

ARTIFICIAL INTELLIGENCE IN PUBLIC ADMINISTRATION AND MAIN CHANGES IN PROFESSIONAL TRAINING

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ABSTRACT

This research initiates an in-depth exploration of the transformative influence of Artificial Intelligence (AI) in public administration at the European Union level. Its aim is to decipher the complex ways in which AI is redefining operational and professional paradigms in public services, marking a new era of digital governance. The study investigates the growing integration of AI technologies into public sector processes, examining their profound implications for work roles, administrative skills and the overall efficiency and effectiveness of public service delivery.

At the heart of this research is a comprehensive analysis of how AI is changing the skills landscape for civil servants. It looks at the evolution of job responsibilities, highlighting the shift to more complex, AI-enhanced roles that require a new set of digital skills. The study expands to investigate how this technological change is altering the interaction between civil servants and citizens, potentially leading to more transparent, responsive, and citizen-centric services.

By reviewing existing academic literature, policy analysis and case studies from the European context, the study paints a vivid picture of a public administration landscape undergoing digital transformation. Explores emerging trends in the application of AI - from automating routine tasks to facilitating data-driven decision-making - and their implications for the skills and training needs of public service professionals.

Furthermore, the research proposes creative insights into the future trajectory of AI in public administration. It discusses the potential of AI to foster innovative solutions to longstanding bureaucratic challenges, thereby improving the efficiency and effectiveness of the public sector. This includes envisioning the role of AI in facilitating more informed policy decisions, simplifying administrative procedures, and promoting a more engaged and empowered citizenry.

By providing a nuanced understanding of the intersection of AI and public administration, this study aims to make a significant contribution to the strategic discourse on public sector digitization. It seeks to provide policy makers, administrative bodies and public service professionals with a robust framework for navigating the challenges and capitalizing on the opportunities presented by AI in digital governance.

KEYWORDS: *Artificial Intelligence (AI), Public Administration, Digital Competencies, Public Service Transformation, AI Integration in Governance.*

INTRODUCTION

Although the first computers were created as early as the 20th century, the real development of digitization did not come until a century later. Artificial intelligence has had an impressive evolution if we refer to the year 1956 when an American computer scientist explained the term as "the science and engineering of making intelligent machines, especially intelligent programs" (Gurkaynak et al. 2016, p 753). Next, computer scientists devised the deep learning method that makes a computer able to learn from experience. As such, the computer can learn the world through this method and the

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innovation comes from the fact that an operator is no longer necessary to give the commands (Kim, 2016). Currently, artificial intelligence is at a higher level of development that can be called "Artificial General Intelligence" (AGI). AGI refers to the fact that technology will be able to match the human mind: "computers will be as intelligent as humans in every way and able to perform all the intellectual tasks that humans can do" (Straus 2020, p 143). The desire of practitioners in the field is for innovation to reach the final stage of "Artificial Superintelligence" (ASI) when the technology will be "much smarter than the best human brain in practically every domain, including scientific creativity, general wisdom and social skills" (Gurkaynak et al. 2016, 751–753). The most relevant players in the business consulting market are debating at an in-depth level how artificial intelligence is almost completely transforming business and society (McWaters, 2018), and academics believe that the future impact of artificial intelligence is comparable to that of electricity on humanity (Ng, 2018). Not only private organizations use artificial intelligence, but also those in the public sector. The advantages of implementing AI in the service of states would bring rapid efficiency of resources but also an improvement of public services so necessary and requested by citizens. (Tangi et al., 2022). Although the European Union's agenda prioritizes digitization by promoting the so-called "Digital Decade", research shows that AI has not yet achieved the expected revolutionary effect in the public domain (Dwivedi et al., 2021).

However, expectations regarding emerging technologies such as collaborative artificial intelligence, sensory enhancement, augmented reality and blockchain remain in the collective mind due to their transformative capacity in various fields, including public administration (Androniceanu, 2023). Certain applications recently introduced in public administration have achieved excellent results and achieved high levels of satisfaction in many European public administration institutions. Among these we mention services that greatly simplified the lives of citizens and brought increased efficiency to public institutions, such as simplified tax declaration processes, electronic invoicing, government cloud infrastructure or digital education and electronic public services (Koman et al, 2022). In this context, it is anticipated that artificial intelligence will have a significant role in public administration as demonstrated by the various research carried out in the academic area (Ciancarini et al, 2023). However, research has not reached a firm conclusion on the challenges of the impact and pervasiveness of AI in terms of privacy, transparency, and accountability in the field of digital transformation (Vaira, 2022),

In conclusion, artificial intelligence faces several significant challenges that must be addressed by researchers, developers, policy makers, and society. These challenges cover technical, ethical, legal and societal aspects of AI development and implementation. From the lack of regulations or responsibilities, data protection issues or a strong shock on the labor market - all these challenges highlight the complexity of integrating artificial intelligence into society in a responsible and ethical way. Addressing them requires a collaborative effort involving governments, academia, industry, and civil society to ensure that AI technologies contribute positively to our world while mitigating potential risks. Even with these obvious threats, Kim et al (2022) believe that the cornerstone of effective governance is government transparency, openness, accountability and active community involvement in policy development and implementation processes and artificial intelligence ensures that these processes are easily accessible and easy to make. In the current context, characterized by a rapid and complex evolution of digital technologies, artificial intelligence (AI) is becoming a key factor in the transformation of fields of activity, including public administration. This research aims to explore the profound and multidimensional impact of AI on public administration, with a particular focus on changes in professionalism and skills required in the public sector.

