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THE ROLE OF AI APPLICATIONS IN ROMANIA'S BUSINESS AND ADMINISTRATION SECTORS

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This paper examines the role of applications that use artificial intelligence, especially those that use Large Language Models (LLMs) and that provide real-time feedback, decision support system, data analysis and predictive forecasting in two important fields in Romania, the areas of interest being business and public administration. Following the answers received during two interviews, the first with a company manager and the second with the mayor of a commune in Romania, we want to investigate how AI can enhance decision-making, improve operational efficiency, and foster innovation in both sectors of interest. From the answers received, it appears that AI-based applications have a high potential to streamline public services, reduce administrative delays, and increase citizen engagement. In the business area, such applications can facilitate cost reduction, operational optimization, and improved competitiveness. At the same time, following this study, several challenges to AI adoption are also identified, including infrastructure, a lack of digital skills, financial constraints, and resistance to change. These challenges can prevent the capitalization of the benefits offered by AI-based applications in the two fields of interest. The current research raises some concerns about the skills of employees, which underlines the need to invest in their educational preparation and digital training to address the skills gap.

The study shows that the adoption of technologies based on artificial intelligence (AI) offers significant benefits over time even if it presents some notable challenges. Also, the interviewed specialists, both the mayor who works for the public sector and the manager who works in the private sector, recognize the importance of collaboration in the development of applications that facilitate the exchange of information and support strategic decision-making.

Key words: Artificial Intelligence, real-time feedback, Large Language Models, public administration, business optimization, digital transformation.

JEL classification: C89, H83, M19, M29

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1. INTRODUCTION

In recent years, an important focus on digitization has been observed. This focus started to be more obvious since the COVID-19 pandemic when physical socialization was restricted and extremely limited and practical solutions were needed to facilitate remote work, efficient communication, education, shopping and even payment of various taxes. Thus, a massive use of digital solutions was observed and the use of applications and platforms in everyday life became a normality. Regarding communication, the use of social media platforms has brought with it an important change in communication and interaction between people (Pinto et. al., 2023). This need to create virtual bridges between people through the use of IT solutions has also been observed and analysed at the European level and the policy program of the Digital Decade, established by the European Commission with clear targets and objectives for 2030, serves as a strategic framework and emphasizes at the same time it addresses the urgent need to accelerate Europe's digital transformation (European Commission).

The purpose of this work is to understand, with the help of two specialists in their fields, the significant potential of Artificial Intelligence (AI) applications, particularly those using Large Language Models (LLMs) with real-time feedback (Gokul, 2023), decision support system and data analysis and predictive forecasting, across two different key sectors in Romania: business and public administration.

The field of artificial intelligence has developed rapidly in recent years and applications and platforms that are based on these technologies create opportunities for modernization in many fields, from education and business to healthcare and public administration. Romania is trying to take significant steps forward, and digitization has become an important point on the agenda of many municipalities in the country. Thus, understanding how AI-based applications can influence the approach in public administration with everything related to the services offered to citizens can boost innovation and enhance the efficiency, transparency, and time response in solving certain problems, leading to improvement and trust in the services provided by the municipality.

The motivation for this research is the desire to understand how this digital transformation and evolution is perceived, both in the public and private sectors. In education, AI-based applications can revolutionize the learning experience by providing personalized, real-time feedback to students, depending on the knowledge and needs of each. Thus, this type of platform can adapt to the needs and individual knowledge of students and can adjust tasks according to performance, offering automatic grades, guidance and tutoring. This offers a flexible and efficient type of education. In public administration, AI-based applications, especially those based on large language models (such as chatbots and virtual assistants) can streamline communication with citizens, significantly reduce administrative delays and improve the response capacity of public administration officials. Such systems can provide real-time answers to citizens' questions or can be of real help in going through complex procedures in the case of obtaining certain documents, helping to streamline administrative processes. In the business area, such AI-based applications can anticipate market trends, answer customers' questions, personalize their experiences and automate repetitive tasks, the resources involved in these sectors being released and able to be used in other areas. They can also be a reliable assistant in decision-making, having the ability to analyse a large set of data in a short time.

Such AI tools like predictive analytics, chatbots, and automated decision-making systems can help optimize operations, improve customer service, and enhance overall productivity.

2. PRIOR STUDIES

The digitization of Europe in the coming years is a priority at the European level. Figure no. 1 captures what are the main targets that are considered for this digitization. As can be seen and understood very easily from the figure below, digitization requires an adequate infrastructure and specific skills for employees in the public and private sectors. Also, effective collaboration between the government and the private sector is essential to ensure the success of the digitization process.

