis, K., & Steiner, R. (2022). Exploring artificial intelligence adoption in public organizations: A comparative case study. *Public Management Review*, 26(1), 114-141. <https://doi.org/10.1080/14719037.2022.2048685>
 40. Nosratabadi, S., Mosavi, A., Keivani, R., Ardabili, S., & Aram, F. (2020). State of the art survey of deep learning and machine learning models for smart cities and urban sustainability. In A. Várkonyi-Kóczy (Ed.), *Engineering for Sustainable Future*. Springer, Cham. https://doi.org/10.1007/978-3-030-36841-8_22
 41. Nubert, J., Truong, N. G., Lim, A., Tanujaya, H. I., Lim, L., & Vu, M. A. (2018). Traffic density estimation using a convolutional neural network. *arXiv:1809.01564*. <https://doi.org/10.48550/arXiv.1809.01564>
 42. Ostapiuk, V. (2024). Shtuchnyi intelekt u systemi publichnoho upravlinnia v Ukraini: Sutnist ta osoblyvosti vprovadzhenia [Artificial intelligence in the public administration system in Ukraine: Essence and implementation features]. *Scientific Perspectives*, 9(51). (In Ukrainian). [https://doi.org/10.52058/2708-7530-2024-9\(51\)-297-308](https://doi.org/10.52058/2708-7530-2024-9(51)-297-308)

43. Panagiotopoulos, I., & Dimitrakopoulos, G. (2018). An empirical investigation on consumers' intentions towards autonomous driving. *Transportation Research Part C: Emerging Technologies*, 95, 773-784. <https://doi.org/10.1016/j.trc.2018.08.013>
44. Rajput, S. K., Patni, J. C., Alshamrani, S. S., Chaudhari, V., Dumka, A., Singh, R., Rashid, M., Gehlot, A., & AlGhamdi, A. S. (2022). Automatic vehicle identification and classification model using the yolov3 algorithm for a toll management system. *Sustainability*, 14(15), Article 9163. <https://doi.org/10.3390/su14159163>
45. Robinson, C., & Dilkina, B. (2018). A machine learning approach to modeling human migration. *COMPASS '18: ACM SIGCAS Conference on Computing and Sustainable Societies*. New York, NY, USA. <https://doi.org/10.1145/3209811.3209868>
46. Savaget, P., Chiarini, T., & Evans, S. (2018). Empowering political participation through artificial intelligence. *Science and Public Policy*, 46(3), 369-380. <https://doi.org/10.1093/scipol/scy064>
47. Schmager, S., Gupta, S., Pappas, I., Vassilakopoulou, P. (2024). Designing for AI transparency in public services: A user-centred study of citizens' preferences. In F.F.H. Nah & K.L. Siau (Eds.), *HCI in Business, Government and Organizations*. Cham: Springer. https://doi.org/10.1007/978-3-031-61315-9_17
48. Sharma, M., Luthra, S., Joshi, S., & Kumar, A. (2021). Implementing challenges of artificial intelligence: Evidence from public manufacturing sector of an emerging economy. *Government Information Quarterly*, 39(4), Article 101624. <https://doi.org/10.1016/j.giq.2021.101624>
49. Sheikh, A., Anderson, M., Albala, S., Casadei, B., Franklin, B. D., Richards, M., Taylor, D., Tibble, H., & Mossialos, E. (2021). Health information technology and digital innovation for national learning health and care systems. *The Lancet Digital Health*, 3(6), e383-e396. [https://doi.org/10.1016/s2589-7500\(21\)00005-4](https://doi.org/10.1016/s2589-7500(21)00005-4)
50. Trebyk, L.P. (2021). Shtuchnyi intelekt dlia transformatsiinykh zmin derzhavnykh instytutsii ta rozvytku tsyvrovoho suspilstva [Artificial intelligence for transformational changes in government institutions and development of digital society]. *Bulletin of the National University of Civil Protection of Ukraine. Series: Public Administration*, (1(14)2021). (In Ukrainian). Retrieved from <http://repositc.nuczu.edu.ua/bitstream/123456789/13679/1/%D0%9B%D1%8E%D0%B4%D0%BC%D0%B8%D0%BB%D0%B0%20%D0%A2%D1%80%D0%B5%D0%B1%D0%B8%D0%BA.pdf>