Forging the Future: Pioneering Approaches in Business, Management and Economics Engineering to Overcome Emerging Global Challenges - 2024

https://doi.org/10.24867/FUTURE-BME-2024-039 Review paper

THE IMPACT OF ARTIFICIAL INTELLIGENCE TECHNOLOGIES ON ORGANIZATIONAL STRUCTURE AND BUSINESS PROCESSES

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Abstract

Artificial intelligence (AI) technologies are used in many forms throughout different organizations. These can include chatbots for customer interaction, recommendation services for business decisions, code or product design suggestions, detecting patterns of behavior or process flows, anomaly detection, and many other applications. Implementation of different AI technologies is related to companies process performance factors which have always the same goal of optimization under given constraints, and it brings novel ways in which companies may organize or reorganize jobs. Thus, AI technologies implementation have an impact on changing the existing business processes and impacting the positions and responsibilities of organizations employees. Since the AI technologies are increasingly present in today's business environment, this paper is focused on detecting the changes in organizational design, business processes and process management, due to AI technology implementation. The paper presents the analysis of how adoption of the AI technologies is changing organizations in these areas. Paper shows the discussion of recent published research papers on these topics, and highlights main implications.

Key words: *artificial intelligence, organizational structure, business processes.*

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1. Introduction

AI is revolutionizing traditional practices in management, marketing, customer service, and organizational processes. It is a major driver of innovation, facilitating the development of new products and services that address market needs (Melnyk et al., 2024). The integration of AI into the business sector has led to changes in organizational processes, impacting not only technological infrastructure but also organizational culture and business practices (Canbul Yaroğlu, 2024).

AI's capability to process and analyze large volumes of data has far-reaching effects on organizations. It has the potential to reshape organizational values, norms, and methods of operation, but it also poses challenges to maintaining a human-centered approach. By automating repetitive tasks, AI enhances worker efficiency, reduces errors, and increases service flexibility. In the face of a rapidly evolving business environment, digital transformation is crucial for maintaining competitiveness, necessitating adaptation to modern technologies and a cultural shift towards embracing change and innovation. Organizations must navigate novel challenges associated with embracing modern technologies to stay profitable and stable. Key issues include effectively leveraging technology, managing rising operational costs, addressing expertise gaps, ensuring security, and complying with customer data regulations (Füller et al., 2022). While most managers recognize the potential and requirements of AI-based innovation, they vary in their preferred methods for implementation. Many organizations report problems in implementing AI systems throughout the organization (Benbya et al., 2020) and much of the expected value remains unrealized (Tarafdar et al., 2020). Organizations must properly prepare themselves to drive AI implementation and unlock its full potential (Jöhnk et al., 2021). This preparation involves investing in specific organizational resources, such as specific human skills and roles, data, and IT assets. However, simply having these resources is not enough; it is crucial how organizations utilize, combine, and integrate them as capabilities to achieve desired outcomes and create value (Mikalef & Gupta, 2021). Capabilities emerge from the complex interplay of resources, along with organizational roles, structures, and processes (Peppard & Ward, 2004).

2. AI impact on organizational structure

To fully leverage the potential benefits of AI technologies, organizations must successfully implement and ultimately scale AI across the organizations (Makarius et al., 2020). Many companies lack the necessary guidance and frameworks to effectively manage the processes involved in implementing and scaling AI (Haefner et al., 2023), so leaders face challenges in establishing the right framework for integrating and scaling AI into their organizations.

The adoption of new technology requires not only changes in how the firm uses technology but also adjustments to its organizational structure and processes (Boothby et al., 2010). Haefner et al (2023) advise that firms must effectively organize to ensure that the AI system can autonomously contribute to value

creation, while also monitoring and maintaining these systems and their contributions to organizational processes. It is important that for to be prosperous in implementing the AI technology that the organizational structure must follow it. Therefore, in the following sections of this paper, we will dedicate our attention to this issue.