The digital age has brought with it significant challenges and opportunities for governments and public institutions. While digitization and information technologies were initially seen as tools to streamline administrative processes, the emergence of AI opens new horizons for innovation and efficiency in public services. This transition is not only technological, but also involves a fundamental transformation of skills, strategies and the way civil servants interact with citizens.

The European context offers a unique framework for the study of AI in public administration, due to the diversity of national approaches and joint efforts to coordinate and standardize digitization at the EU level. This research focuses on understanding how AI is integrated into various administrative systems and its impact on public professionalism and skills.

The main objective of the study is to map the transformations brought about by AI in public administration, assessing how this technology is changing the roles, responsibilities, and expectations of civil servants. It will look at how AI can help increase efficiency and transparency in public services, as well as how it can improve the interaction between government and citizens. In addition, the study will examine the challenges and barriers encountered in the process of integrating AI, from technical aspects to those related to workforce training and adaptation.

Through this approach, the research aims to provide a comprehensive and detailed perspective on the role of AI in modernizing public administration, thus contributing to an essential dialogue about the future of digital governance and the role of technology in contemporary society.

This research approaches AI not only as a technological tool, but also as a catalyst for cultural and structural change in public administration. The integration of AI implies not only the implementation of advanced technological solutions, but also a reconsideration of the way in which public policies are formulated, implemented and evaluated. Therefore, the study will focus on deep understanding of the dynamics between technology, administrative processes and interaction with citizens.

In this context, a central aspect of the research is how AI can influence and improve decision-making in public administration. AI has the potential to analyze large volumes of data, identify trends and predict policy outcomes, which can lead to more informed and effective decisions. However, it also raises important questions about transparency, ethics and accountability in AI-assisted decision-making.

Another area of interest is the impact of AI on the interaction between the public sector and citizens. While digital technologies have already facilitated communication and access to services, AI has the potential to further personalize these services, anticipate citizens' needs and respond more effectively to their requests. This can lead to a more citizen-oriented public administration and more responsive to their feedback.

1. LITERATURE REVIEW

Today, industry 4.0. it creates an indispensable link between humans and machines as digitization is a vital component in almost every aspect of our lives. Digital tools such as the Internet, mobile phones, cloud solutions, artificial intelligence or self-driving cars make digital skills no longer an objective but an obligation in our daily lives (Juhász et al , 2022). In recent years, there has been a growing interest in the use of digital technologies such as blockchain, the Internet of Things or artificial intelligence. Among all these innovations, researchers are increasingly discussing artificial intelligence as the most promising general-purpose technology of our era (Jovanovic & Rousseau, 2005). AI systems are capable of "making determinations on their own, as well as evolving their determinations over time once deployed in an organization" (Murray et al., 2021, p. 553) Researchers' optimism comes from the fact that artificial intelligence refers to the simulation of human intelligence in machines or computer systems, allowing them to perform tasks that typically require human intelligence. These tasks include reasoning, problem solving, learning, understanding natural language, pattern recognition, and decision making. According to the European Commission (2019), artificial intelligence (AI) systems "are human-designed software (and possibly hardware) systems that, with a complex purpose, act in the physical or digital dimension by perceiving their environment through data acquisition, structured data interpretation or unstructured collected, reasoning. regarding the knowledge or processing of information derived from this data and deciding the best action to take to achieve the given objective". Researchers believe that artificial intelligence can be defined as "a machine-based system that can, for a given set of human-defined objectives, make predictions, recommendations or decisions that influence real or virtual environments" (Vincent-Lancrin and van

der Vlies, 2020, p. 7). Both organizations such as UNESCO (2019) and the World Economic Forum (2020) have recently reiterated the strategic importance of artificial intelligence in achieving the goals that states have set in areas such as sustainable development and sustainability.

Both scientists and practitioners are aware that the use of AI has the potential to disrupt almost all industries (Raisch & Krakowski, 2021). In recent years, artificial intelligence has accelerated expansion especially in the subfield of deep learning. Artificial intelligence has the potential to improve people's financial independence, contribute to global economic well-being and help sustainable economic growth. Also, innovation can be the key to bringing solutions to the global challenges of states such as "climate change, health crises, education, resource scarcity and discrimination" (OECD, 2019).

