

## THE DEVELOPMENT OF ARTIFICIAL INTELLIGENCE IN ORGANIZATIONAL MANAGEMENT

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### Abstract

Over the course of several decades, the incorporation of artificial intelligence (AI) into organizational management has been a transformative voyage, characterized by significant milestones and innovations. The field of artificial intelligence went under a rapid evolution in the 1980s with the introduction of machine learning algorithms and neural networks, which allowed systems to learn from data.

This development was preceded by early AI research that concentrated on symbolic reasoning and problem-solving. In the 1990s, AI applications acquired prominence in business sectors as a result of data mining techniques and expert systems.

The 2000s were characterized by the rapid advancement of AI technologies, such as computer vision and speech recognition, which expanded their commercial applications. In recent years, organizations have been able to resolve complex challenges and spur innovation by further accelerating the adoption of deep learning and reinforcement learning.

This paper investigates the fundamental transformation of management practices by AI advancements, which have improved operational efficiency, facilitated innovation, and improved decision-making. AI has revolutionized conventional management methodologies by automating routine duties and offering predictive insights.

Organizations are now capable of anticipating market trends, optimizing resource allocation, and mitigating risks through the incorporation of predictive analytics and decision support systems. AI-driven tools have fostered an innovative culture by improving consumer interactions, workforce planning, and collaboration.

The function of AI in organizational management is anticipated to expand further as it continues to evolve, thereby fostering new paradigms in strategic planning and organizational efficiency.

**Keywords:** artificial intelligence, development, organizational management

## A MESTERSÉGES INTELLIGENCIA FEJLŐDÉSE A SZERVEZETI MENEDZSMENTBEN

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### Absztrakt

A mesterséges intelligencia (AI) beépítése a szervezeti menedzsmentbe több évtizeden átívelő folyamat volt, amelyet jelentős mérföldkövek és innovációk jellemeztek. A mesterséges intelligencia területe az 1980-as években gyors fejlődésen ment keresztül a gépi tanulási algoritmusok és a neurális hálózatok bevezetésével, amelyek lehetővé tették a rendszerek számára, hogy tanuljanak az adatokból.

Ezt a fejlesztést a korai AI-kutatás előzte meg, amely a szimbolikus érvelésre és problémamegoldásra összpontosított. Az 1990-es években az AI-alkalmazások az adatbányászati technikák és a szakértői rendszerek eredményeként kerültek előtérbe az üzleti szektorban.

A 2000-es éveket a mesterséges intelligencia-technológiák, például a számítógépes látás és a beszédfelismerés gyors fejlődése jellemezte, amelyek kibővítették kereskedelmi alkalmazásukat. Az elmúlt években a szervezetek képesek voltak megoldani az összetett kihívásokat és ösztönözni az innovációt azáltal, hogy tovább gyorsították a mély tanulás és a megerősítő tanulás elfogadását.

Ez a cikk a menedzsment gyakorlatok alapvető átalakulását vizsgálja a mesterséges intelligencia fejlesztései révén, amelyek javították a működési hatékonyságot, elősegítették az innovációt és a döntéshozatalt. A mesterséges intelligencia forradalmasította a hagyományos irányítási módszereket azáltal, hogy automatizálta a rutin-feladatokat, és előrejelző betekintést kínál.

A szervezetek ma már képesek előre jelezni a piaci trendeket, optimalizálni az erőforrás-allokációt, és mérsékelni a kockázatokat a prediktív analitikai és döntéstámogató rendszerek beépítésével. A mesterséges intelligencia által vezérelt eszközök a fogyasztói interakciók, a munkaerő-tervezés és az együttműködés javításával elősegítették az innovatív kultúrát.

A mesterséges intelligencia üzleti menedzsmentben betöltött szerepe várhatóan tovább fog bővülni, ahogy folyamatosan fejlődik, és ezáltal új paradigmákat hoz létre a stratégiai tervezésben és a szervezeti hatékonyságban.

**Kulcsszavak:** mesterséges intelligencia, fejlődés, szervezeti menedzsment

## **INTRODUCTION**

The integration of artificial intelligence into organizational management is a transformative voyage that has been the subject of technological innovation and advancement for several decades. Traditional management practices have been consistently transformed by AI, which has evolved from its humble beginnings in symbolic reasoning and problem-solving to its present state of sophistication with deep learning and reinforcement learning. This development has been propelled by substantial milestones and innovations that have broadened the commercial implementations of AI in a variety of business sectors.

