

CHALLENGES OF USING ARTIFICIAL INTELLIGENCE IN MANAGEMENT DECISION MAKING

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Abstract. The technology development of society has a strong impact on the labor market. The use of artificial intelligence leads to changes in the requirements for occupying certain professions, the elimination of some positions, as well as the appearance of new professions. This necessitates changes in the organizational structure and job design. Also changing are the requirements for employees who must acquire new knowledge and develop skills to be able to occupy certain professions. The turbulent business environment also requires organizations to be able to identify emerging trends and quickly respond to these new demands in order to stay in the market. It is here that to stay “in the game” analysis is needed, which projects future trends using artificial intelligence.

Keywords: artificial intelligence; management decisions; organizational decision-making

1. Introduction

Over the past four decades, companies have invested significantly in building their analytics capabilities, to improve significantly the processes of decision-making procedures. However, the current landscape increasingly emphasizes the exploration and exploitation of artificial intelligence (AI). Moreover, the objectives of AI and business analytics align closely: both leverage vast datasets, use up-to-date technology and analytical instruments, and implement sophisticated statistical theory to use modern value sources.

Presenting AI as an organic new progression of analytics, and leveraging existing analytical capabilities, offers the most straightforward and effective path for most companies to embrace AI successfully. While there are instruments of AI, which are not inherently statistical, statistically-based AI technologies.

Analytics 4.0 represents the following phase of analytical sophistication where companies, heralding the age of cognitive technologies. This paradigm

has gained widespread adoption, with adoption rates ranging from 20 to 30% across large enterprises, depending on geographical location.

The increasing need for the introduction of Artificial Intelligence (AI) tools in every business area is based on the dynamics of the environment (Molhova & Biolcheva 2023). However, many firms face significant challenges in successfully implementing AI. Some surveys indicate that the most instruments of AI leads fail to gain traction (Browder et al. 2022). Why is this the case, and how can firms overcome these obstacles to effectively leverage AI? To fully harness the eventual pluses of AI technologies, companies shall not only implement but also scale AI within their organizations. This necessitates a structured approach to using and scaling AI, wherein organizations establish the foundational requirements to effectively utilize AI technologies—enhancing the efficiency in operations or creating modern value-creation possibilities using the AI. Failure to adapt to and adopt AI approaches and instruments may hinder firms' ability to remain competitive in the long term.

No doubt that increasing use of AI technologies is imperative for long-term competitiveness, and recognizing that many firms struggle with successful AI deployment, a thorough examination of in what manner the organizations should realize AI use and scaling within their facilities is paramount.

Accordingly, it is paramount to develop a deeper understanding of how firms can effectively implement and scale AI to fully harness its significant benefits. Previous research on technology adoption emphasizes the importance of firms undergoing a transformative process wherein they not only learn to manage the up-to-date technology but also establish the necessary company structures to support its integration. In a broader context, adopting technology necessitates changes not only in how the firm employs technology but also in its organizational framework (Boothby et al. 2010).

AI technology is main considered a subset of digital technologies. The recent policy of technological advancements differs from the waves of technological achievements in last decade. Some researchers note that contemporary technologies possess unique characteristics compared to past technologies like IT. However, analyzing recent and up-to-date technologies in digitalization is crucial and very important because lead to significant change in business models and the transformation of the role of humans in decision-making processes.

Therefore, this paper aims to investigate decision-making through AI and challenges to the use of AI. In order to fulfill the purpose, a survey of the attitudes of managers was conducted in Bulgarian organizations.

2. Theoretical background

Previous research on technology adoption consistently highlights the importance of outlining an suitable socio-technical system for successful implementation inside firms. This principle applies broadly, including to IT adoption. Numerous studies

underscore that AI policy involves socio-technical elements that companies have to effectively rule to capitalize on its benefits (Anthony et al. 2023). Effective HRM represent a significant success factor for an organization. Highly relevant for organizations combining essential role of HRM with the potential of AI technology (Weber 2023). The management team of organizations are starting to develop a strategy for using artificial intelligence. Artificial intelligence helps employees improve their decision-making abilities by improving their analytical skills (Dual et al. 2019). Given AI's generative, malleable, and combinatorial nature and its ability to autonomously manage all important and crucial for the organization processes (Murray et al. 2021), firms face significant problems in establishing a proper socio-technical system to leverage the digitalization wave. It can be considered that, investigation on the socio-technical elements is crucial for exploiting AI with success, including implementation and scalability, remains limited, prompting calls for further investigation in this area. Specifically, it can be concluded that companies have to prioritize the development of data models and following analytics procedures. Standing on social policy, companies have to articulate an AI implementing strategy, foster AI operations, and establish an organizational approach supportive of AI system development.

