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Artificial Intelligence as a Supporting Tool for Local Government Decision-Making in Public Safety

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Abstract

Objectives: The purpose of this article is to present artificial intelligence in the public security system at local government level of a state. This article answers the following questions: Does artificial intelligence have the potential to be used in the field of public safety by public administrations at the level of local authorities and, if so, are there successful examples of such applications? Is it advisable to expand the understanding of public safety to include such an area where AI is applied to public services?
Methods: Desk research, analyzing literature and documents.
Results: The result of the study is the confirmation of both research theses (H1 and H2) posed in the social science area of public safety and artificial intelligence systems.
Conclusions: This article states that that AI has the potential to be used in the field of public safety by public administrations at the level of local and regional authorities, despite the correlated risks arising from the use of AI by the public sector. It is advisable to expand the understanding of public safety to include such an area where AI is applied in public services.

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Introduction

Artificial intelligence (hereinafter: AI) and Big Data will deeply influence the transformation of governments worldwide (Pencheva, Esteve, & Mikhaylov, 2020). The extent of this impact is yet to be fully understood, but it can confidently be compared to inventions such as the printing press or the steam engine. It is important to consider the challenges associated with its adoption and the resulting consequences for the public sector, particularly in the realm of public safety. Therefore, it is appropriate to assert that research on AI should not be confined solely to the domain of exact sciences but should also be deepened from a multidisciplinary perspective, encompassing the humanities and social sciences.

Artificial intelligence as a social phenomenon (and likely as an element of the next information revolution, referred to as the fourth industrial revolution) gained widespread public awareness towards the end of 2023, following the introduction of the ChatGPT chatbot based on artificial intelligence, developed by OpenAI. The frequency of searches for the phrase „artificial intelligence" in the topic category on Google search engine in September 2022 accounted for only 16 percent of search results compared to the interest of internet users in January 2024 ('Google Trends', 2024). However, throughout the aforementioned period, the phrase "artificial intelligence and public safety" unfortunately did not appear as a searched term even once (ibidem), which negatively impacts the research hypothesis. The hypothesis (H1) posits that artificial intelligence has the potential for utilization in the realm of public safety by the public administration at the level of local government units, despite the correlated threats arising from AI usage by the public sector. After all, public administration, by virtue of its origins, should be characterized by continuity, stability, and provide citizens with a sense of security and responsibility (Karpiuk, 2008). As part of the second hypothesis (H2), I propose expanding the concept of public safety to include the area in which AI is utilized in public services. This expansion is necessary considering the challenges associated with the implementation of AI in the public sector and its specificity, distinct from the economic sector, also referred to as private or business sector. Furthermore, it is essential to acknowledge the resulting consequences for the public sector in the realm of public safety. Therefore, research on AI should not be confined solely to the domain of exact sciences but should also be approached from a multidisciplinary perspective, encompassing the humanities and social sciences.

The article falls within the theoretical publication stream. The research tools and techniques used are characteristic of the social sciences, including political and administrative sciences and security sciences. Mainly the following were used : desk research, analysis of literature , normative acts, documents and strategies. The analysis was extended with statements of practitioners from local government as representatives of public administration.

1. The definitional challenges of the concept of artificial intelligence

Despite the widespread use of the term „artificial intelligence" in both scholarly discourse and public information dissemination, it is not a legally defined term, specifically by legislators. Furthermore, it is not a homogeneous concept, not only within related scientific disciplines but also in the normative acts of individual state actors on the international stage

(provided that a given state has such regulations at all). The definitional challenges of the concept of artificial intelligence stem from its multifaceted nature and evolution over time. AI refers to computer systems capable of performing tasks that typically require human intelligence, such as pattern recognition, learning, planning, or decision-making. However, the boundaries between what is considered intelligence" and what is merely algorithmic data processing can be fluid. Additionally, the concept of AI encompasses various approaches, such as machine learning, natural language processing, or artificial neural networks, further complicating its definition. Definitional difficulties also arise from different research, philosophical, and other perspectives.

