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APPLICATION OF ARTIFICIAL INTELLIGENCE IN SMALL AND MEDIUM-SIZED ENTERPRISES AND ITS IMPACT ON ECONOMIC EFFICIENCY

Abstract

This article examines the application of artificial intelligence (AI) in small and medium-sized enterprises (SMEs) and its impact on economic efficiency. The main objective of the study is to determine the level of AI usage in SMEs and to assess its effects on labor productivity, cost reduction, decision-making, sales, and overall business performance. A survey was conducted among 150 respondents, and the collected data were analyzed using SPSS software. The results indicate that AI is primarily applied in marketing, customer service, and sales forecasting within SMEs. According to respondents, AI accelerates business processes, enhances productivity, and positively affects economic efficiency. However, high implementation costs, limited financial resources, and the shortage of qualified personnel were identified as key barriers to broader adoption. Overall, the study demonstrates that AI serves as a strategic development tool for SMEs and, when properly implemented, can significantly enhance economic efficiency. The findings provide a basis for more informed decision-making regarding AI adoption in SMEs and offer practical and theoretical insights for future research.

Keywords: artificial intelligence, SMEs, economic efficiency, digital transformation, business performance.

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KİÇİK VƏ ORTA BİZNESLƏRDƏ SÜNİ İNTELLEKTİN TƏTBİQİ VƏ İQTİSADI SƏMƏRƏLİLİYƏ TƏSİRİ

Xülasə

Bu məqalədə kiçik və orta bizneslərdə süni intellektin tətbiqi və onun iqtisadi səmərəliliyə təsiri araşdırılmışdır. Tədqiqatın əsas məqsədi KOBİ-lərdə süni intellektdən istifadə səviyyəsini müəyyən etmək, bu texnologiyanın əmək məhsuldarlığına, xərclərin azalmasına, qərarverməyə, satışlara və ümumi biznes nəticələrinə təsirini qiymətləndirməkdir. Araşdırma çərçivəsində 150 respondent arasında anket sorğusu keçirilmiş və əldə olunan məlumatlar SPSS proqramı vasitəsilə təhlil edilmişdir. Nəticələr göstərir ki, süni intellekt KOBİ-lərdə əsasən marketinq, müştəri xidməti və satış proqnozlaşdırması sahələrində tətbiq olunur. Respondentlərin cavablarına əsasən, süni intellekt iş proseslərini sürətləndirir, məhsuldarlığı artırır və iqtisadi səmərəliliyə müsbət təsir göstərir. Bununla yanaşı, yüksək tətbiq xərcləri, maliyyə resurslarının məhdudluğu və ixtisaslı kadr çatışmazlığı süni intellektin geniş tətbiqinə mane olan əsas amillər kimi müəyyən edilmişdir. Ümumilikdə, tədqiqat süni intellektin KOBİ-lər üçün strateji inkişaf vasitəsi olduğunu və düzgün tətbiq edildikdə iqtisadi səmərəliliyi artırmaq imkanına malik olduğunu göstərir. Əldə olunan nəticələr KOBİ-lər üçün süni intellektin tətbiqi ilə bağlı daha əsaslandırılmış qərarların qəbuluna şərait yaradır. Eyni zamanda bu tədqiqat gələcək araşdırmalar üçün praktik və nəzəri baza kimi çıxış edə bilər.

Açar sözlər: süni intellekt, KOBİ, iqtisadi səmərəlilik, rəqəmsal transformasiya, biznes performansı.

Introduction

Relevance of the Topic. In the modern era, digital transformation has led to significant changes across all sectors of the economy, and one of the main driving forces of this process has been artificial intelligence technologies. Artificial intelligence is no longer viewed merely as a technical innovation; it serves as a strategic tool for optimizing business processes, improving decision-making, and enhancing competitiveness. Increasing competition in global markets forces enterprises to operate more flexibly, rapidly, and efficiently, which makes the application of artificial

intelligence a necessity. Since small and medium-sized enterprises (SMEs) constitute a major part of the economy, they are directly affected by these technological changes. However, the limited financial and technical resources of SMEs make the implementation of artificial intelligence both an opportunity and a process accompanied by certain challenges. Therefore, examining the level of AI adoption in SMEs and its impact on economic efficiency is considered highly relevant from both theoretical and practical perspectives.

Purpose of the Study. The aim of this study is to determine the level of artificial intelligence adoption in SMEs and to empirically evaluate its impact on economic efficiency. At the same time, the main challenges encountered during the implementation process and future prospects are also examined.

Research Method. A quantitative approach was applied in the study, and data were collected through a survey questionnaire. The obtained results were statistically analyzed using the SPSS software.