This introductory section establishes the foundation for the investigation of the significant influence of AI on management practices. By following the trajectory of AI development from its inception to its current stage, we can obtain a deeper understanding of the transformative potential of AI technologies.

The hypothesis of the research is that the incorporation of artificial intelligence into organizational management has resulted in a fundamental transformation of traditional practices, thereby fostering innovation within organizations, improving decision-making processes, and augmenting operational efficiency. This investigation is designed to elucidate the ways in which AI has transformed the efficacy of organizations, the processes of decision-making, and the innovation of businesses.

## **BUSINESS-RELATED MILESTONES AND ADVANCEMENTS OF AI**

A number of significant milestones and innovations have influenced the incorporation of AI into management practices. Early AI research during the 1950s and 1960s concentrated on symbolic reasoning and problem-solving, thereby establishing the groundwork for rule-based expert systems (Yip, 1991). AI was transformed in the 1980s with the advent of neural networks and machine learning algorithms, which empowered systems to acquire knowledge from data and enhance their functionality progressively (Chen, 1995). The 1990s witnessed the advent of AI applications in the business sector, as expert systems and early data mining techniques gained prominence (Gargano & Raggad, 1999). Artificial intelligence technologies, such as speech recognition, natural language processing, and computer vision, advanced at a rapid rate during the 2000s, broadening the range of AI's commercial applications (Liao et al., 2012). Advancements in deep learning and reinforcement learning have significantly accelerated the integration of artificial intelligence into management practices in recent times. This has empowered organizations to address intricate challenges and foster innovation (Matsuo et al., 2022).

## **THE DEVELOPMENT OF AI IN MANAGEMENT**

Important turning points and innovations have characterized the evolution of AI in organizational management, which has revolutionized the way in which organiza-

tions function and arrive at decisions. Initially, the application of AI in business centered on enhancing operational efficiency through the automation of normal human duties, such as data input and processing. In the beginning, systems were dependent on rule-based expert systems, which utilized algorithms to execute particular tasks by encoding human expertise and knowledge (Grosan & Abraham, 2011).

As machine learning and data analytics technologies have progressed, more complex AI applications have become feasible in business contexts. Artificial intelligence has progressed since its inception as an automation system to incorporate predictive analytics, which empowers businesses to anticipate forthcoming trends, demand patterns, and market dynamics. The predictive capability enables organizations to make informed decisions based on data and proactively anticipate shifts in their operational surroundings (Samanpour et al., 2018).

Furthermore, the emergence of AI-driven decision support systems has occurred, which utilize machine learning algorithms to analyze intricate data sets and furnish managers and decision-makers with practical insights. These systems facilitate the efficient allocation of organizational resources, the detection of strategic opportunities, and the mitigation of risks. The proliferation of big data and cloud computing has expedited the incorporation of artificial intelligence into management practices, allowing organizations to exploit extensive volumes of data for the purposes of operational optimization and strategic decision-making (Raparathi, 2021).

Understanding the effects of AI on management requires an examination of numerous frameworks and theoretical perspectives from the management and AI literature. An example of such a framework is technological determinism, which asserts that changes in organizations and society are propelled by technological progress. From this particular standpoint, the integration of AI into management practices is propelled by market forces and technological advancements, which in turn transform organizational frameworks and operations (Iaia et al., 2024). Socio-technical systems theory, which emphasizes the interaction between technological and social factors in determining organizational behavior and outcomes, is another pertinent framework. The implementation and impact of AI in management are influenced by sociocultural, economic, and organizational factors in addition to technical considerations (Sony & Naik, 2020).

Moreover, the resource-based view of the firm offers valuable insights regarding the strategic utilization of AI by organizations in order to attain a competitive edge. From this particular standpoint, it is argued that the implementation of AI functionalities including data analytics, predictive modeling, and decision support systems can generate value for institutions by facilitating the efficient utilization of their data resources and organizational capacities (Phillips-Wren et al., 2021).

Hierarchical structures, standardized processes, and centralized decision-making have been the foundations of conventional management practices, which were utilized to coordinate and direct organizational activities. Functional departments, including

marketing, operations, and finance, function in isolation, with minimal information sharing and collaboration between functions (Dempsey et al., 2022).