Artificial intelligence can be defined in multiple ways: as systems that are software (and possibly hardware) designed by humans, which, considering a complex goal, operate in the physical or digital dimension, perceiving their environment by collecting data, interpreting gathered structured or unstructured data, reasoning based on knowledge, or processing information obtained from these data and deciding on the best actions to take to achieve a given goal. Artificial intelligence systems may utilize symbolic rules or learn a numerical model, and also adapt their behavior by analyzing the impact of previous actions on the environment [1]. EU regulation indicates that artificial intelligence refers to systems that exhibit intelligent behavior by analyzing their environment and taking actions - with some degree of autonomy - to achieve specific goals. Artificial intelligence-based systems can be purely software-based, operating in the virtual world (e.g., voice assistants, image analysis software, search engines, speech and face recognition systems), or artificial intelligence can be embedded in hardware devices (e.g., advanced robots, autonomous vehicles, drones, or Internet of Things - IoT applications).

As a scientific discipline, artificial intelligence encompasses several approaches and techniques, such as machine learning (with particular examples including deep learning and reinforcement learning), machine reasoning (which includes planning, scheduling, knowledge representation and reasoning, search, and optimization), and robotics (which encompasses control, perception, sensors, as well as the integration of all other techniques with cyber-physical systems) [2].

In Poland, regulations regarding the implementation of AI are also in place. In December 2020, the Council of Ministers adopted the Polish national strategy on artificial intelligence [3]. Poland commits to implementing ethical frameworks for the use of AI and launching mechanisms for the development of the Polish AI ecosystem in ethical, legal, technical-operational, and international dimensions. It provides strategic guidelines and policy initiatives to develop a holistic artificial intelligence ecosystem to achieve the following objectives: reforming the education system and providing lifelong learning opportunities in

[1] European Commission Communication to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions Coordinated Plan on Artificial Intelligence, COM(2018) 795 final, 2018.

[2] A definition of AI: main capabilities and disciplines. Definition developed for the purpose of the AI HLEG's deliverables, EUROPEAN COMMISSION', 2019.

[3] 'Resolution No. 196 of the Council of Ministers of December 28, 2020 on establishing the „Policy for the development of artificial intelligence in Poland from 2020", Monitor Polski Official Journal of the Republic of Poland of January 12, 2021, Item 93', p. 196.

AI-related fields; encouraging the development and innovation of AI companies through dedicated support for AI research, including ensuring sufficient financial resources; increasing national and international partnerships in the field of artificial intelligence; creating a trustworthy and high-quality data ecosystem with enhanced data exchange mechanisms; strengthening digital infrastructure, regulatory frameworks, and testing environments to support innovation in artificial intelligence.

In academic discourse, there is an increasing focus on the utilization of AI in public administration. AI policies and strategies have been developed and implemented in the public sector in recent years (Criado &Zarate-Alcarazo, 2022). Despite the initial examples of AI implementation in the public sector, their number remains significantly lower compared to identical implementations in the private sector.[4] Due to its characteristics, the public sector approaches the above issue much more cautiously. This goes beyond financing issues, which differ in the public sector compared to the private and non-profit sectors. The specificity of the public sector determines its attitude towards AI, which inherently differs from the attitudes of other social sectors, such as the private sector (business) and the non-profit sector (NGO). The responsibility of the public sector to protect citizens from potential threats posed by AI contrasts with the desire to increase efficiency through algorithmic solutions. With the growing pressure to implement automated decision-making systems in the public sector, this issue becomes increasingly significant, raising a number of doubts. These include whether arguments related to efficiency, resource savings (human and financial), speed of service, environmental concerns, etc., can constitute the sole rationale for the use of AI. Unfortunately, empirical research on what determines successful AI implementation in the public sector remains scarce (Neumann, Guirguis &Steiner, 2022, p. 1).

2. Artificial intelligence as a tool supporting local government decisions

New digital public services utilizing artificial intelligence can make citizens' everyday lives easier, more satisfying, and safer. Local governments are in an ideal position to, among other things, integrate government, private, and citizen data to provide beneficial new digital public services (Pittaway and Montazemi, 2020). Artificial intelligence (AI) not only finds application in the realm of government administration but also brings significant benefits to local administration. Local governments face unique challenges and have specific needs that can be addressed through tailored AI solutions. The use of AI technology enables decision-making at the local level, facilitating understanding and meeting the specific needs of the local community. Data analysis using AI algorithms can optimize resource allocation, streamline processes, and reduce administrative burdens, leading to increased operational efficiency and resource utilization optimization. Additionally, AI enhances the provision of services at the local level through task automation, customization of interactions with citizens, and providing quick responses to inquiries. Local authorities can use AI to solve local problems, such as optimizing transportation systems or monitoring environmental factors. AI also facilitates citizen engagement and participation by gathering their input and feedback, allowing local authorities to incorporate citizens' perspectives into decision-making processes.