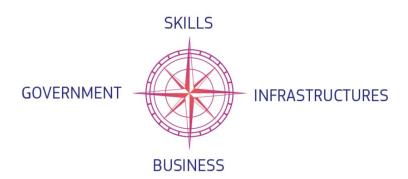


Figure no. 1. Digitalization of Europe - concrete targets regarding digitalization Source: European Commission

The shift to digitalization in recent years (even if there are still important steps to be taken at the local, regional and centralized European level) brings with it the desire of users to receive instant answers to questions arising in the case of products and services of interest as well as to provide feedback. That's why intelligent algorithms based on Large Language Models, chatbots, which can successfully answer users' questions, appear more and more often in companies' platforms and websites. Solving the problems that arise automatically brings about the request for feedback and a lot of data appears that requires interpretation to offer and increase quality services and products. "AI (artificial intelligence) and machine learning now play a key role in analyzing this vast amount of freely available customer feedback in the form of quantitative data (product ratings), text (customer reviews), images and videos (customer experiences)" (Lee et al., 2022).

The digitization of public administration and public services is a topic of interest that is discussed in numerous specialized articles such as (Frățilă (Adam) et. al., 2023), (Tiach and Abdellatif, 2023), (Dumitrescu, 2024), (Kolbenhayerová and Homa, 2022), (Voinea, 2024) and many others.

The specialized articles also specify the fact that the availability of citizens as well as their knowledge to adopt and use digitized public services is essential, which requires the development of an educational and training initiative for them (Cernat and Bercu, 2024).

Integrating artificial intelligence into public administration can revolutionize governmental operations, enhance service delivery to citizens, and improve overall quality of life (Božić, 2023).

In the private sector (business area), artificial intelligence is a useful tool. "In industries like cybersecurity, financial services, and information technology, its potential influence might be much greater" (Gupta and Katoch, 2023). From customer relation management to marketing and sales, risk management, and knowledge-based systems, AI applications in companies have "made substantial improvements in the efficiency and efficacy of their procedures" (Njeru, 2023).

3. ARTIFICIAL INTELLIGENCE APPLICATIONS ADAPTED TO TODAY'S NEEDS

Artificial Intelligence is a branch of Computer Science, "is an interdisciplinary science with multiple approaches, advancements in machine learning and deep learning" (Valavanidis, 2023).

Applications that are based on intelligent algorithms have started to be spread in many fields, from education to marketing and advertising, from medicine to industry, agriculture, entertainment, creation in art, the list of domains being extremely long. Efforts are being made to adapt artificial intelligence applications to the specific needs of users across various domains of interest, ensuring that these technologies address practical challenges and provide customized solutions.

Of course, the types of applications that can be utilized in the numerous fields mentioned earlier are diverse and extensive. Among them, we can include applications for:

- Natural Processing Language (NLP) which analyses, understands and generates human language used for automatic translation, sentiment analysis, answering questions, etc.
- recognition, interpretation and generation of forms, voice for image classification, object detection, gesture analysis
- recognition and interpretation of biometric data for the analysis of physical or behavioural characteristics for identification and authentication facial recognition, voice recognition, fingerprint recognition, iris recognition, etc.
- recommendation system recommend content or different products or services for users based on their wishes or actions
- content generation create new content such as text (social media posts, short stories, images, music, etc.)
- autonomous robots which control physical devices to perform complex tasks autonomous drones, autonomous vehicles, cleaning robots, industrial robots, etc.
- semantic analysis which understands the context and meaning from various types of unstructured data (images, text, voice, etc.) (sal)
- simulations and models to simulate complete scenarios

- decision support system that analyse data and provide insights to support human decision-making for Business analytics, market trend analysis, scenario planning, etc. (Narne et. al., 2023)
- data analysis and predictive forecasting applications that analyse a set of data and make different forecasts (for example, to optimize different processes)
- planning and optimization which optimizes processes and allocates resources efficiently resource allocation, production planning, supply chain optimization, etc. (Martins, 2024)
- anomaly detection which identifies unusual patterns in data and can recognize problems or risks fraud detection, identification of defects in industrial processes (e.g. in a factory where ceramic objects are made), security monitoring, etc.

In the context in which applications based on intelligent algorithms offer a faster and more accurate data analysis, administrative processes that often consume a lot of time can be automated (Androniceanu, 2024).

