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Applications of Artificial Intelligence in Electronic Commerce

Abstract

Artificial intelligence (AI) technologies have led to revolutionary changes in the field of e-commerce in recent years. Modern e-commerce platforms personalize the user experience, increase sales and optimize operational efficiency through AI algorithms. The application areas of AI are wide and mainly focus on personalized recommendations, chatbots and virtual customer services, price optimization, commerce analytics and predictive models. Personalized recommendations optimize product offerings based on users' previous viewing and purchasing behaviors, which ultimately leads to increased sales. Chatbots and virtual assistants, on the other hand, improve service quality and reduce operational costs by responding to customer inquiries immediately. AI also allows e-commerce platforms to dynamically determine pricing strategies. Predictive analytics and machine learning models adjust prices at an optimal level, taking into account sales trends, seasonal demand and competitor activity. At the same time, AI provides analysis of large amounts of data, increasing the effectiveness of inventory management, supply chain and marketing strategies. Studies show that the application of AI technologies is not limited to increasing sales and revenue, but also increases customer satisfaction, platform trust and competitiveness. However, issues such as protecting personal data and ensuring ethical principles still remain in the spotlight.

Keywords: *artificial intelligence, technology, platform, commerce, electronic*

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Süni intellektin elektron kommersiyada tətbiq sahələri

Xülasə

Süni intellekt (AI) texnologiyaları son illərdə elektron kommersiya sahəsində inqilabi dəyişikliklərə səbəb olmuşdur. Müasir e-ticarət platformaları, AI alqoritmləri vasitəsilə istifadəçi təcrübəsini fərdiləşdirir, satışları artırır və əməliyyat səmərəliliyini optimallaşdırır. AI-nin tətbiq sahələri genişdir və əsasən fərdiləşdirilmiş tövsiyələr, çatbotlar və virtual müştəri xidmətləri, qiymət optimallaşdırması, ticarət analitikası və proqnozlaşdırıcı modellər üzərində cəmləşir. Fərdiləşdirilmiş tövsiyələr, istifadəçilərin əvvəlki baxış və alış davranışlarına əsaslanaraq məhsul təkliflərini optimallaşdırır və nəticədə satışların artmasına səbəb olur. Çatbotlar və virtual köməkçilər isə müştəri sorğularını dərhal cavablandıraraq xidmət keyfiyyətini yüksəldir və əməliyyat xərclərini azaldır. AI elektron kommersiya platformalarının qiymət strategiyalarının dinamik şəkildə təyin olunmasına da imkan verir. Proqnozlaşdırıcı analitika və maşın öyrənməsi modelləri, satış trendlərini, mövsümi tələbatı və rəqiblərin fəaliyyətini nəzərə alaraq qiymətləri optimal səviyyədə tənzimləyir. Eyni zamanda, AI böyük həcmdə məlumatların təhlilini təmin edərək inventar idarəçiliyi, təchizat zənciri və marketinq strategiyalarının effektivliyini artırır.

Tədqiqatlar göstərir ki, AI texnologiyalarının tətbiqi yalnız satış və gəlir artımı ilə məhdudlaşmır, həm də müştəri məmnuniyyətini, platforma etibarını və rəqabət qabiliyyətini yüksəldir. Bununla belə, şəxsi məlumatların qorunması və etik prinsiplərin təmin olunması kimi məsələlər hələ də diqqət mərkəzində qalır. Nəticə olaraq, süni intellektin elektron kommersiyada tətbiqi həm texnoloji, həm də iqtisadi perspektivdə strateji əhəmiyyət daşıyır və bu sahənin gələcəkdə daha da genişlənəcəyini göstərir.

Açar sözlər: *süni intellekt, texnologiya, platforma, kommersiya, elektron*

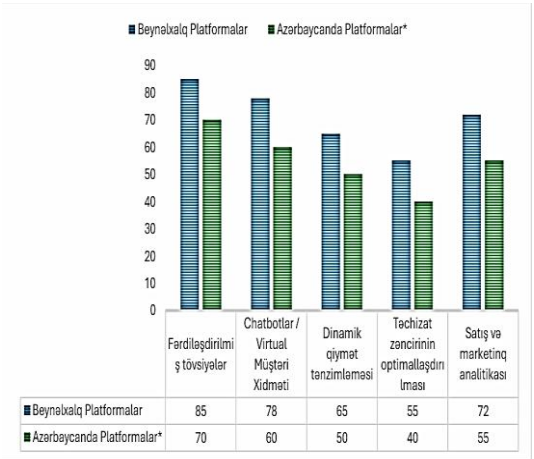
Introduction

With the rapid spread of digital commerce, e-commerce platforms have moved beyond product presentation and sales to new technologies – especially artificial intelligence (AI) – to improve user experience, operational efficiency, and competitive strategies. For example, a study of European countries found that the application of AI technologies to marketing and sales channels in the e-commerce sector is closely related to the level of digital infrastructure in countries (Bocean, 2025). In addition, AI-generated content has been positively received in user-oriented stores in terms of functionality, aesthetics, and security (Stamkou et al., 2025). The application areas of AI in e-commerce are diverse: personalized recommendations, chatbots and virtual customer services, dynamic pricing adjustments, supply chain optimization, and big data analysis are examples. For example, AI-suggestion systems on Chinese online platforms have been found to increase user click-through rates and conversion rates (Yin, 2025; Bian, 2025; Marjerison, Zhang, Zheng, 2022). However, it is also noted that SI applications vary, and that regulatory, ethical, and privacy risks still exist at a secondary level (Papastamoulou, 2025). In this context, the aim of this study is to identify the main application areas of artificial intelligence in the e-commerce environment, to systematically examine the opportunities they offer for businesses and the challenges they face. Thus, the aim is to form a theoretical and methodological base for developing the application prospects of SI technologies in the retail and online commerce environment in Azerbaijan.