Scientific Novelty of the Study. In this research, the relationship between artificial intelligence adoption and economic efficiency in SMEs is comprehensively evaluated based on empirical data. One of the key contributions is the identification of correlation relationships between the level of AI usage, attitudes toward AI, and economic outcomes. Additionally, the combined analysis of barriers and implementation prospects provides a clearer understanding of the economic role of artificial intelligence.

Theoretical and Practical Significance of the Results. The study expands existing approaches to the application of artificial intelligence in business within the context of SMEs and provides a foundation for future research. From a practical perspective, the results support SME managers in making more effective decisions. Furthermore, the findings also serve as a guiding reference for government bodies and policymakers.

Application of Artificial Intelligence in Business

Artificial intelligence in the modern business environment is not only a technological innovation but also serves as a management and strategic decision-making tool. This technology provides advantages to enterprises through rapid data processing and the automation of processes (Abdullayeva, 2026). At the same time, its application increases competitiveness and makes businesses more agile (Zeybekci, 2026; Umarova, 2025; Şahin, 2025).

Artificial intelligence is mainly applied in areas such as the automation of operations, data-driven decision-making, and the analysis of customer behavior (Wamba-Taguimdje et al., 2020). In particular, its use is more widespread in marketing and customer service (Tayçu Dolu & Marangoz, 2025). In addition, artificial intelligence has a positive impact on the development of SMEs in sectors such as communication and agriculture (Talibova et al., 2024; Atlı, 2024).

In SMEs, artificial intelligence creates both opportunities and challenges. While it increases productivity, financial constraints and a lack of skilled personnel make its implementation more difficult (Bhalerao et al., 2022; Zavodna et al., 2024). Research shows that when properly implemented, this technology improves economic outcomes and accelerates business growth (Muminova et al., 2024; Şahin, 2025). SaaS models and increasing investment trends indicate that the role of artificial intelligence will become even stronger in the future (Bayram et al., 2025; Şahinbaş, 2025).

Application Areas of Artificial Intelligence in SMEs

The application of artificial intelligence in SMEs is largely driven by practical needs. Small and medium-sized businesses typically adopt AI technologies to reduce costs, improve customer service, increase sales, and simplify management processes. Studies show that artificial intelligence can be used in SMEs in areas such as marketing, customer service, inventory management, financial control, and decision-making processes (Atlı, 2024).

In marketing, artificial intelligence is used to analyze customer behavior, personalize advertisements, generate social media content, and identify potential customers. A study by Tayçu Dolu and Marangoz shows that SMEs are aware of AI

capabilities such as product design, price updates, inventory control, and customer recognition (Tayçu Dolu & Marangoz, 2025). The role of artificial intelligence is also increasing in public relations and communication. Social media monitoring, analysis of user feedback, crisis communication, and content creation are considered key application areas in this field (Talibova et al., 2024).

Artificial intelligence is applied across various business functions in SMEs, generating tangible economic and managerial outcomes. In marketing, it enables the analysis of customer behavior and the personalization of advertisements, leading to increased sales and more precise targeting. In customer service, chatbots and automated response systems save time and improve customer satisfaction (Umarova, 2025). In inventory and supply processes, AI reduces the risks of overstocking and shortages through demand forecasting and inventory tracking. In finance, risk analysis and cost monitoring allow for more accurate and well-founded financial decisions. In management processes, data analysis and report generation accelerate decision-making and improve efficiency. At the same time, in public relations, social media analysis and content creation contribute positively to strengthening the company's brand image.

The Impact of Artificial Intelligence on Economic Efficiency

The impact of artificial intelligence on economic efficiency is mainly explained by cost reduction, increased productivity, improved decision quality, and revenue growth. By using artificial intelligence, enterprises can automate repetitive tasks, reduce human errors, and provide faster services (Wamba-Taguimdje et al., 2020).

For SMEs, economic efficiency is a more sensitive issue, as these enterprises operate with limited budgets and a smaller workforce. When properly implemented, artificial intelligence enables SMEs to achieve greater results with fewer resources. For example, the use of chatbots in customer service can reduce employee workload, while the application of AI in marketing can help use advertising budgets more efficiently (Muminova et al., 2024).

However, the efficiency gains from artificial intelligence do not occur automatically. For this, technological readiness, a proper data infrastructure,

employees' digital skills, and managerial support are essential. Otherwise, the technology may create additional costs and fail to deliver the expected results (Zeybekci, 2026; Zavodna et al., 2024).

Table 1. The Impact of Artificial Intelligence on Economic Efficiency

Efficiency Indicator	Impact of Artificial Intelligence	Possible Outcome for SMEs
Operational costs	Automation of routine tasks	Reduction in costs
Labor productivity	Employees focus on more important tasks	More work completed in less time
Sales volume	Analysis of customer behavior	More accurate sales strategies
Decision-making	Data-driven analysis	More precise managerial decisions
Customer satisfaction	Fast and personalized service	Increased customer loyalty
Competitiveness	Technological advantage and innovation	Stronger market position

Source: Compiled by the authors based on research findings.

