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Artificial Intelligence (AI) Mechanisms in Enhancing The Competitiveness of Small Business

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Abstract: This study explores the role of implication of AI tools, including CRM systems, big data, machine learning, ERP, and blockchain in enhancing the competitiveness of small-sized businesses in Uzbekistan. The research also identifies the influence of these AI tools on marketing and sales, financial management, production, innovation, and risk management. The integration of Artificial Intelligence (AI) mechanisms has become a critical factor in enhancing the competitiveness of small businesses in the modern digital era. As small enterprises face significant challenges in staying competitive, AI offers innovative solutions for optimizing operations, improving decision-making, and enhancing customer engagement. This paper explores the role of AI technologies, including machine learning, data analytics, and automation, in driving efficiency and fostering innovation within small businesses. By analyzing current trends and case studies, the research highlights the transformative potential of AI in areas such as market analysis, supply chain management, and personalized customer experiences. Furthermore, the paper discusses the barriers to AI adoption, including cost, lack of expertise, and data privacy concerns, and proposes strategies for overcoming these challenges. The findings underscore the importance of embracing AI tools for small businesses to thrive in a rapidly evolving market landscape and to achieve long-term sustainability and growth. The study concludes with recommendations for policymakers and business leaders to foster an AI-driven environment that supports small business competitiveness.

Keywords: small business, competitiveness, artificial intelligence, CRM systems, big data, machine learning, ERP, blockchain.

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1. Introduction

Small businesses have emerged as crucial organizations ensuring full employment, creating new jobs, introducing innovative products, and responding the local market demands in the contemporary economic system of Uzbekistan. As they strive for stable functioning in the global marketplace in the age of technological competition and the digital economy, many businesses turn to information technologies as crucial enablers. AI technologies, including analytical programs, CRM systems, big data, machine learning, ERP, and blockchain *increase competitiveness* of small business enterprises - providing fast, high-quality, and affordable products and services; *optimize costs*- reducing costs through the efficient use of resources; *enhance marketing* - analyzing customer experiences, making appropriate proposals to the target audience, forecasting market conditions, and making right decisions.[1]

Currently AI tools have emerged as an important mechanism of statistical-economic, strategic-investment, artificial intelligence, or “supporting instruments” in enhancing the competitiveness of small businesses in the global marketplace. They are crucial in establishing a stable resource foundation for small business entities through concessional loans, grants, leasing mechanisms, subsidies, and tax incentives for financial support;

analyzing market conditions through information and consulting services; developing marketing strategies; preparing business plans; and assisting in risk assessment.[2] Additionally, they enhance operational efficiency through software solutions such as online trading platforms, electronic payment systems, CRM, and ERP, leveraging innovative and digital technologies. Furthermore, they simplify the business environment through institutional and legal support, expediting the permit acquisition process based on the "single window" principle.[3] In today's competitive global marketplace, AI tools are necessary for the development of small enterprises, as they provide comprehensive economic support, make them more competitive and guarantee their position in a market economy, which will boost employment, boost local budget revenues, and play a significant role in supplying the domestic market. They provide more support when small firms compete with giant corporations to foster their competitiveness and maintain antitrust balancing fostering a positive atmosphere of competition.[4]

Small firms can use AI technologies to accelerate the application of scientific and technological advancements, improving the quality of their goods and services by encouraging creative development. The successful operation of small companies, particularly in rural areas, helps to boost household incomes, lower migration, and build regional infrastructure, all of which contribute to the revitalization of the regional economy.[5] AI tools help small firms increase their integration into global markets and adjust to the digital economy in the time of international integration and digital transformation.

2. Materials and Methods

The concept of competitiveness is developed according to Michael Porter's model, when competitive advantage arises through price or differentiation. His famous "Five Forces Model" shows the main factors determining competitiveness within the industry. This model is important in strategic planning for any entity, from small businesses to large enterprises.

The Professor of the University of Great Britain Md Afnan Hossain states that the analytical potential of digital marketing increases the ability of SMEs to "feel-capture-reconfigure" the market and the adoption of AI strengthens this effect and stabilizes the competitive advantage. Abdullah M. Baabdullah from King Abdulaziz University of Saudi Arabia and Ramakrishnan Raman from India study the factors (technological roadmap, infrastructure, awareness) and consequences (customer interaction based on AI, relationship management, performance indicators) of the adoption of AI practices in B2B SMEs assessing the usage of PLS-SEM. Their studies reveal that the adoption of AI in Saudi SMEs significantly enhances performance results and customer relationships.

Sawsan Badghish from Saudi Arabia researches Saudi SMEs and states that comparative advantage, compatibility, sustainable human capital, market/client demand and government support significantly increase AI adoption as a result the adoption of AI improves economic and operational results. Siarhei Yasiukovich and Moutaz Haddara analyzed 22 articles from 2014-2020 while conducting research with Norway and the Arab region, and systematically summarized social-CRM adoption flows, benefits (customer attraction, sales efficiency, competitive advantage) and challenges in SMEs.