Haefner et al (2023) define AI organizational structure as the: "Organizational design of the AI team and its responsibilities within the firm".

Depending on the organization's vision and the stage of AI implementation and scaling, the AI structure will be different. Early phases may require more centralized AI structure where all AI-related activities are managed by a central team or department to ensure consistency and proper governance, while later stages, focused on scaling, might benefit from a decentralized AI structure where individual business units or departments independently manage AI initiatives based on their specific needs or hybrid AI structure to foster flexibility, innovation, and integration across various departments. Collaboration plays a crucial role in developing AI systems, especially due to the inherent complexity and opacity of AI, which widens the information gap between IT and other business functions in centralized AI structure. On one hand, IT departments need input from business units to design AI systems effectively, choose relevant features, and assess their performance (Lebovitz et al., 2021). On the other hand, business units need transparency and clear explanations from the IT team regarding the AI system's inner workings, performance, and limitations (Watson, 2017).

In centralized AI, central coordination helps prevent teams from duplicating efforts and promotes collaboration. For instance, if one team has effectively addressed a problem using AI, there should be a system in place that allows them to share their insights broadly across the organization. By centralizing efforts, leaders can develop a comprehensive AI strategy. This approach allows them to set a clear direction and prioritize the most critical AI projects. However, when organizations centralize AI responsibilities, they risk creating isolated teams of "tech experts" who may develop solutions that are disconnected from real business needs and lack practical value. As a result, the most successful AI initiatives strike a balance between centralized and decentralized efforts.

To overcome these obstacles, a hybrid AI organizational structure approach is often used, where a central AI team—often referred to as the Center of Excellence (CoE)—consolidates key functions and expertise while maintaining close connections with decentralized units and the wider organization. The AI CoE is supported by an integration team that ensures Proof of Concepts (PoCs) are successfully incorporated and scaled within the organization's structure.

Depending on the context, each CoE can operate effectively. However, it is generally advisable to position the AI CoE near key decision-makers to ensure alignment with strategic priorities (Shrestha et al., 2019).

In the literature, this type of structure supporting AI within an organization can be referred to as a "hub-and-spoke" model. In this structure, the 'hub' is responsible for setting standards, defining training strategies, ensuring ethical guidelines, and managing broader issues, while the 'spokes' focus on tasks more closely related to the practical application and use of AI Fountaine et al., 2019). Next, we will see how AI impacts business processes.

3. AI impact on organizational processes, and process management

The organizations are on a path to transforming their processes and process management approach to AI-assisted. Traditionally, the processes always follow a specific path when applying technologies as an improvement. Tracking process execution performances, such as process time, process costs, and quality of work, can reveal process performance over time or can show if the process executes within the given boundaries. Process time and costs are related, and process quality can impose repetition of process steps, which then brings us back to the dimensions of time and costs.

If performance degrades then the problem must be described and quantified. This enables priority-making in solving the existing problems which cause performance degradation or the inability of a process to reach organizational goals. The next step is to find the solutions and to decide if they are feasible and cost-effective. If the decision outcome on feasibility and cost-effectiveness is positive, then this solution or group of solutions is applied to the process, to some part of the process or just to process tasks. A solution type can be twofold. Solutions can express a way of task adjustment without introducing automation (reorganizing). But most often, solutions introduce some type of software. The previously described approach is called the Business Process Management methodology - BPM (Dumas et al., 2018). BPM methodology consists of several phases, guiding the organization from process discovery to process improvement. It has been often used when the business organization is motivated to do the digital transformation of its processes (Gabryelczyk et al., 2023). The BPM phases are intertwined with AI abilities when this technology is applied. Usually, the BPM digital solutions are in the form of wide-scope Business Process Management Systems (BPMS), which help in process flow automation and process performance tracking. With the introduction of AI, according to (Dumas et al., 2023), BPMS software will transform towards ABPMS – Augmented BPMS, helping processes become more adaptable and adding proactivity with respect to process time, costs, or quality. This type of software would represent not only the AI-empowered system, but also it would change the business process management approach where ABPMS would have interact with one or more human or digital agents, and execute the phases of BPM lifecycle autonomously (Dumas et al., 2023). The BPM conversational ability is also noted in (Rosemann et al., 2024), where different stakeholders such as process owners and process analysts can be able to send queries in natural language and get the desired response. So, the strictly transactional task execution nature will not be eliminated, but the AI's ability to process natural language would enable process management software with more a person-like behavior. The authors in (Rosemann et al., 2024) note that conversational and transactional integration is still at the beginning. Also the organizational processes would move from simplified to sophisticated (more customized to users' needs), and from automatized to autonomous (due to the machines being able to make autonomous decisions in the processes) (Rosemann et al., 2024).