The table clearly shows that artificial intelligence can improve economic efficiency in SMEs in several directions. The most significant impact is related to cost reduction and increased productivity. In addition, since AI enables more accurate decision-making, it can also positively influence the long-term development of enterprises.

Overall, artificial intelligence is not only a technological innovation for SMEs but also a strategic tool that enhances economic efficiency. However, to gain real benefits from this technology, enterprises must implement it in a planned manner, improve employees' skills, and ensure proper data management (Şahinbaş, 2025).

Research Methodology and Results

In this study, the application of artificial intelligence in small and medium-sized enterprises (SMEs) and its impact on economic efficiency were examined using a quantitative approach. Data were collected through a survey questionnaire conducted among 150 respondents. The survey was designed based on a Likert scale, and the collected data were analyzed using statistical methods through the SPSS software. The results of the analysis indicate that the majority of respondents consider artificial

intelligence beneficial for business; however, the level of implementation is not uniform across all enterprises, and certain readiness issues exist.

Table 2. Demographic and Technological Indicators

Indicator	Category	Percentage
Gender	Male	58%
	Female	42%
Age	26–35	41%
Education	Bachelor's	51%
AI usage level	Yes	46%
	No	32%
	Planned	22%

Demographic results show that the majority of respondents belong to the young and middle-age groups. This indicates that they are more open to and adaptable to technology. The high level of education has positively influenced the quality of responses. The fact that most respondents have higher education confirms that they possess a certain level of understanding regarding artificial intelligence. However, the level of AI usage suggests that artificial intelligence has not yet been fully adopted in SMEs, although its expansion is likely in the future.

Table 3. Areas of AI Application and Attitudes

Area / Indicator	Percentage / Mean
Marketing and advertising	38%
Customer service	34%
Sales forecasting	29%
Usefulness	4.31
Increases work speed	4.38
Improves decision-making	4.19

The table shows that artificial intelligence is mainly applied in customer-oriented areas. Marketing and customer service are at the forefront, while its use in other areas remains relatively lower. Respondents note that artificial intelligence is beneficial and accelerates work processes, indicating growing trust in the technology. However, the level of organizational readiness remains relatively low.

Table 4. Economic Efficiency, Barriers, and Correlation

Indicator / Variable	Mean / r
Productivity	4.32
Cost reduction	4.05

Profitability	4.02
High cost	4.41
Lack of skilled staff	4.36
Financial resources	4.24
AI usage – efficiency	0.684
Attitude – efficiency	0.621

Economic efficiency indicators are generally rated highly. The strongest impact is observed in labor productivity, while cost reduction and profitability are also evaluated positively. Among the barriers, high costs and a lack of skilled personnel stand out, along with insufficient financial resources as a significant factor. Correlation results indicate a strong positive relationship, confirming that as the use of artificial intelligence increases, economic efficiency also improves. The findings support both theoretical perspectives and practical applications.

Conclusion

The conducted study shows that artificial intelligence serves as an important tool for increasing economic efficiency in SMEs. The results obtained from 150 respondents reveal that it accelerates work processes, increases labor productivity, improves decision-making, and positively affects cost reduction. The wider application of AI, particularly in marketing, customer service, and sales forecasting, confirms its practical significance. Correlation results also indicate a positive relationship between the use of artificial intelligence and economic efficiency.

At the same time, factors such as high implementation costs, a shortage of qualified personnel, and limited financial resources hinder its widespread adoption. Therefore, enterprises should implement artificial intelligence in a planned manner, enhance employee knowledge, and correctly identify application areas; otherwise, the expected economic benefits may not be fully achieved.

Based on the conducted research and obtained results, the following recommendations have been identified:

1. The implementation of artificial intelligence in SMEs should be carried out gradually. It is advisable to start with simpler areas such as marketing, customer service, and reporting.

2. Employees' knowledge of artificial intelligence and digital technologies should be improved. For this purpose, training sessions, short courses, and practical seminars should be organized.
3. SMEs should prioritize low-cost and user-friendly artificial intelligence tools. In particular, SaaS-based solutions may be more suitable for small and medium-sized businesses.
4. The government and relevant institutions should provide financial incentives, subsidies, and advisory services to support the digital transformation of SMEs.
5. Data security and ethical considerations should be taken into account when implementing artificial intelligence. Enterprises should develop internal policies for protecting customer data and ensuring responsible use of technology.

In conclusion, artificial intelligence is not only a technological innovation for SMEs but also a strategic tool that creates economic development and competitive advantage. The proper and planned implementation of this technology can enable small and medium-sized businesses to operate more efficiently, strengthen their market positions, and enhance their long-term growth potential.

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