The literature consistently emphasizes AI's potential to significantly enhance firm performance across various industries (Makarius et al. 2020). Some scholars argue that leading technology companies have established a reasonable lead by bolstering their AI applications within recent platforms. However, many other companies struggle to capitalize on the benefits of AI (Browder et al., 2022), raising the question of why some succeed while others falter in leveraging AI. Presently, there is mounting pressure because important transformations driven by famous AI instruments, fundamentally reshaping business operations across numerous industries (Edelman and Abraham 2023). Despite long-standing expert predictions regarding AI's transformative impact on competition across industries, the pace of change is accelerating, prompting many firms to swiftly strategize on optimal AI implementation and scalability. By examining how companies are addressing these challenges, we aim to contribute several insights to the research in this field.

Implementing and scaling new technologies present formidable challenges for organizations (Fontaine et al. 2021). Considering the essential levers available to management for positive results in executing the technological transitions is of paramount importance. Through founded analysis of surveys conducted in different research, it can be discerned the main pivotal elements as outlined by the interviewees, which significantly enhance the criteria of positive results of AI use in organizations that reflects to technical and social components.

Technical components – Effectively managing the technology itself emerges as one of the pivotal aspects of using AI in companies. It can be indicated three key levers in the technical component's category. Firstly, the approach how to manage

the operation data stands out as a critical aspect. Many organizations grapple with challenges related to collecting and structuring the data for comprehensive AI implementation and scaling. Consequently, managing data becomes essential to facilitate the AI initiatives.

Secondly, the technical infrastructure encompasses the important issues related to the AI systems within the companies. Firms are confronted with various variants in this realm, each carrying implications for the scalability of AI systems. Lastly, AI models represent the algorithmic approaches adopted by organizations in creating specific AI systems. These approaches encompass a spectrum, ranging from well-known machine learning methods to sophisticated ensembles of modern learning-based systems.

By adeptly managing these technical components, organizations can significantly enhance their capacity to use AI systems successfully.

Social components—another pivotal aspect of successfully using AI in companies includes establishing the appropriate social context. Within this dimension, that have been identified three crucial sub-elements. Firstly, the AI vision encompasses the overarching target outlined by the company in terms of the use of AI within the organization. This approach provides the framework for decisions made within other elements.

Secondly, AI possibilities play a critical role in leading AI initiatives to success. Organizations have amalgamate both technical expertise and domain-specific capabilities to effectively execute AI initiatives.

Thirdly, the manner in which the AI would be involved in daily operation processes in a firm significantly will reflect on the design of the organizational structure and that phase have to be agreed in advance in the company.

All these components outline primary levers available to organizations striving to scale and use the AI instruments.

3. Discussion

Today there is the unresolved question of whether the AI were supposed to augment the decision maker or replace them, or even replace them for part of the job. The researchers identified different roles the system could play for example consultant, tutor, assistant, critic, expert and second opinion (Cao et al. 2021).

In this article we investigate the field of most often use of AI as well as challenges of using AI in managerial decision-making. The developed questionnaire contains closed questions presented with five-point Likert scales. The survey is addressed to senior management levels in organizations. In the research 22 managers employed in various sectors took part in the survey and their opinion were analysed. The organizations participating in the study operate in the manufacturing sector (8 organizations), banking sector (3 organizations), telecommunications organizations (1 organization), IT sector (5 organizations) and 5 in the service sector. The

survey was conducted face-to-face in order to obtain additional comments on the application areas of artificial intelligence. The managers were given the survey form and each question was discussed in detail when filling it out. The survey was conducted in the period December 2023 – January 2024. The obtained data were summarized and basic statistical methods such as frequency distribution were used for their processing. Correlation and regression relationships were not sought between the studied indicators. The aim is to synthesize data on the field of use of artificial intelligence in management decision-making and the challenges before it, based on the studied sample.