Nevertheless, the implementation of AI-powered advancements may result in either enhancements or disturbances to conventional management methodologies. AI technologies empower organizations to delegate human duties, including data input and processing, to automated systems. This enables the reallocation of human resources towards more strategic and innovative endeavors. Furthermore, decision support systems powered by artificial intelligence furnish managers with instantaneous insights and suggestions, facilitating decision-making that is better informed and grounded in data. In addition, the utilization of AI-driven predictive analytics empowers organizations to proactively strategize and allocate resources by enabling them to anticipate market trends, consumer preferences, and competitive threats. In general, the integration of AI-powered advancements into organizational management has the capacity to fundamentally transform conventional approaches by augmenting productivity, adaptability, and ingenuity (Zulaikha et al., 2020).

### **AI AUTOMATION FOR ROUTINE TASKS AND DECISIONS**

By automating human decision-making and repetitive duties, AI technologies transform business operations, freeing up human resources for more strategic pursuits. By utilizing automation tools and machine learning algorithms, AI streamlines processes, increases productivity, and decreases the need for human labor. For example, AI-powered systems have the capability to automate record updates, extract information from diverse sources, and input data into databases, thereby eradicating the necessity for manual data entry. Aside from handling routine inquiries, troubleshooting problems, and providing immediate support, AI-driven chatbots in customer service enable human agents to concentrate on complex inquiries and high-touch interactions. Likewise, AI algorithms are utilized in supply chain management to optimize inventory levels, predict demand, and detect opportunities for cost reduction. This empowers organizations to make well-informed decisions and promptly adjust to ever-changing market conditions (Asatiani et al, 2020).

Artificial intelligence enables organizations to leverage the potential of large-scale data sets in order to generate practical insights and predictive analytics. Through the examination of extensive quantities of data, AI algorithms reveal correlations, patterns, and trends that elude human analysis. In the field of finance, for instance, AI-powered predictive models enable organizations to maximize returns and optimize investment portfolios by identifying investment opportunities, forecasting market trends, and mitigating risks. AI algorithms analyze patient data in the healthcare industry to personalize treatment plans, forecast disease outcomes, and enhance overall patient outcomes. Moreover, analytics tools enabled by AI are utilized in marketing to segment consumers, forecast their purchasing behavior, and optimize campaigns,

thereby increasing targeting precision and return on investment (Olaniyi et al., 2023).

Customer interactions are transformed by AI-powered tools, including recommendation engines and chatbots, which scale the delivery of personalized experiences. By engaging consumers in natural language conversations, responding to inquiries, and resolving problems in real-time, chatbots increase customer loyalty and satisfaction. In order to propose pertinent products or content, recommendation engines leverage consumer preferences, perusing history, and purchase patterns. This results in increased cross-selling opportunities and revenue. Organizations enhance consumer relationships, promote brand loyalty, and encourage repeat purchases by customizing products, services, and communications to suit individual preferences (Khan & Iqbal, 2020).

Predictive modeling and optimization algorithms powered by AI expedite operations and optimize resource allocation across multiple domains. In the domain of inventory management, for instance, AI algorithms predict demand, optimize storage levels, and minimize stockouts, thereby enhancing supply chain efficiency and decreasing inventory carrying costs. AI-driven algorithms are utilized in production scheduling to optimize the allocation of resources, mitigate delay, and increase productivity while decreasing lead times. Moreover, within the realm of workforce planning, analytics tools propelled by AI predict the requirements for personnel, detect deficiencies in skills, and optimize the distribution of personnel, thereby guaranteeing the most effective use of resources and the lowest possible cost (Aslam, 2023).

The utilization of AI technologies in management processes stimulates innovation and creativity through the facilitation of idea generation, prototyping, and experimentation. AI-powered ideation platforms, for instance, recognize emerging trends, generate novel concepts for product development or process optimization, and analyze vast quantities of data. Accelerating the product development lifecycle, AI-driven simulation tools facilitate rapid iteration and testing of design concepts during prototyping. Furthermore, AI-powered collaboration platforms enable interdisciplinary teams to engage in co-creation, idea exchange, and knowledge sharing, thereby promoting an innovative culture and propelling organizational performance advancements (Botega et al., 2020).