[4] This is a trend characteristic of the entire area of new technologies, which, lagging behind the private sector, are implemented by the public sector.

Furthermore, AI promotes collaboration and knowledge exchange among local administrations, enabling mutual learning and addressing common challenges. With the increasing availability and affordability of AI technologies, local administrations can implement AI applications without significant infrastructure or financial constraints. AI can enable local administrations to be more efficient, effective, and responsive to the needs of their communities. The future of AI in local government appears to be a growing trend on one hand; however, the current literature largely ignores how local governments are adapting their organizational dynamics in order to change (Zou et al., 2023, p.236).

3. AI and Public Safety and Services

Public safety, constituting a doctrinal definition, can be defined from various perspectives (Czaputowicz, 2012; Chojnacki et al., 2018; Mickiewicz, 2020; Skelnik, 2022). Public safety is one of the most recognized and significant elements that comprise the internal security space of a state (Fehler, 2010).[5] Depending on the research approach, the definition varies, citing its basic version as "the entirety of conditions and institutions protecting the state and citizens from phenomena threatening the legal order" (‘bezpieczeństwo publiczne’, no date), and "protecting the system against attacks on the fundamental political institutions of the state". Regardless of attempts to determine the typology or fundamental components of public safety and define their scopes, with the development of AI, it seems to appear not only in comprehensive research and studies, but also not only as an element of cyberterrorism and threats in cyberspace, but also as threats that can have consequences in the real world (Artificial intelligence, real consequences: how AI is changing the way we live, 2023).

In accordance with the second research thesis (H2), I propose to expand the understanding of public safety to include the area in which AI is used in public services. From this perspective, public safety will encompass a range of functions carried out by the public sector, primarily by local government, where AI is already implemented or piloted. For the purposes of the study, I have adopted the catalog of tasks of local government at the municipality level (Act of 8 March 1990 on Local Government, 1990), county level (Act of 5 June 1998 on County Self-Government, 1998), and voivodeship level (Act of 5 June 1998 on Voivodeship Self-Government, 1998), carried out as own tasks and commissioned by the above-mentioned entities for the benefit of residents, constituting by law their self-governmental community.

As a result of desk research, the following cases of support for local government by AI were noted (among Polish and foreign local governments)[6]:

a) Urban energy: Gdynia is the first city in Poland where artificial intelligence „delivers heat”. The Gdynia local government is implementing a pioneering pilot project on a

[5] In the context of security, a significant argument for the separate application of both concepts lies in the requirements for effective action to maintain internal security, which involve diverse legal and institutional measures aimed at maintaining and restoring public safety and order. According to the author, which is generally consistent with doctrine, this concept is often unjustifiably combined with the concept of public order into a single term - public safety and order.

[6] Due to the small sample size, the examples provided may only serve as a contribution to further research; however, based on experiences from other studies, this tendency appears to be valid.

national scale. It involves managing the city's heat supply using artificial intelligence (Gołąb, 2023).[7]

b) Flood area control: Utilizing its ability to handle vast amounts of data and provide accurate forecasts, deep learning has become a powerful tool for improving flood prediction and control (Kumar et al., 2023).

c) Public transportation: In this case, the primary goal of using artificial intelligence is to improve service quality or better understand passenger behavior. Trains and buses are the dominant modes of transportation studied. Furthermore, artificial intelligence is mainly used for three tasks; the most common of these is prediction, followed by real-time estimation and resource allocation, including planning and scheduling (Jevinger et al., 2023).

The cited case studies confirm the thesis that the advancement of AI technology offers opportunities to streamline many operational and organizational processes, including public safety. I decided to supplement these results with AI itself in the form of one of the generative models of AI, here's whether it has the potential to support municipal decision-making in the field of public safety. The answer addressed such support in several different ways (ChatGPT 3.5, 2024b)[8]:

1. Data analysis: AI can analyze vast amounts of data from various sources such as surveillance cameras, traffic monitoring systems, or police reports. By employing data analysis techniques, it can detect patterns and anomalies in this data, aiding in the identification of areas requiring greater attention from local government authorities.
2. Crime forecasting: AI algorithms can be used to predict potential high-risk crime areas based on historical, demographic, and other factors. This enables better planning of police patrols and resource allocation for crime prevention.
3. Real-time event monitoring: AI systems can be used to monitor live events such as sudden traffic accidents, water main breaks, or social protests. This information can be quickly analyzed and relayed to the appropriate services for swift intervention.
4. Action planning optimization: Using machine learning algorithms, AI can assist in optimizing action planning for public safety, such as optimal deployment of surveillance cameras or patrol route planning for law enforcement agencies.
5. Cyberthreat identification: Artificial intelligence can be employed to monitor and identify potential cyber threats to local government infrastructure, such as computer networks or traffic management systems.