4. RESEARCH METHODOLOGY

Our goal is to investigate what is the point of view about artificial intelligence applications of some people with decision-making power within a public institution and within a company. Because "data collection is an essential component to conducting research" (Monday, 2020), we consider that, in this case, the interview is the best data collection tool.

Also, we agree with T. U. Monday that some of the strengths of the Interview method of data collection, among many others, are opportunity for feedback, probing complex answers and high participation (Monday, 2020). These advantages reinforced our belief that this type of data collection method is appropriate for this research.

Among the existing interview types, which include structured interviews, semi-structured interviews, unstructured interviews and non-directive interviews (Monday, 2020), we select the semi-structured interview for the current research.

That's why we invited two people with experience in their fields of activity to answer our questions. The institution and the company for which the interviewed persons work are from Romania, the Central Region, and, for greater geographical accuracy, the Transylvania region.

The first person interviewed is the mayor of a municipality in Romania, with a lot of experience. He has been mayor of the same municipality for more than 34 years. The second person interviewed is a company manager, with approximately 10 years of experience in this position.

Considering certain goals, 3 sets of questions were formulated: the first set contains 4 questions, which are common questions, both for the mayor and for the company manager. Table no. 1 contains both the questions from the first set, as well as the purpose pursued, and the answers received to each individual question.

The second set of questions was specially thought for the mayor, and the third set of questions was specially prepared for the manager of the week. The second and third sets contain 3 questions each. Tables no. 2 respectively Table no. 3 contain the questions asked, the answers received as well as the purpose pursued for each individual question.

Table no. 1. Common questions for the mayor and manager. The purpose of the question and the answers received.

Question 1	Do you the provide in in your we	Purpose of the question	
Answers	Mayor	At the moment I don't know if I could say, 100%, that such a technology would help me. But this is about the experience I have, accumulated in over 30 years as a mayor. However, there are times when in order to make the best decision I have to wade through a lot	Understanding how decision-making can benefit or be influenced by tools

		of documents and related legislation, so I would be interested in	that provide real-time
		testing such a technology.	feedback.
	Manager	AI technology input have a big impact in day-to-day business & operational activities by supporting the decisional process giving intuitive and supportive information, although human factor remains the last step in choosing and applying the appropriate solution case by case.	
Question 2	What do y might end as automa	Purpose of the question	
		I think the discussions would arise, first, about the infrastructure that	
	Mayor	should be used and the costs needed to be able to apply it. Another aspect would be the training of the officials I work with, and, finally, I have to think about my citizens, if they could use different and new equipment.	Identifying the various barriers that may exist
Answers	Manager	As every change, integration of new systems is conditioned by economical, organisational, operational factors. In real life, usage of new applications and technologies start with the fear of usage, which are connected with lack of knowledges or familiarization and directly related with learning curve. Once all features are known and users developed sufficient skill to understand the informational flow and benefits, all the difficulties meet during integration phase disappear and start to request improvement based on their work.	(such as costs, lack of training or difficulties in adapting to new tools).
Question 3	Have you application how?	Purpose of the question	
	Mayor	Yes, I use the computer, tablet, smartphone. I use e-mail daily and the Microsoft Office package to write or access certain documents, and since the pandemic I have also become familiar with applications that allow real-time communication. Of course, in the city hall, certain departments have their specific applications that are helpful, but of course there is room for improvement.	
Answers	Manager	Digitalisation and Automation is the new way of operating a business as it brings the most benefits. Almost all companies have Intranet pages, work platforms, Share points, financial, logistic, customer service, human resources, learning, process control platforms. Accessibility of the platforms is done with, PC's, laptop's, mobile devices which ease the work and provide support accessing remotely the systems. Using technology in all the forms available in professional context bring economic benefits as a primary gain but not only (accessibility of information, motivation, time management, connectivity).	Learn about current use of digital tools and perceived benefits.
Question		you think public institutions or private companies can work	Purpose of the
4	together t	o make better use of technology for the benefit of all?	question
Answers	Mayor	Yes, there is always the possibility of collaboration between the public and private sectors, and I think that certain applications could be developed to facilitate the sending of documents between certain institutions and private companies. Here I could give, for example, urban planning, where a link between town halls, county councils, architecture or design offices, the State Construction Inspectorate and other companies that offer different services in the field such as site management would be useful.	Exploring ideas for public-private
	Manager	If, I may say private sector is more advance in technology integration however public sector made important steps in performing connections at technology level especially for control of taxes, UIT codes, Invoicing, VAT declarations, labour declarations, etc. Although Public section is making steps forward in usage of informational technologies, accessibility from private usage remain a challenge to overcome. Let wish that with steady steps progress will come.	partnerships to improve services and efficiency

The answers received from the interviewed specialists to the common questions help us to have an overview of the realities in each field and how the people with decision-making power perceive the use of new technologies in their fields.

