ARTIFICIAL INTELLIGENCE AS A FACTOR IN INCREASING BUSINESS EFFICIENCY AND COMPETITIVENESS

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ABSTRACT

The article explores the impact of artificial intelligence on strategic management in business. It analyzes how AI is transforming decision-making processes, enhancing efficiency and competitiveness of companies. Special attention is given to adapting to new technologies and potential limitations related to data quality and interpretation complexities. The necessity of a balanced approach to AI integration is emphasized, considering both the opportunities and challenges associated with this technology.

Introduction

At the turn of the 20th century, science fiction introduced the concept of artificial intelligence (AI). In the 1950s, scientists, including Alan Turing, the father of the modern computer, were already discussing the potential of AI to create intelligent machines. In 1956, the first artificial intelligence program was developed, spurring advances in machine learning and algorithms, making AI an integral part of the modern era of big data.

Since the late 19th century, various management concepts and technologies have been applied, increasing the competitiveness of individual organizations and countries. Since the mid-20th century, companies have begun to apply AI in business to increase efficiency, optimize processes, improve forecasting and decision-making, and create new products and services that enhance user experience and company competitiveness [1].

Artificial intelligence (AI) is transforming strategic management, enabling deep data analysis and streamlining decision-making processes. This technology allows companies to adapt to dynamically changing market conditions and improve competitiveness through more accurate forecasting and planning. However, despite significant advantages, AI in strategic management faces limitations, such as the quality of input data and the difficulty of interpreting complex human interactions, requiring careful management and integration with traditional management approaches.

Literature review

This article, devoted to the use of artificial intelligence in strategic decision-making in business, presents a fascinating exploration of contemporary trends in business analytics. It analyzes the role of artificial intelligence in improving strategic decision-making processes and its significance for modern organizations.

The article examines in detail the benefits of using artificial intelligence in business, such as increased efficiency and accuracy of data analysis, improved trend forecasting, and optimized strategic planning. It also touches on the challenges companies may face when implementing and using artificial intelligence.

The article pays special attention to examples of the successful application of artificial intelligence in various business sectors, demonstrating its broad potential and opportunities for improving the competitiveness of companies.

Overall, the article provides valuable research that helps understand the role of artificial intelligence in modern business and its potential for improving strategic management. It is an

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excellent resource for anyone interested in digital transformation and business innovation.

Research methods

This article, devoted to the use of artificial intelligence in strategic decision-making in business, utilizes various research methods. A literature review was conducted to analyze current scientific publications on the application of AI in business and strategic management. This allowed us to identify key trends, challenges, and development prospects in this field. Furthermore, an analysis of practical AI application examples at various companies was conducted, helping to identify key principles and practices that facilitate the successful application of AI in business and strategic management.

Using AI in Business

There are several areas of AI use in business:

1. Demand forecasting

Forecasting product demand plays a key role in developing technological products, improving customer interactions, and enhancing business efficiency. Improving forecast accuracy helps reduce risks and costs, improve inventory management, develop a strategic plan for an organization, and identify products that are most in demand by consumers [2]. Demand forecasting actively utilizes machine learning algorithms, such as linear regression to assess the dependence of demand on various factors, and decision trees and random forests to account for nonlinear relationships and complex consumer behavior patterns. Neural networks are also used to process large volumes of data and identify hidden patterns, which helps improve the accuracy of demand forecasts [3].

2. Consumer segmentation

One of the main applications of machine learning is customer segmentation—an application of machine learning that helps businesses divide their customers into groups based on their characteristics, needs, preferences, or behavior. Customer segmentation can facilitate a better understanding of customers, tailor marketing strategies, offer personalized services, and optimize pricing [2]. Customer segmentation can use various machine learning techniques, such as clustering, classification, or regression, to find the optimal way to segment customers based on available data. For example, online retailers use machine learning to segment their customers based on purchase history, browsing behavior, or demographic information [4].

3. Recommender systems

One of the most widespread and popular applications of machine learning in business is recommendation systems. These systems use machine learning algorithms to analyze user preferences, behavior, and feedback to suggest relevant products, services, or content. Recommendation systems can improve customer satisfaction, loyalty, retention, and revenue for companies operating in e-commerce, entertainment, education, and other industries [5, p. 83].