[7] Simultaneously, the Gdynia Municipality is embracing modern technologies, harnessing the potential of artificial intelligence to ensure quick and efficient service for its citizens. The Gdynia local government is one of the first in Poland to utilize the capabilities of the so-called „virtual clerks" (although not yet supported by AI systems, as early as 2012). Today, virtual clerks, including voibots (with which voice conversations are also possible), assisting petitioners, are quite commonly used by municipal, county, and voivodeship offices (although not as common as in the private sector).

[8] It should be noted that responses may vary in detail and scope not only depending on the type of AI but primarily on the specificity and construction of the given prompt, the language of the query, and the timeframe of the question (in relation to the rapid development of AI).

6. Social sentiment analysis: Through analyzing data from social media and other sources, AI can aid in monitoring social sentiments and identifying potential areas where social unrest or conflicts may arise.

However, it is important to maintain a balance between the use of AI and privacy protection, as well as ensuring transparency and accountability in the decision-making process. Additionally, continuous training of local government personnel in the use of these tools is necessary, along with awareness of potential limitations and associated risks (ibidem). Interestingly, AI also recognizes the threats posed by its use in public safety (thus simultaneously becoming a component of its assurance system): „Artificial intelligence can pose a threat to public safety through abuses, algorithmic errors, or social exclusion. However, appropriate regulations and risk awareness can mitigate these threats" (ChatGPT 3.5, 2024a).

4. Potential threats

One manifestation of compromising public safety may be the tempting desire for full automation of certain processes, such as informational ones, by local government offices. However, it should be remembered that AI, still recognized for its imperfections, serves as a supplementary and supportive tool with limited effectiveness. AI does not have (and should not have) access to all complete information[9], and algorithms may fabricate or have so-called „hallucinations".

It is evident that local government units, authorities, and government agencies are increasingly vulnerable to cyber attacks. The public sector spent an average of 6.6% of its overall IT budget on cybersecurity in 2023 (Pouchet, 2023, p.5). Additionally, this sector has the lowest ratio of cybersecurity personnel to total staff compared to other industries[10]: 1/2996 (ibidem), with the lowest level of advancement in implementing cybersecurity solutions (36.1%) (ibidem). Additionally, there are few solutions from the central level that can be implied for local government administration (as an exemplary case, the expansion of government application services like mObywatel with functions supporting local governments can be considered here). Most GovTech solutions, referring to socio-technical solutions developed and operated by private organizations, combined with components of the public sector to facilitate processes in the public sector, are offered to them by external companies from the private sector. GovTech refers to socio-technical solutions developed and operated by private organizations, combined with components of the public sector to facilitate processes in the public sector. GovTech solutions promise citizens and businesses better customer service compared to current government portals (Bharosa, 2022).

According to the comments contained in the ELI Model Rules on Impact Assessment of Algorithmic Decision-Making Systems Used by Public Administration (European Law Institute, 2022), traditionally decisions within public administration were made by humans, with each decision associated with a specific person, body, or institution. However, this study

[9] Neither for verified information, most generative AI models rely on unrestricted and unverified internet resources.

[10] For comparison, in the finance sector, one person in the organization dealing with cybersecurity corresponds to only 358 other employees.

indicates a significant change in this context, as operational decisions are increasingly no longer clearly attributable to specific individuals, bodies, or groups of people. Operational decisions can be made using algorithms or other automated decision-making mechanisms. Although there is still the possibility of human involvement in the process of designing the algorithm or engaging in the decision-making process before its execution, once the system is configured, it can operate fully automated, meaning that decisions can be made without human involvement, including the decision-making process. The Model Rules aim to create a basis for supplementing European legislation on AI in the context of public administration while not limiting the introduction of AI to the public sector and allowing for an objective assessment of the impact of its implementation. According to the authors, this is intended to contribute to ensuring the safety and increasing the trust of the participants in these technological and social changes.