While the manager considers that AI technologies have a great impact in "day-to-day business & operational activities by supporting the decisional process giving intuitive and supportive information", emphasizing its supportive role with human oversight as the final step, the mayor is a little more reserved in the case of AI applications that can provide support in decision-making, and this is due to personal experience of over 30 years in the same position. However, the latter is eager to test the new technologies, especially for support in going through the large number of documents that need to be analysed in certain cases.

Regarding the difficulties that can be encountered in the use of new technologies, the mayor emphasizes the infrastructure, the necessary implementation costs, the training of public officials as well as the ability of citizens to use them, the manager highlights the initial fears that always appear in the use of new technologies, but which disappear with the new knowledge acquired over time.

The use of digital tools and different applications and platforms every day is a common answer for both interviewees, and the manager highlights the fact that "Using technology in all the forms available in professional context bring economic benefits as a primary gain but not only (accessibility of information, motivation, time management, connectivity)."

Table no. 2. Specific questions for the mayor. The purpose of the questions and the answers received.

		t ways do you think that digital tools that can automatically manage	-
Question		requests or automatically generate official documents (e.g.	Purpose of the
1		ates) could help the city hall provide faster and more efficient s to citizens?	question
	services	There is no question that such digital tools would not be useful.	
		Reducing the time, it takes to issue a certificate or tax certificate	
		would clearly help to provide quality services to citizens. However, for	Assessing how AI-based
Answers	Mayor	this the digital infrastructure should be functional, the city hall's	solutions can reduce
		databases should be filled with "up to date" data, civil servants should	workload and improve
		be extremely well trained, citizens should have certain knowledge to	services for citizens.
		be able to request the necessary documents electronically, and because	
		we always must think about the costs, they should be reasonable.	
Question		view, what types of information could be considered for a system to	Purpose of the
2	analyse	and propose useful actions for your community?	question
		I think I would like to have such "intelligent support" for monitoring	
		public transport and road infrastructure in the commune. In making	
		decisions for the community, it is very important to have the correct	Understanding how
		information and in the shortest possible time. An analysis of public	analysed data can
Answers	Mayor	transport would be useful to me in order to arrive at the best operating	support decision-making
		hours of the means of transport.	and project development
		I would also like such a system to know everything related to public	for the community.
		utility networks so that I can more easily create a schedule for	
Question	How de	prioritizing their repair and maintenance work. you see the evolution of artificial intelligence-based technology in	Purpose of the
3		administration in the next 5-10 years?	question
		I hope that this technology will develop in such a way that it provides	
		real benefits for both public administration employees and citizens.	
		For civil servants, I would like to reduce the workload, which is now	
		extremely high. That is, to generate an automatic response to certain	
		requests, in an extremely short time.	Understanding the
Answers	Mayor	For citizens, I hope to significantly reduce the time spent at the	future perspective on the
		counters for paying taxes or fines, for example.	subject.
		At the same time, for both citizens and public administrations, I would	
		like to reduce, or why not, eliminate, the travel expenses that arise as a	
		result of the obligation to submit or pick up certain documents in	
		person.	

Through the specific questions addressed to the mayor, the aim was to evaluate how solutions based on artificial intelligence can reduce the workload, improve services for citizens, support the decision-making process and the development of community projects, as well as provide a future perspective on the subject.

The responses received emphasize that digital and artificial intelligence-based solutions could speed up and make services offered to citizens more efficient, but their implementation requires a functioning digital infrastructure, up-to-date data, well-trained staff and reasonable costs. Also, the mayor is aware that such technologies could support community decisions by monitoring infrastructure and public networks (the example provided by the mayor). Regarding the evolution of these technologies, the mayor hopes that they will have an impact on reducing the workload of officials, the time citizens spend at the counters and the costs associated with submitting or picking up documents.

Table no. 3. Specific questions for the manager. The purpose of the questions and the answers received.