4. Fraud detection

Another key application of machine learning in business is fraud detection. This process involves using machine learning methods to identify and prevent fraudulent transactions, actions, or behavior that could lead to financial losses or damage to the reputation of companies or their customers. Fraud detection can utilize machine learning methods that analyze historical data and identify anomalies, patterns, or outliers that indicate fraud. For example, credit card companies use machine learning to flag suspicious transactions and alert cardholders or authorities [6, p. 57].

5. Autopilots and autonomous transport systems

Artificial intelligence has the ability to analyze the current situation (process data, manage resources, perform diagnostics) and make decisions based on it. "Smart" devices can be used by companies to monitor production processes, control robots, PBXs, drones, and other devices, or improve the quality of delivery systems. This allows companies to minimize human error [7].

6. Language models

Generative artificial intelligence (AI), particularly large language models (LLMs), built on advances in machine learning and natural language processing, represent a paradigm shift in how we interact with information and, consequently, how we work. These technologies are capable of creating original content, extracting insights from large volumes of data, translating languages with near-human accuracy, and potentially even making complex decisions [8]. The comprehensiveness and effectiveness of these

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technologies, including new LLM-based human-machine interfaces such as intelligent agents, could have profound implications for the workplace and the future of labor.

7. Chatbots and virtual assistants

Virtual assistants or "intelligent" chatbots possess human-like abilities. They offload some routine tasks from humans, thereby reducing costs and enhancing brand appeal, which is determined by the nature of customer interactions. AI differs from human employees in its lack of emotional impact and its high speed of processing requests.

The advantages of "smart" chatbots lie in their ability to maintain contextual communication without requiring human resources. Chatbots can solve most user problems.

However, such systems also have drawbacks: cost and difficulty in training. Before a bot can answer any question within the context of an organization's activities, it must be trained [9].

How AI has changed business

To understand how AI technologies are transforming industry standards and processes, and to determine the potential of artificial intelligence (AI) in strategic management, it is necessary to consider specific examples of AI use in business.

Amazon actively uses advanced deep learning technologies to reduce packaging waste by determining the optimal amount of packaging for each product. This was made possible by analyzing big data from numerous customer reviews and product images. As a result, over the past six years, Amazon has been able to reduce packaging weight by 36% and reduce its use of packaging materials by over a million tons, which has not only reduced costs and increased customer satisfaction but also made a significant contribution to the company's sustainable development [10].

Google is actively using artificial intelligence to improve the efficiency of its data centers. Specifically, using machine learning developed by DeepMind, Google was able to reduce cooling energy consumption by up to 40%. Using neural networks trained on various operating scenarios and data center parameters, the company created an adaptive system for optimizing equipment operation and managing energy consumption [11].

*Netfli x*successfully uses artificial intelligence (AI) to personalize content, significantly increasing the service's popularity. The AI analyzes user preferences based on movies and TV series watched, ratings, and genre selections. Then, using sophisticated machine learning algorithms, the system identifies patterns in user behavior and suggests content they will enjoy most. Thanks to this recommendation system, up to 80% of views on the platform are from content curated in this way [12].

IBM is using artificial intelligence to improve fraud detection and prevention in banking, card, and payment systems. The new IBM Z16 Telum processor incorporates a dedicated AI accelerator that enables the application of AI models directly on the chip in real time. This significantly increases throughput and reduces response times, enabling the processing of virtually all transactions through deep learning-based fraud detection models. This innovation has the potential to reduce fraud losses by up to $161 billion globally, providing a more efficient and faster solution to financial fraud [13].

After considering the practical impact of artificial intelligence (AI) on various business processes, it is necessary to delve deeper into its role in strategic management to understand the role of AI in strategic management today.

AI in strategic management

Artificial intelligence (AI) is penetrating strategic management, offering new approaches to data analysis and decision-making, significantly changing management processes. The impact of AI on strategic management, its potential uses, supporting and limiting evidence, and the future of AI are discussed in more detail below.