Another category of security threats to the implementation of AI in local government management may be „non-technological" ones: sometimes the danger lies not in the technology itself, but in societal resistance to its use. In the case of too rapid adoption of AI without understanding from society or too extensive use (such as ubiquitous public monitoring), social frustrations may arise. Even the idea originally based on widespread use of AI in city management, the so-called 'smart cities" concept, transforms, recognizing this category of threats. Smart cities have gained importance in theory and practice over the past two decades. Although many aspects of smart cities have been explored, disproportionate attention has been paid to physical and technological elements at the expense of social justice and democratic values (Alizadeh and Sharifi, 2023).

The potential for using AI in its functioning in terms of public safety by individual units of local government is also influenced by many factors. It is misleading to say that these are only such diverse financial, organizational, or personnel possibilities. It can be said that the statement that the system is as efficient as its weakest link applies to cybersecurity. Therefore, in the area of using AI as an element of ensuring public safety, every single person who would have contact with the system should be taken into account. I am not referring only to the IT staff of a given office, but to everyone who has contact with the system and has the possibility of modifying its data. Unfortunately, this is confirmed by audits carried out by the Supreme Audit Office, indicating the danger associated with collecting and sharing data related to human activity in ensuring the security of IT systems and the data of residents collected in them, conducted since 2014. In 61% of the audited local government offices, there was no systemic approach to ensuring information security (Supreme Audit Office, 2019). In 74%, there was no full and up-to-date information on the IT resources used to process data, which could significantly hinder the rapid reconstruction of infrastructure and ensure the continuity of service provision to citizens in the event of a serious failure (ibid). As a result of the study of blocking or revoking access to IT systems by 157 people who ended their employment in the audited offices, it was found that as many as 23 former employees (i.e., 15%) from seven offices had their accounts not blocked and remained active (ibid). The shortcomings were explained not only in terms of technological deficiencies, but also, among others: a workload, frequent employee turnover, employee oversight (Supreme Audit Office, 2019, p. 25). As can be seen, the threats arising from the use of AI in ensuring public safety

have not only a technological aspect. Equally significant may be the level of acceptance within the organization's internal environment and the education of its employees. Therefore, the caution of a representative of the private sector directing its AI solution services to public administration units seems appropriate: „when generating information for residents, it is better to still use AI as a supporting element rather than the main tool (...) One must always keep in mind that this mechanism requires constant control and verification" (Olejniczak, 2023).

5. Conclusions

The following research hypotheses have been verified as a result of the study:

a) (H1) artificial intelligence has the potential to be used in the field of public safety by public administration at the level of local government units, despite correlated threats arising from the use of AI by the public sector.
b) (H2) it is purposeful to expand the understanding of public safety to an area where AI is used in public services.

Given the challenges associated with implementing AI into the public sector and its specificity (in contrast to the economic sector, also known as private or business sector) and the consequences for the public sector in the field of public safety, research on AI should not be confined solely to the realm of exact sciences but should be approached from a multidisciplinary perspective, also from the standpoint of humanities and social sciences, as indicated in the article. To ensure public safety (which also includes public services delivered through AI systems), it is necessary - especially in the public sector, which is responsible for the safety of citizens, as indicated in the article - to rely to a broad extent on data obtained from research on new technologies. This is to better understand how local governments enhance their organizational capacity to achieve digital transformation, for example (Gasco-Hernandez et al., 2022). In this regard, a recommendation of this study can be to highlight the helpful role of so-called best practices in the above. Some governments and technology firms from the private sector have published ethical guidelines for the use of artificial intelligence, such as the ethical guidelines of the European Commission (European Commission, 2019), the Canadian Algorithmic Impact Assessment (Government of Canada, 2020), and the guidelines of the UK government (Government of UK, 2019). In addition to EU regulations on the use of AI (leading in this matter worldwide), Poland has guidelines for central-level implementation, which, however, affect its framework for implementation at the local and regional levels of government. Hence, it is reasonable to state that in Poland, there are normative frameworks allowing for the regulated use of AI in the practice of functioning of local government units and their public safety systems. However, normative frameworks will not always correspond to practice, for example in terms of data security, as indicated by audits conducted by NIK in recent years or the readiness of human resources to implement AI.

Comparative research comparing AI responses to the same prompts at different time intervals and interpreting the changes accordingly also seem to be an interesting approach. In conclusion, I give the floor to local government practitioners. Grzegorz Frugalski, Secretary of the City of Sosnowiec, states: „We still do not know what the consequences of this revolution will be. It cannot be demonized, but we must also be aware of the threats it may bring" (Moliszewska-Gumulak, 2023).

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