Question	How has your company used technology, such as apps, online systems, or		Purpose of the
1	different	tools, to save time or improve customer satisfaction?	question
Answers	Manager	Process control operations is fully automated (SCAD /CIMPLICITY platform) and is controlled through specific applications with ability to control a plant operation remotely with light interventions from process operators. Apart of process parameters, applications used to control production environment use advance algorithms to collect data from the installed sensors (AVEVA predictive maintenance, IFM Moneo system that integrate sensors related to vibration, temperature, levels, airflow) which are projecting new parameter to guide the process and to perform process corrections (adjusting the feeding for raw material, adjusting hoppers levels, stopping equipment if silo's capacities are achieved) to improve productivity. New technology integration and upgrade of existing one is a continuous activity that support maintaining the production process at the most effective production cost and the specifications of the products in line with customer satisfaction. Main platform to interact with customers is SALES FORCE however technology is not substituting direct contact through all forms of communication (verbal, written, electronic, face to face meeting, etc.) in order to meet full customer satisfaction.	Understanding how companies have adopted technology to improve efficiency and customer service.
Question	What ar	e the most important aspects you consider when deciding to	Purpose of the
2	purchase	new equipment or technology solutions for your company?	question
Answers	Manager	Every company have their own strategy or policy in term of new equipment's and technologies however all the pre-acquisition analysis are made based on needs-costs-life time-benefits-payback period (or amortisation time).	Understanding the factors that influence investment decisions in new technologies.
Question	How do y	ou anticipate customer expectations will evolve as your company	Purpose of the
3	adopts ne	w smart technologies?	question
Answers	Manager	Customer expectations are to increase the connectivity with suppliers through the Customer service platforms by using automated transfers of information related to need directly into orders and for prompt service related to connected activities. As always progress start with obstacles in integration of AI technology in day-to-day business activities however we don't realise that personal and professional life is already supported by many AI functions. It is up to us to find the meaning were AI technology to be integrated to add value.	Understanding how managers perceive changes in customer behaviour and expectations as a result of the implementation of advanced technologies such as artificial intelligence.

Through the questions addressed to the manager, the aim was to understand how companies adopt technology to improve efficiency and customer services, the factors that influence investment

decisions in new technologies and, last but not least, what is the perception of people with decision-making power in companies on the changes in customer behaviour and expectations as a result of the implementation of technologies based on artificial intelligence.

From the answers received from the interviewed manager, we learn that his company already uses advanced technologies for process automation and production optimization, all of which contribute to cost reduction and improved customer satisfaction. He points out that decisions are based on analysing needs, costs, benefits and amortization period, and the integration of new smart technologies aims to increase connectivity with customers and simplify processes through automated platforms, although the implementation of these technologies may encounter certain obstacles at the beginning.

5. CONCLUSIONS

The role of applications based on artificial intelligence in the two sectors of interest is important and is generally recognized, knowing the benefits (reduce workload, improve operational efficiency, enhance decision-making, etc.), and at the same time the challenges that must be faced to be implemented and used; here we can refer to high costs, the necessary infrastructure, updated databases, trained human staff and others.

From the analysis of the answers received we can see that the manager perceives AI as a crucial tool for improving efficiency and decision-making, emphasizing its supportive role with human oversight as the final step, while the mayor approaches AI with cautious optimism, shaped by decades of personal experience and a reliance on traditional processes. This highlights the private sector's proactive adoption of technology compared to the public sector's hesitance. Regarding barriers to adoption, the mayor focuses on infrastructure, training, and citizen adaptability, reflecting broader community concerns, whereas the manager points to initial fears and the learning curve, which are eventually overcome through adaptation.

Also, we can conclude that there are contrasts between the public and the private environment, at least in terms of the way technologies are used. While the manager refers to a highly digitized and automated environment, the mayor relies on basic digital solutions. The private sector is more advanced in the use and implementation of last-generation digital solutions, while in the public sector things are more reserved, but still optimistic about the potential that AI-based solutions can offer.

The need for collaboration between the public and private sectors is recognized, and the mayor exemplifies a situation in which such technologies would create a bridge between institutions and companies, in support of the citizen.

This study underlines the fact that the people interviewed are aware of new technologies and how they can influence the fields in which they work. At the same time, they are aware of the need and openness to what is new in order to improve the services offered to citizens, but also in the case of easier management of the work flow and time management of public officials (in the case of the public administration) as well as to improve the links and the connectivity between companies with their clients and suppliers.

In Romania, an improvement of the public sector is desired through digitization and the use of the latest generation technologies, but unfortunately it is found that there is no centralized policy of adoption and implementation at the national level (except in very few cases). Also, the links (through computer applications) between the public and private sectors for the efficiency of certain processes are quite limited and those that exist, most of the time work with difficulty.

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