The results of the field of application of artificial intelligence in organizations are presented in table 1.

Table 1. Field of most often use of AI

For each, please circle the most appropriate responses to indicate most often use AI	1	2	3	4	5
	Never	1/4 of the decision making	1/2 of the of the decision making	3/4 of the decision making	Always
In Human Resource management	14%	18%	32%	27%	9%
For information analysis	9%	27%	36%	18%	9%
1.1. In managerial decisions	18%	41%	27%	14%	0%
In administrative work	36%	32%	23%	9%	0%
In logistic process	14%	23%	28%	23%	14%
For feedback and information with suppliers and customers	18%	27%	36%	9%	9%

The results show the weakest use of artificial intelligence in management decision-making. During the covid pandemic, many businesses have shifted to working in a digital environment (Vitliemov and Stoycheva 2022). However, the obtained data show the relatively weak use of artificial intelligence in administrative work, where it is not used in more than 50% of the decisions made.

In human resources management, 14% of respondents never use artificial intelligence when making decisions related to people, in 4 organizations (18%) it is used in 25%, in 50% of decisions made artificial intelligence is used in 7 organizations (32%), in 6 (27%) organizations it is applied in 75% when making decisions and only in 2 respondents (9%) it is always used. Its application is most often in the recruitment and selection of personnel, training of newly hired and

currently employed, as well as in measuring the performance of workers. When using artificial intelligence in the recruitment and selection of personnel, care must be taken that the database it processes does not lead to discrimination of candidates for certain job positions. AI is also used for non-material stimulation, such as expressing company praise and personal greetings, for example on birthdays and name days.

In the first place of surveyed organizations AI is most widely used in information analysis. This confirms the results obtained from other studies, namely that the available database can be analyzed with the help of artificial intelligence (Franke et al. 2022). Managers make three basic types of decisions unstructured decisions, structured decisions and semi-structured decisions. Organizations increasingly use AI to make structured decisions that are tactical, must be processed swiftly recurring and require a large amount of numerical data. One important example of structured decision is pricing. Pricing is the kind of decision that AI is currently very able to support. AI models analyze the company's past pricing decisions and their results – whether the customer accepted the price and bought the product. AI model can predict whether a certain price will lead to a sale (Gümüşay et al. 2022). In the banking sector, artificial intelligence is widely applicable and you displace the human factor. Many employees lost their jobs because the customer got greater self-service options, so a physical visit to an office is no longer necessary to claim a number of banking products. When assistance is needed in the contact center, the application also began to find artificial intelligence. Despite the lack of emotions from the point of view of courtesy and individual approach through artificial intelligence, banks process large data sets and get to know their clients better. So they can offer them personalized offers. In this way, the efficiency of the processes is optimized.

In order to determine the challenges to the use of artificial intelligence, as well as its advantages and disadvantages managers evaluated these indicators on a scale from 1 – strongly disagree to 5 strongly agree.

Table 2. Challenges of using AI in managerial decision-making

Elements	1	2	3	4	5
	Strongly disagree	Disagree	Undecided	Agree	Strongly agree
AI give additional information	5%	14%	22%	27%	32%
AI saves me time to think and compare different alternatives	9%	9%	27%	18%	37%
Managerial decisions are more reasonable	9%	22%	37%	18%	14%

AI saves me effort	9%	18%	32%	23%	18%
AI provides objective solutions	5%	9%	27%	37%	22%
1.2. AI predicts trends	9%	9%	27%	32%	23%
1.3. Optimize efficiency of working process	5%	18%	36%	27%	14%
AI cost a lot of money	0%	14%	32%	36%	18%
Need for trainings to use AI	0%	9%	18%	50%	23%
Lack of innovative thinking	0%	14%	23%	45%	18%
Lack of creativity	0%	18%	18%	41%	23%
Loss of trust among subordinates	0%	9%	32%	37%	22%
Lack of emotional impact	0%	9%	18%	41%	32%
Lack of protection of personal data	9%	14%	27%	36%	14%
Another challenge is integrating AI algorithms with existing systems	9%	9%	14%	36%	32%

The results indicate that the advantages of artificial intelligence are that it gives additional information, saves efforts and time, provides objective solutions (for more than 50% of managers). Another benefit of using AI in the workplace is its ability to predict trends and optimize efficiently of working. This is important for quick decision-making in the changing external and internal environment in which organizations operate. Real-time decision making by processing a large array of data is also one of the advantages of artificial intelligence in this globalized world.