The concept of artificial intelligence (AI) in public administration has become increasingly relevant as governments and public organizations explore ways to use AI technology to streamline administrative services and processes. Citizen experience, engagement and collaboration have become essential factors in the process of service development and implementation (Casula et al., 2020). Both organizations and individuals must adapt to this digital change by developing the necessary digital skills (Androniceanu et al., 2022). In addition to the need for technologies, numerous researchers highlight the process, and way public institutions must fulfill their vital mission of increasing the digital literacy of civil servants (Medaglia and Tangi, 2022). According to Androniceanu & Georgescu (2023), the "digital first" principle represents an orientation that some public administrations in the EU states adopt in designing their policies and strategies. The uniform approach at national level regarding the re-use of public data can contribute to the provision of higher quality services to both citizens and private companies by the public administration. Already existing data can be used by the administration to support effective decision-making in key strategic areas of the public sector. At the same time, administrations produce the data and infrastructure needed to facilitate the reuse of data by public and private sector organizations in order to boost economic competitiveness.

In most of the member states of the European Union, the processes of digital transformation have been carried out rapidly. A strategic framework for this digital transformation of public services for citizens and the private sector has been defined (Rymarczyk, 2021). This strategic framework focuses on four main directions (Lindgren et al., 2019):

- Digital Public Administration involves a digital transformation of the administrative apparatus, evolving from a traditional administration to an intelligent government.
- The Digital Economy explores the digital transformation of economies, with a focus on stimulating the development of small and medium-sized enterprises.
- Digital Education involves integrating technology into educational processes, including policies to develop and improve digital skills across the population.
- The Digital Society refers to the transition of citizens to a new social framework based on the accessibility of various services, such as jobs, health services, social assistance, public transport, and recreation options, all in the digital environment.

With the spread of artificial intelligence globally, numerous technological, ethical, or socio-economic challenges have arisen. Of course, the states and regions cannot respond to all these aspects in a unified manner. The Global Index of Artificial Intelligence (IGIA) is the first indicator to assess countries in terms of their degree of investment, innovation, and adoption of artificial intelligence technology. The goal of the IGIA is to provide a meaningful assessment of progress in the field of artificial intelligence in the 62 countries that have allocated resources to its development. This is the first global ranking based on three main analysis criteria: investment, innovation, and implementation (IGIA, 2023). Countries are ranked according to their AI performance globally. According to the fourth report of the Global Artificial Intelligence Index (IGIA), published on June 28, 2023 (IGIA, 2023), the United States ranks first in all three main categories - implementation, innovation, and investment - with a perfect score of 100%. Especially in terms of investment, the US stands out for its outstanding performance in the Commercial Investment sub-category. China ranks second with a

score of 62% due to its significant performance in the Development sub-category of Innovation. The rest of the high-scoring countries are mostly from Western Europe, East Asia and North America. Singapore scores well overall, the UK excels in Research and Business Investment, and Germany scores excellently in Implementation. Finally, the IGIA is based on a set of 111 indicators, drawn from a total of 28 diverse data sources, both public and private, and involving collaboration with 62 governments. These indicators are grouped into seven distinct sub-pillars, namely: Talent, Infrastructure, Operating Environment, Research, Development, Government Strategy and Trade (IGIA, 2023). The analysis of the Global Artificial Intelligence Index report for 2023 reveals an interesting reality: not all European Union (EU) member states are in this ranking and countries such as Romania, Bulgaria, Croatia, Latvia and Cyprus do not appear in the list. This finding indicates that there are significant differences in the development and adoption of AI among EU member states. However, it is important to point out that there are EU countries that have stood out and achieved top positions in this artificial intelligence ranking. These countries have demonstrated a strong commitment to innovation and development in the field of AI, which has allowed them to rank in the top 10 positions globally. Therefore, at the level of the 3 main analysis criteria: investment, innovation and implementation grouped in the 7 sub-pillars, we have the following results (IGIA, 2023)