AI enables the development of strategies based on the analysis of large volumes of data, enabling a deeper understanding of market trends and consumer behavior.

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AI systems help companies adapt to change, predict future trends, and optimize decision-making processes, making them more responsive and evidence-based. The use of AI in strategic planning can also accelerate analysis, which is an input parameter for strategy, and even change the approach to major decisions that are regularly revised based on changing assumptions [14].

Usage AI for strategic management

AI is actively used to improve strategic management, particularly in areas that require large-scale data analysis and decision-making. Companies using AI can respond more quickly to market changes and make informed decisions, increasing their competitiveness. This is supported by examples of companies that have adapted their financial planning to observed market patterns using AI, allowing them to quickly respond to changes in supply and demand and maintain profitability [15].

Facts supporting the use of AI:

1. Adaptation to change – AI is capable of quickly adapting to changes in the external environment, which is critical for strategic management.
2. Objectivity of decisions – AI provides objective analysis of data, minimizing human biases and errors.
3. Forecasting and optimization – AI helps predict trends and optimize processes, making strategic decisions more effective [3].

The rise of AI in business: trends and prospects

Many believe that artificial intelligence will replace most jobs in the future, which will increase unemployment in developed countries. However, job replacement is only possible in the mining, construction, and manufacturing sectors, while in others, AI will assist in performing routine and repetitive tasks: searching for documents, responding to potential clients, processing payments, etc. Compared to 2017, in 2022 the percentage of companies using neural networks in their operations increased by 30%, and by 2024, more than half of organizations worldwide use artificial intelligence. According to 2024 data, AI saves an average employee 2.5 hours per day. The use of AI-based software and tools allows 15% of all work tasks in the US to be completed significantly faster today. In the future, AI may take over 47% to 56% of all work tasks [16, 17].

As part of the Microsoft 2023 study, more than 1,000 business leaders and employees were surveyed. Nearly 50% of respondents were wary of implementing artificial intelligence in their work due to fear of job losses. Seventy percent of respondents, mostly executives and managers, were willing to delegate some routine tasks to AI to reduce their workload and devote time to more strategic tasks. Employees with knowledge of neural networks are essential for businesses. Close communication between staff and AI will improve productivity, save time and resources, enhance creative and technical support, and strengthen the company's reputation [18].

It's important to understand that artificial intelligence is not a replacement for humans, but merely an assistant. AI's advantage lies in its ability to analyze vast amounts of data and identify patterns that are not immediately obvious to humans. However, the decision to take specific actions remains with humans.

Today, AI is being used by companies to develop their businesses. It's important to understand that AI will only help companies if they have well-structured interactions with employees. Such collaboration will not only reduce the processing time for routine operations but also improve

Currently, some employees are wary of artificial intelligence and don't always know how to work with it. For the successful integration of AI into business processes, it's crucial to formulate requests correctly. In this context, users act as "clients" of the AI system. Effective use of neural networks depends on several key aspects:

1. Understanding the potential of AI: Understanding which problems are best solved by AI and being aware of its technical limitations.
2. Precise formulation of requests: the ability to clearly define and describe the tasks and goals that the AI should solve.
3. Data science skills: Knowledge of data science fundamentals, statistics, and machine learning

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techniques, which is necessary for the effective application of AI algorithms.

Conclusion

This study demonstrates how artificial intelligence (AI) is fundamentally transforming business processes and strategic management. AI not only automates routine tasks but also significantly improves forecasting accuracy, optimizes customer interactions, and improves logistics operations. These changes open up new opportunities to increase efficiency and foster innovation within companies.

However, despite its many benefits, AI integration requires careful management and adaptation. It's important to consider not only the technological capabilities but also potential challenges, such as data security and the ethics of AI use.

The approach to AI implementation must be balanced, taking into account the specifics of the industry and the individual needs of the company.

AI is expected to bring significant added value to the economy in the near future, opening up new avenues for cost reduction and revenue growth. AI's contribution to industry development will grow, providing companies with the tools to achieve sustainable growth and competitive advantage in the global marketplace.

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