The implementation of AI in management offers substantial prospects for organizations to optimize operations, decrease expenditures, and enhance overall performance. Through the utilization of AI technologies, organizations have the ability to optimize resource allocation, streamline workflows, and automate repetitive tasks, resulting in notable enhancements in productivity and efficiency (Wamba-Taguimdje, 2020). In addition, decision support systems powered by artificial intelligence facilitate expedited and precise decision-making, granting organizations the ability to promptly address shifts in the market and competitive forces. The utilisation of artificial intelligence has been shown to have a favourable effect on performance metrics of organisations, as evidenced by case studies, empirical research, and enhancements

in operational efficiency, productivity, and cost reductions in numerous sectors (Andronie et al, 2021).

Adoption of artificial intelligence reshapes workforce dynamics and organizational structures, potentially resulting in agile teams, reduced hierarchies, and changes in job responsibilities and roles. Automation of human duties by AI enables personnel to allocate their efforts towards more valuable endeavors, including innovation, problem-solving, and customer engagement. Nevertheless, this paradigm shift could potentially lead to the loss of employment opportunities or alterations in certification prerequisites, thereby requiring initiatives to enhance and retrain the workforce in order to maintain its flexibility and preparedness. Organizations must proactively manage these changes by nurturing a culture of continuous improvement and life-long learning through the provision of training and professional development opportunities for employees (Rudko et al., 2021).

### **SOCIETAL IMPLICATIONS AND ETHICAL CONSIDERATIONS REGARDING AI IN MANAGEMENT**

Organizations are obligated to confront the ethical quandaries and societal ramifications that emerge from the extensive implementation of AI in management. Key concerns include but are not limited to algorithmic discrimination, privacy violations, and job displacement. Ethical frameworks and guidelines pertaining to the responsible deployment of artificial intelligence prioritize accountability, transparency, and equity; they direct organizations in the process of making ethical decisions and mitigating risks (Baker-Brunnbauer, 2021). By placing ethical considerations and societal impacts at the forefront, organizations can establish credibility with stakeholders, fulfill their social responsibility obligations, and capitalize on the revolutionary capabilities of artificial intelligence (Brendel et al., 2021).

In order to effectively incorporate AI into their management practices, organizations ought to embrace pragmatic suggestions and benchmarks. In order to effectively champion AI initiatives, establish strategic objectives, and allocate resources, leadership support is vital. Programming for employee training and upskilling guarantees workforce engagement and preparedness with AI technologies. Engagement of stakeholders promotes cooperation and congruence of objectives, which in turn stimulates transformation within an organization and stimulates innovation. By adopting these approaches, organizations can effectively navigate the obstacles associated with the implementation of AI and fully harness its capabilities to revolutionize managerial procedures and foster enduring expansion (Al Mansoori et al., 2021).

**SUMMARY**

The transition from rule-based expert systems to advanced AI-driven tools has significantly improved operational efficiency. AI systems automate routine tasks, enabling businesses to capitalize on predictive analytics, enabling proactive and informed decisions. AI-driven decision support systems use machine learning algorithms to analyze complex data sets, facilitating resource allocation, strategic opportunity identification, and risk mitigation. The integration of AI into management has been accelerated by cloud computing and big data, enabling organizations to leverage vast amounts of data for strategic decision-making and operational optimization.

The transformative effects of AI on management practices support the notion that technological advancements drive organizational and societal changes. The socio-technical systems theory emphasizes the interaction between technological and social factors, while the resource-based perspective postulates that AI can offer a competitive edge by facilitating more effective utilization of organizational capabilities and data resources. AI-driven systems have disrupted traditional management structures, increasing productivity and decreasing manual labor. AI-powered predictive models in finance, healthcare, marketing, customer interactions, and workforce planning have transformed various business functions. AI fosters creativity and innovation within organizations, generating novel ideas for process optimization and product development.

The hypothesis was validated by the considerable enhancements in various aspects of organizational management that have been facilitated by the evolution of artificial intelligence technologies, from early rule-based systems to sophisticated decision support systems and predictive analytics tools. Organizations have been able to improve their operational efficiency and strategic decision-making by automating routine tasks, anticipating market trends, optimizing resource allocation, and mitigating risks with the help of these advancements. Furthermore, AI-driven tools have revolutionized consumer interactions, workforce planning, and collaboration, thereby cultivating an environment of innovation within organizations. In general, the empirical evidence corroborates the hypothesis that the incorporation of AI has indeed profoundly altered traditional management practices, in accordance with the changing requirements of the contemporary business environment.

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