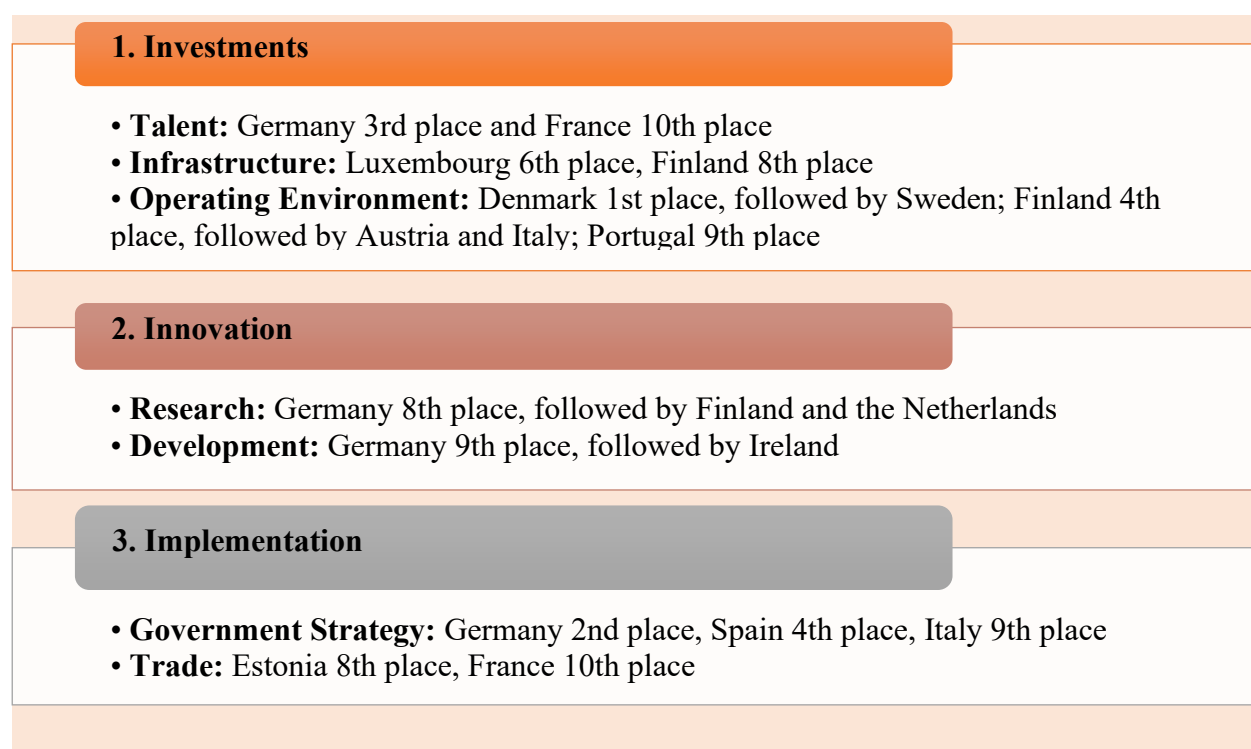


Figure 1. Top 10 EU Countries in the Global Artificial Intelligence Index

Source: Own elaboration based on data extracted from the report of the Global Index of Artificial Intelligence, 2023

These results, summarized in Figure 1, provide an interesting picture of the performance in the field of artificial intelligence for the top 10 countries in the European Union, according to the Global Artificial Intelligence Index report for 2023. In terms of the "Investment" criterion, Germany and France stand out with good positions, with Germany occupying the 3rd place in the "Talent" sub-pillar and France occupying the 10th place in the same sub-pillar. Luxembourg and Finland are marked with strong positions in the sub-pillar "Infrastructure," occupying the 6th and 8th places, respectively, indicating that these countries have developed strong infrastructures for the development of artificial intelligence. Denmark leads in the sub-pillar "Operating Environment," with a favorable environment for AI innovation and development, followed by Sweden, while Finland ranks 4th, followed by Austria and Italy, indicating a promising environment for innovation. Portugal ranks 9th in this category. Regarding the "Innovation" criterion, Germany scores well, ranking 8th in the "Research" sub-pillar, while Finland and the Netherlands follow, showing a continued

commitment to AI research. And in the "Development" sub-pillar, Germany ranks 9th, with Ireland behind. Regarding the "Implementation" criterion, Germany stands out again, being the 2nd place in the implementation of a government strategy for AI, indicating a strong commitment from the state in this area. Spain ranks 4th and Italy ranks 9th. Estonia and France score well in the "Trade" sub-pillar, ranking 8th and 10th, respectively.

These results show that Germany has a significant presence and coherence in all three analysis criteria, and other important EU players such as France, Finland, Luxembourg, Denmark, Sweden, and Italy also stand out in different aspects of the development of artificial intelligence. EU countries have made significant progress in adopting AI technologies, and this report provides valuable insight into their specific performance in this area.

Innovation has become a major driver of economic growth and strong figures for investment in AI development and patenting place China, the US, Japan and Korea as the main players in the field as the analysis above shows. For now, researchers believe that Europe's plans to become a leader in the AI revolution are, however, optimistic. According to Belton, Europe excels particularly in regulation, strategy, and investment planning (2019). Thus, the digital transformation process is advancing in the member countries of the European Union (Micheli et al., 2018). Recent research in this area (Szostak, 2022; Taburchak et al., 2022; Craglia et al., 2018) points out that Estonia enjoys a global reputation as the most advanced country in terms of digitization, with a digitization rate of interactions between the government and citizens of 99% (Sabatini et al., 2022; Stępień & Światowiec-Szczepańska, 2022). In Estonia, the only situations where citizens have non-digital interactions with the authorities are at the time of marriage or divorce. Estonia is also known for its highly advanced digital platform called "e-Estonia." Estonian citizens can perform almost all government services online, including voting in elections. Estonia has also developed the "e-Residency" program, which allows people outside Estonia to access Estonian digital services. (Government of Estonia, 2023).