Despite these advantages, the data show that managers are still not convinced that when it comes to management decisions they are more reasonable using artificial intelligence. It is for this reason that managers define the role of artificial intelligence as assistant, second opinion or consultant rather than tutor, critic or expert.

Some of the major disadvantages (for more than 70% of the respondents) of the application of artificial intelligence are that it costs a lot of money and need for training to use it. Another lack is integrating AI algorithms with existing systems (for 68% of managers). A disadvantage, according to managers, is the lack of emotions in artificial intelligence. This issue is complex, because the use of artificial intelligence excludes the possibility of human error, as well as the occurrence of a conflict situation. For more than 60% of respondents, the lack of innovative and creative thinking in artificial intelligence when making management decisions is a drawback. The creative approach is characteristic of man. Also, managers feel mistrust regarding the confidentiality of data, from where the trust between the various stakeholders involved in business processes falls.

4. Findings

Managers often struggle with the lack of time and the need to make quick decisions. This requires the processing of a large volume of data and information, and this is where they use artificial intelligence. Respondents are unanimous about its indisputable advantages as an assistant in processing and comparing a large database.

According to the surveyed managers, immediate feedback and receiving information from customers and suppliers also requires the use of artificial intelligence. Here, managers must consider to what extent this does not impair the quality of the service offered.

Contrary to initial expectations, despite the transition to a digital environment and the change in the organization of the work process and communications, the application of artificial intelligence is not widely used in the administrative work of the studied organizations.

There are not a few cases in which, when a management decision is made, it is subjected to an artificial check, mostly related to the analysis of large data sets. It is difficult to understand the complex nature of the algorithms used by artificial intelligence to make decisions. This ambiguity calls into question the reliability of processes in organizations using artificial intelligence. Managers say that the lack of trust (especially among the older part of the staff with a more conservative mindset) and the necessary competence are still the main factors for the limited use of artificial intelligence in making management decisions. Also, importance is beginning to be given to different ethical nuances related to the application of artificial intelligence.

A positive aspect of management decision making process using AI is objectivity and avoiding a potential conflict situation. At the same time, according to the data obtained, a disadvantage is the lack of emotions and empathy, which are important for a person to perceive and evaluate a given situation. AI, according to managers, cannot replace human intuition, innovative, abstract and creative thinking of people. It is here that the role of the manager is to skillfully balance the use of the human factor and artificial intelligence.

5. Conclusion

The ascent of AI is swift, heralding the dawn of Analytics tools. With AI's transformative potential for businesses, the impact of analytics instruments is anticipated to surpass that of previous technological shifts significantly. Moreover, companies embracing AI may surge ahead of their counterparts, having likely honed additional competencies such as agility approaches, cloud infrastructure, and proficiency in open-source technologies, providing them with further strategic advantages.

The journey toward realizing AI success commences with a foundational understanding of AI, its enterprise-wide implications, an assessment of the organization's current capabilities, and the formulation of a viable decision-making strategy. Companies leveraging their existing analytical capabilities are poised for a swifter and more effective initiation into the realm of AI.

Undisputed decision-making by artificial intelligence leads to more efficient and faster results. Although managers share that significant funds are needed to implement artificial intelligence in a number of functional activities, they must appreciate that by automating tasks and procedures will lead to future savings of funds and especially time. The use of artificial intelligence minimizes the possibility of human error and is able to detect correlations and regressions that are not obvious and that humans would not think of. The application of artificial intelligence leads to the achievement of a competitive advantage in the globalized world in which we live, but its application must be together with the human factor to maintain its leading role.

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