Research

The effectiveness and results of AI applications in e-commerce cannot be measured solely by theoretical approaches; experiments and statistical indicators in this field should also be carefully evaluated. The analysis section focuses on assessing the performance and impact of AI technologies in key application areas such as personalized recommendation systems, chatbots and virtual customer services, dynamic pricing adjustments, and supply chain optimization (Madanchian et al., 2024; Yu, 2025).

Graphic 1. Usage Percentage by AI Application Areas (%)



Source: Compiled by the author

Chart 1 shows that AI application is more widespread internationally. Personalized recommendation systems are the most widely used area (85%), followed by chatbots and virtual customer services (78%). In Azerbaijan, however, the application of AI technologies is still limited, but there is a growth trend.

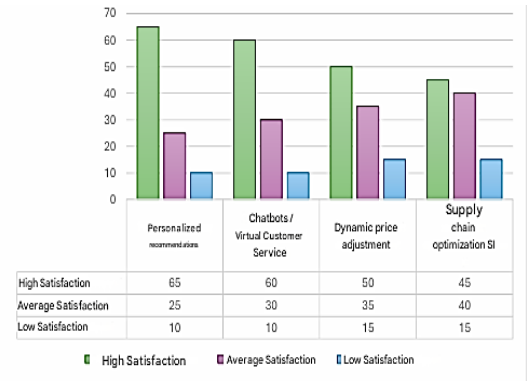
Table 1.
Analysis of Sales Growth with AI Application.

Application Area	Sales Increase (%)	Additional Notes
Personalized Recommendations	20–35	Product recommendation systems increase sales by offering user-specific suggestions (Yin, 2025).
Chatbots / Virtual Customer Service	10–18	Enhances customer satisfaction and reduces response time to customer inquiries.
Dynamic Pricing Optimization	8–15	Prices are optimized by considering seasonality and competitors' pricing strategies.
Supply Chain Optimization	5–12	Reduces inventory costs and increases product availability.

Source: Compiled by the author

Table 1 shows that personalized recommendation systems have the greatest impact on sales growth, while chatbots and dynamic pricing provide additional benefits. Supply chain optimization increases long-term economic efficiency.

Graphic 2. Customer Satisfaction and SI Implementation (%).



Customer satisfaction is shown in Graphic 2. Personalized recommendations and chatbots increase customer satisfaction more. Supply chain optimization and price adjustment indirectly affect satisfaction.

The analysis results show that the application of artificial intelligence in e-commerce significantly increases the efficiency and competitiveness of platforms.

Personalized recommendation systems, as the application area with the highest impact, have yielded results ranging from 20-35% in sales growth. These systems provide users with appropriate product suggestions based on their previous browsing and purchasing behavior, which ultimately increases conversion rates and increases customer satisfaction (Yin, 2025; Dalain, Alnadi, Allahham, Yamin, 2025). Chatbots and virtual customer services also help reduce operating costs by increasing the efficiency of customer support. Analysis shows that these technologies increase satisfaction levels by reducing response time to customer inquiries and strengthen trust in the platform. While dynamic pricing has a slightly lower impact on sales growth, it increases overall profitability through optimized

pricing strategies that match seasonal demand and competitor strategies. Supply chain optimization is also of strategic importance for e-commerce. AI technologies reduce warehousing costs, increase product availability and speed up supply processes. This allows for increased operational efficiency, especially in large and complex online sales platforms (Lin, Zhang, 2025; Oprea, 2025; Teixeira, Ferreira, Ramos, 2025). The analysis results show that personalized recommendations and chatbots produce the highest results in terms of customer satisfaction, while pricing and supply chain optimization have an indirect effect.

Conclusion

The study shows that artificial intelligence technologies play a significant role in optimizing both operational and marketing processes in the field of e-commerce. Personalized recommendation systems directly affect sales growth, chatbots and virtual customer services increase customer satisfaction and platform trust, and dynamic pricing optimizes profitability. Supply chain management through AI serves to increase long-term economic benefits and operational efficiency. The analysis shows that although the level of AI application on international and regional platforms varies, in all cases customer-oriented and operational efficiency-increasing application areas prevail. The application of AI technologies is not limited only to sales and revenue growth, but also has a positive impact on strategic aspects such as customer experience, digital trust and competitive advantage.

However, issues such as personal data protection, ethical principles, and technology governance still remain in the spotlight.

In the future, the wider application of AI technologies and the development of innovative solutions will lead to higher operational efficiency and customer satisfaction in e-commerce. As a result, the application of artificial intelligence is not only as a technological innovation, but also plays a significant role in supporting strategic business decisions and ensuring competitive advantage.

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