Finland has implemented several digital services for citizens and businesses. For example, their Kanta system, which is an electronic health record, allows patients to access and manage their own health information online. Finland also has a digital service for businesses that enables quick business registration and management of legal documents (Government of Finland, 2023). Denmark developed the "Digital Post" platform, which replaced traditional correspondence with the government. Citizens and businesses now receive all government communications digitally through this platform. This significantly reduced the use of paper and increased administrative efficiency. Sweden uses blockchain technology to manage properties. This system allows citizens to register their properties in a transparent and secure way, eliminating the need for intermediaries (European Commission, 2023). The Netherlands has developed an electronic identification platform called DigiD, which allows citizens to securely authenticate themselves to access government services online. This platform is widely used in the country. Lithuania has developed a fully digital tax return system that allows taxpayers to complete and submit their tax returns online. This significantly reduced red tape and simplified the tax process. These examples illustrate how some EU Member States have successfully adopted digital technologies to improve the efficiency of public administration and provide better services to citizens and businesses. So, the use of algorithms in daily and repetitive tasks can have an exponential impact in regarding the efficiency and performance of civil servants.

While bringing numerous benefits to public administration, AI also raises technological, ethical, economic, and societal challenges related to privacy, discrimination, job displacement and the potential for misuse (Wirtz et al, 2018). These concerns are shared by the entire academic community but also by specialist practitioners and the public (Zhang and Dafoe, 2019). In a paper looking at the integration of artificial intelligence into the provision of social care services in the UK, Wright (2021) shows that local governments are increasingly opting for chatbots and virtual assistants as practical and inexpensive alternatives. The author believes that the chatbot has "the potential to dramatically transform and improve the long-problematic communication between citizens and government" (Wright, 2021, p.366). Although effective, such applications have their challenges. Thus, in the race for digitization, governments have to integrate a basic principle of public administration, namely that

of social equity that guarantees access to public services for all citizens, an aspect that maintains citizens' trust in their governments (Frederickson, 2010). Also, among the examples of applications that use artificial intelligence in complex tasks is the CDSS system (clinical decision support system) or DARLENE (DeepAR Law Enforcement Ecosystem) - a project funded by the European Union that supports law enforcement employees to use algorithms and augmented reality to deliver services in complex and stressful situations (Apostolakis et al., 2022). Unlike in the private sector, public officials must ensure that they implement the technology that will bring value from the perspective of citizens and here, several studies have revealed certain disadvantages of AI. For example, the study by Obermeyer, Puterbaugh, Vogeli, and Mullainathan (2019) demonstrated how "algorithms can discriminate based on patient race in making healthcare priority decisions." Regarding official recognition technologies used in law enforcement, there have been some studies that have highlighted discrimination against certain citizens such as those with darker skin (National Institute of Standards and Technology, 2021). Addressing these challenges is essential to ensure that AI continues to have a positive impact on our lives, and researchers must advance their analysis as the technologies are implemented in public administration. This research helps to establish the direction to follow in the digitization of public services so that the goal remains improving the lives of citizens.

Digitization in public administration, a vast topic explored in the international literature, is illustrated by studies such as that of Margetts & Dunleavy (2013), which analyzes the effects of information technology on governance. This perspective is complemented by Burlacu et al., (2022), who emphasizes the importance of digital public administration for sustainable development, demonstrating how technology can improve government efficiency and sustainability.

Linders (2012), in his study of open government and citizen engagement in the digital age, argues that digital technology can transform the interaction between government and citizens. This idea is extended by Burlacu et al. (2022), which explores the impact of digital globalization on the economy and society and its implication in public administration.

Meyer-Sahling, Mikkelsen & Schuster (2020) investigate administrative reforms in Central and Eastern Europe, highlighting the challenges of digitization. These findings are complemented by Negescu et al. (2021), who examine the paradigms of digitalization of public administration in the context of the COVID-19 pandemic.

Dunleavy & Margetts (2015) discuss digital age governance and the reshaping of public services through technology. This framework is extended by Calin et al. (2022), who emphasize the need for a government framework adapted to digital requirements.

Bannister & Connolly (2015) analyze the challenges and opportunities of e-government while Burlacu et al., (2021) focus on the impact of digital globalization on economic and social life.

Mergel (2016) analyzes the adoption of emerging technologies in the public sector, highlighting the importance of technological innovation in improving public services. This perspective is reflected in the study by Popescu et al. (2021), which examines how the COVID-19 pandemic has accelerated digital globalization and influenced public administration.

Another essential aspect in the specialized literature is addressed by Charalabidis & Lachana (2020), who discuss open governance and the role of information and communication technologies in facilitating citizen participation. This idea is amplified by Burlacu, et al. (2021), who emphasize the potential of digital public administration for sustainable development, highlighting how digitization can lead to more efficient and responsive administration.