If the company's automation decision goes into the process task automation direction, then the complexity of the task usually deters the automation type. The possibilities of task automation can vary from the automation scope. Task automation has been usually done with Robotic Process Automation (RPA) approach. These can be simple software bots for doing tasks like extracting information from an invoice document and copying it into the spreadsheet software, or consolidating multiple tables into one report which can be sent over email then, etc. Simple tasks are repetitive and time-consuming. Their automation does not require a complex bot. But, as task complexity grows, AI technology applications emerge. Technologies incorporating machine learning or deep learning, such as chatbots, exemplify adaptive solutions. Chatbots, which utilize natural language processing (NLP) and machine learning, have become integral in various aspects of consumer interactions, from shopping to healthcare (Enholm et al., 2022; Urbani et al., 2024). These software bots simulate human-like interactions, enhancing customer experiences, although they may lack deep contextual understanding and primarily generate optimized responses. We see the same attributes as in BPMS software, like conversation and customization, but on a process task level.

Lastly, Large Language Models (LLMs) are gaining popularity for the use of process management as seen in (Berti et al., 2024) and (Beheshti et al., 2023). In (Kampik et al., 2024), a Large Process Model (LPM) is proposed. LPM would merge AI approaches and process management knowledge, enabling understanding of the business processes management specifics to a wider audience, thus making the BPM projects more feasible in organizations (Kampik et al., 2024). In (Ziche & Apruzzese, 2024), a represented case study shows the implementation of LLM for the needs of business process modeling in an international company. In this case, the LLM does not replace but rather supports process modelers, having in mind process documentation used for models creation and organizational specifics. The natural language recognition is emphasized in all these papers, enabling process modeling, but the application is still in its beginning phase concerning the limitations, and specifics of each business process and the organizational system in which it lives.

4. Conclusions

We can see that the AI technology organizational implementation has started and that it brings competitive advantage, but also impacts the organizations to take different approach to work. To be able to integrate AI into everyday business, companies may need to adapt organizational structure to a balanced one between centralized and decentralized approach, and also have to be aware of ethical and other issues which can arise if not properly managed. As for the processes, the AI can be applied to a process as a whole, but from a managerial point of view it impacts mostly process modelling, analysis, and monitoring. When applied on to a single task, or group of tasks, then it impacts how the task is implemented. The strict process step-by-step approach would be looser with the conversational potentials of AI technology. Challenges for business process implementation lie in different procedures, policies, available information and knowledge. We conclude that AI will

definitely be more and more present in everyday organizational activities, and that will impact organizations more than any other technology, but surely this is only the beginning, and some adaptation of processes and organizational structure will be needed so that this technology can live to its potential.

Acknowledgments

This research has been supported by the Ministry of Science, Technological Development and Innovation (Contract No. 451-03-65/2024-03/200156) and the Faculty of Technical Sciences, University of Novi Sad through project "Scientific and Artistic Research Work of Researchers in Teaching and Associate Positions at the Faculty of Technical Sciences, University of Novi Sad" (No. 01-3394/1).

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