In addition, the study by Bovens & Zouridis (2002), which analyzes digitization in public administration and the associated ethical challenges, provides a critical perspective on the impact of digital technologies on governance. These ethical and governance aspects are also addressed in the work of Rădulescu et al. (2018), which discusses business crisis management in the digital age.

The complex analysis of the literature reveals an upward trend in the adoption of digital technologies in public administration, with a special emphasis on the need for ethical, transparent and citizen-oriented approaches. The studies provide an overview of the challenges and opportunities associated

with digitalization, highlighting how it can transform public services, government efficiency and the relationship between citizens and public administration.

The integration of AI in public administration is not only a technological trend, but also a major change factor in the professionalism of the public sector. Wirtz & Birkmeyer (2015) discuss AI applications in public administration, highlighting the impact of technology on efficiency and innovation in government services.

Young & Hermans (2019) investigate how AI affects decision-making in the public sector, highlighting the challenges and opportunities associated with data analytics. This aspect is complemented by the research of Calin et al. (2022), which analyzes digital governance in public management, highlighting the need to adapt government frameworks to digital realities. Schwartz & Straub (2019) focus on ethics in the use of AI in public administration, discussing the importance of transparency and accountability in the use of emerging technologies. To better understand the changes in professionalism caused by AI, Linders' (2012) study of open government and citizen participation provides a relevant perspective.

As public administrations around the world adopt artificial intelligence technologies, academic studies are focusing on how they can be used to improve efficiency and innovation. Henman (2018) explored the application of AI in public policy, highlighting the potential for advanced data analysis and evidence-based decision-making. These technologies can lead to more personalized and responsive public services, as discussed by Bovens and Zouridis (2019), who analyzed the impact of decision automation and AI-assisted public services.

However, the adoption of AI in the public sector also raises significant ethical and transparency issues. Yeung (2017) addressed the ethical challenges of using decision-making algorithms in public administration, emphasizing the need for strong ethical and governance frameworks. These concerns are amplified by Hildebrandt's (2019) study, which looked at the risk of bias and lack of transparency in AI-based systems.

Another important aspect is the need to develop digital skills among civil servants, as pointed out by Young (2020). While AI opens new possibilities, it also requires a new set of skills and knowledge for public officials to effectively manage and oversee these technologies.

To improve citizen engagement and democratic participation, Meijer (2018) suggested that AI can be used to facilitate more effective communication between government and citizens. This includes using chatbots to provide information and collect citizen feedback.

The literature highlights a dynamic and continuously evolving landscape of AI in public administration. With its potential to revolutionize public services and decision-making processes, AI also brings significant challenges related to ethics, transparency and skills development. Addressing these challenges will be essential to ensure that AI is used responsibly and effectively in public service.

In addition to improving efficiency and transparency, AI has the potential to transform the way public administration responds to complex problems. Reddick and Aikins (2020) examined the use of AI in analyzing and solving public policy problems, showing how AI-based systems can contribute to more effective and evidence-based solutions. Similarly, Schintler and McNeely (2021) discussed the ability of AI to process large volumes of data to identify trends and patterns, thereby facilitating more strategic and data-driven planning.

A crucial aspect in the adoption of AI in public administration is the management of organizational and cultural change. Mergel (2019) addressed the challenges AI poses to traditional organizational culture in the public sector, emphasizing the need for continuous adaptation and innovation. This cultural transformation is essential for the effective integration of AI, as shown by Janssen and van den Hoven (2019), who discussed the importance of an open mind and a collaborative approach in adopting emerging technologies.

In the context of expanded digital governance, AI can play a significant role in improving accessibility and inclusion in public services. Gil-Garcia, Helbig, and Ojo (2018) explored how AI can contribute

to more inclusive public administration by providing personalized services that meet the diverse needs of citizens. This is an important step towards a fairer and more citizen-oriented public administration. AI also raises important data security and privacy questions. Luna-Reyes and Gil-Garcia (2020) addressed data security concerns in the AI era, emphasizing the importance of protecting personal data and respecting privacy in the use of AI-based technologies.

The literature highlights a wide spectrum of AI applications and challenges in public administration. From improving efficiency and transparency to managing organizational change, data security and inclusion, AI is a fundamental change in the way public services are delivered and managed. Addressing these challenges and maximizing the potential of AI will be crucial to the future of public administration.

2. METHODOLOGY

The study adopted a mixed methodology, combining qualitative research with quantitative techniques, to investigate the impact of artificial intelligence in public administration and the evolution of digital skills of civil servants in Romania. Within the qualitative component, a documentary analysis was carried out, which included the review of specialized literature alongside the analysis of government documents and digitization strategies, providing a framework for understanding the current context and development directions of the public administration. This approach provided in-depth insights into their AI experiences, perceptions, and expectations.

For the quantitative part of the study, a questionnaire designed to assess the level of digital skills of civil servants was designed and distributed. Data collected through the questionnaire were subjected to statistical analysis to identify trends, correlations, and differences between different groups of officials.

Through this mixed approach, the research provided a comprehensive and nuanced perspective on the role of AI in the transformation of Romanian public administration and the digital skills needed in this new context.

3. ANALYSIS AND DISCUSSIONS

Analysis of the collected data revealed several significant trends. Interviews indicated that there is generally moderate enthusiasm for the adoption of AI in public administration, along with an increased awareness of the need to develop digital skills. However, it was found that there is a gap between the current level of digital skills of civil servants and the requirements imposed by the implementation of AI-based technologies. In addition, the case studies highlighted various challenges, including resistance to change, lack of resources and inadequate infrastructure to support large-scale digital transformation.

The survey results confirmed these findings, showing that most civil servants are aware of the importance of AI and digital skills, but feel they need additional training and support to effectively adapt to new technologies. The statistical analysis revealed a significant correlation between the level of education of officials and their degree of familiarity and comfort with digital technologies and AI. The study contributed to the existing literature by providing empirical evidence on the current state of digital skills in public administration in Romania and provided a deeper understanding of the impact of AI on administrative processes and practices. Based on these findings, the research recommended the development of training programs and professional development initiatives, as well as a more strategic approach to the adoption of AI in the public sector.

The study revealed several key aspects of the impact of artificial intelligence in public administration in Romania. First, it has been observed that although there is an increased interest in the adoption of AI, the digital skills of civil servants are not yet at the level required to fully exploit the potential of this technology. This skills gap is a significant barrier to the effective implementation of AI-based solutions.

The quantitative data analysis showed that the level of education and work experience significantly influence the familiarity of officials with digital technologies and AI. This suggests that training and professional development programs should be tailored to address the specific needs of different groups of officials.

The interviews also highlighted that there is a need for cultural and organizational change to facilitate the adoption of AI. Resistance to change, lack of understanding of the benefits of AI and fear of automation are factors that can hinder the adoption of digital technologies in public administration. In addition, the study identified issues related to technological infrastructure and available resources. Many public institutions face limitations in terms of the budget, equipment and technical support needed to implement and maintain AI-based solutions.

Based on these findings, for a successful transition to a more digitized and efficient public administration, a strategic and integrated approach is needed. This includes investment in technology infrastructure, training programs to develop digital skills and a change in organizational culture to support innovation and adaptability.

The study also showed that the integration of AI in the public administration in Romania is a complex process, which requires a multifaceted approach. The success of this transition depends not only on technology, but also on human and organizational factors. An effective strategy should include skills development, support for cultural change and appropriate investment in technology infrastructure.

As part of the research, the following hypotheses were formulated and tested through an opinion survey applied to civil servants from the National Agency of Public Servants of Romania (ANFP):

1. *Hypothesis on the adoption of AI in management positions:* There is a significant correlation between the educational level of civil servants and their degree of acceptance of artificial intelligence in management positions.

This hypothesis could explore whether civil servants with a higher level of education are more open or reluctant to integrate AI in top or middle management decisions.

2. *Hypothesis on the impact of age on adaptation to AI:* There is a significant difference between different age groups in terms of adaptation to AI technologies in public administration.

This could indicate whether younger civil servants are more inclined to accept and adopt AI compared to older ones.

3. *Hypothesis related to training needs.* Civil servants perceive an increased need for training and professional development to keep up with the implementation of AI in public administration. This hypothesis could investigate whether there is a significant demand for digital and AI skills training or development programs, especially among non-management civil servants.

To test and validate the formulated hypotheses, we used appropriate statistical methods based on the available data. The results of the chi-square tests for each of the three hypotheses are as follows:

Hypothesis regarding the adoption of AI in management positions (Educational Level vs. Attitude towards AI): Chi-square value: 7.64, p-value: 0.106

Hypothesis regarding the impact of age on adaptation to AI (Age Group vs. Adaptation to AI): Chi-square value: 6.47, p-value: 0.167

Hypothesis related to training needs (Educational Level vs. Perception of AI Training Need): Chi-square value: 2.87, p-value: 0.580.

The p-value is an indicator of statistical significance. In general, a p value of less than 0.05 indicates that there is a statistically significant difference between groups. In this case, for all three hypotheses, the p-values are greater than 0.05. This suggests that there is no statistically significant difference between the compared groups in terms of education level and attitude towards AI in management positions, between age groups and adaptation to AI, or between education level and perceived need for training in AI.

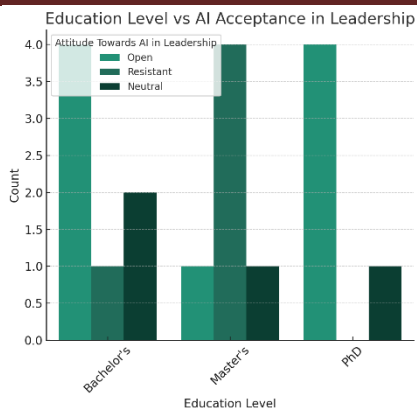


Figure 2. Educational Level vs Acceptance of AI in Management Positions

Source: Own elaboration

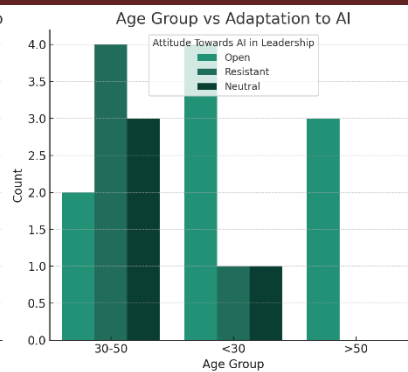


Figure 3. Age Group vs AI Adaptation

Source: Own elaboration



Figure 4. Perception of the Need for AI Training

Source: Own elaboration

Figure 2 shows the distribution of attitudes (Open, Neutral, Resistant) towards the adoption of AI in management positions, divided by education levels (Bachelor, Master, Doctorate). Figure 1 shows how different age groups (<30, 30-50, >50) relate to AI adoption in public administration, with the same set of attitudes. Figure 4 shows the distribution of civil servants' perception of the need for AI training (High, Moderate, Low).

Integrating the results of the chi-square tests with the observations from the graphical representations and with the existing knowledge in the field of public administration and artificial intelligence we can state the following:

1. *The Hypothesis on the Adoption of AI in Management Functions:* The figure suggested some variation in attitudes towards AI in management positions by level of education. The chi-square test indicated a p-value of 0.106, suggesting no statistically significant difference. In the literature, it is often noted that higher education can lead to greater openness to innovation and new technologies, including AI. However, our results do not support a strong correlation in this regard.

A possible reason could be that the attitude towards AI in managerial positions is influenced not only by the level of education, but also by other factors, such as professional experience, organizational culture, or the perception of the impact of AI on jobs.

2. *Hypothesis regarding the Impact of Age on Adaptation to AI:* Figure 2 showed a varied distribution of attitudes by age group. The chi-square test indicated a p-value of 0.167, suggesting no statistically significant difference. It is a common belief that young people are more attuned to new technologies, including AI. However, our results do not confirm a significant difference between age groups. This may suggest that individual factors such as personal interest or previous exposure to technology may play a greater role than age itself in adapting to AI. In addition, it is possible that in public administration, age differences in adoption in technology are less pronounced due to the uniform training and professional development policy.

3. *Hypothesis related to Training Needs:* Figure 3 indicated a diverse distribution of the perception of the need for AI training. The chi-square test indicated a p-value of 0.580, indicating no statistically significant difference. In the context of accelerating digitization, it was expected that there would be an increased perception of the need for training in AI, especially among those with a lower educational level. Our results do not support this idea. This may indicate that civil servants, regardless of their educational level, recognize the importance of AI training to a similar extent, suggesting a uniform awareness of the importance of this skill.

CONCLUSION

This research provides an exhaustive perspective on the role and impact of artificial intelligence (AI) in public administration, with a special focus on the Romanian context and the evolution of digital skills of civil servants. The study combines qualitative and quantitative approaches, providing a complex picture of how AI is reconfiguring operational and professional paradigms in public services. The analysis of the collected data indicates a moderate enthusiasm towards the adoption of AI in public administration, together with an increased awareness of the need to develop digital skills. However, the results reveal a gap between the current level of digital skills of civil servants and the requirements imposed by the implementation of AI-based technologies.

Interestingly, although literature often suggests that a higher level of education leads to a greater openness to innovation and new technologies, the study results do not support a strong correlation in this regard. There was also no significant difference between age groups in adaptation to AI, which may suggest that individual factors such as personal interest or previous exposure to technology may play a greater role than age itself.

Furthermore, it was observed that civil servants, regardless of their level of education, similarly recognize the importance of training in AI, suggesting a uniform awareness of the importance of this skill. This shows broad recognition of the impact AI is having on the transformation of public services and the need for professional adaptation.

Based on these findings, a strategic and integrated approach is required for a successful transition to a more digitized and efficient public administration. This includes investment in technology infrastructure, training programs to develop digital skills and a change in organizational culture to support innovation and adaptability.

In conclusion, the study highlights that the integration of AI in public administration in Romania is a complex process, which requires a multidisciplinary approach. The success of this transition depends not only on technology, but also on human and organizational factors. An effective strategy should include skills development, support for cultural change and appropriate investment in technology infrastructure. With these measures, public administration can successfully navigate the challenges of the digital age, transforming into a more efficient, transparent and citizen-centered institution.

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