Scientific research by academicians from Granada and Spain Sánchez, Calderón and Herrera offers a conceptual analysis of the perception of AI in SMEs with the integration of TOE+DOI analyzing 10 important obstacles and practical solutions, as well as a 6-stage roadmap for implementing AI being practical methodology that helps to increase competitiveness.

Analyzing the research of the above-mentioned scientists, Baabdullah's research demonstrates the role of government support in the context of Saudi Arabia and Great Britain. In Uzbekistan, however, technological infrastructure and financial capabilities are relatively limited and the level of personnel training in SMEs is lower. However, it is also possible to analyze the factors of small business adoption of AI in Uzbekistan based on the TOE model. As a result, the adoption of AI strengthens relationships with the client and increases efficiency.

The research of foreign scientists should be implemented in Uzbekistan as a scientific methodology and practical mechanism for small business, but there are some obstacles in infrastructure, financial resources, personnel qualifications, and the legal environment to apply. At the same time, state strategies (for example, “Digital Uzbekistan 2030”) and the digital literacy of the young population can decrease these shortcomings and strengthen the positive aspects.

3. Results and Discussion

Currently, the rapid development of the digital economy in Uzbekistan is creating new markets for small businesses through e-commerce, online services, and digital marketing. There are grants and benefits to small businesses for the implementation of AI technologies within the framework of the “Digital Uzbekistan – 2030” strategy in Uzbekistan.[6]

Increased competition in globalization requires small businesses to gain an advantage not only offering low prices but also through innovative solutions in competing with national and foreign companies. The experience gained from the pandemic and the global crisis, the acceleration of the transition to electronic services, have shown the need to create a new environment for small businesses in Uzbekistan. [7]

From a scientific point of view, it is necessary to develop indicators, integral indices, and econometric models for measuring the effectiveness of small businesses based on AI. From a practical point of view, with the help of AI tools, the possibilities of automating production processes, risk management, and creating new services in small enterprises are expanding. Small business is an important component of economic development and plays a key role in the introduction of innovations, ensuring employment, and diversifying the regional economy. However, the changing demands of the global market, the expansion of the digital economy, and the strengthening of the competitive environment require new approaches from small businesses. From this point of view, the integration of artificial intelligence tools into business processes is one of the most relevant mechanisms for increasing competitiveness.[8]

It is necessary to develop integral indices and panel regression models to assess the impact of AI tools on efficiency in small businesses from a scientific point of view. Practically, opportunities are emerging to optimize resource use, forecast customer behavior, reduce costs, and expand market share using AI, see Table 1.

Table 1. Indicators of the impact of artificial intelligence tools on the competitiveness of small businesses

Main areas of small business activity	In example of AI tools	Resultant effect	Indicator
Marketing and sales	CRM Systems, Chatbots	Fast customer interaction, increased sales	Sales growth (%)
Financial management	AI analytics, Big Data	Cost reduction, stabilization of financial flows	Profitability coefficient (%)
Manufacturing	IoT, RPA, Machine Learning	Efficient use of resources, reduction of production costs	Cost reduction (%)

Innovation	AI design Blockchain	Creation of new products and services	Innovative products share %
Risk management	Predictive Analytics	Preliminary identification of market and currency risks	Risk reduction (%)

Table 1 demonstrates the results achieved through the implementation of AI tools in various areas of small business activity and indicators for their measurement. In particular, it shows the tools in marketing and sales, as a result of the use of CRM systems, Chatbots, rapid and personalized communication with clients, and an increase in sales volume in online and offline sales. In Uzbekistan, the digitalization of the sales market is being widely recognized, and the competitiveness of small businesses is increasing through the strengthening of customer communication channels (telegram bot, online platform, call-center AI).

It is possible to reduce costs, effectively control cash flows, and detect fraud using AI-analysis and Big Data in financial management.[9] Budget optimization based on AI gives a significant advantage to the countries like Uzbekistan due to the limited financial resources of small businesses. For example, it is possible to monitor cash flow in real time and reduce unnecessary expenses. Tools such as IoT (Internet of Things), RPA (Robot Process Automation), and Machine Learning can be used to efficiently utilize resources and reduce production costs in manufacturing. In other industries such as the cotton-textile, food, and construction materials, it is possible to optimize production processes, predict malfunctions, and reduce waste using IoT.[10]

Innovative tools include AI design, the use of Blockchain, the development of new products and services, intellectual property protection, and ensuring reliable transactions. The introduction of payment systems through blockchain and personalized services using AI opens up new markets for small businesses in the tourism, fintech, and service sectors of Uzbekistan. It is possible to predict market, currency, and supply chain risks using Predictive Analytics tools in risk management. Exchange rate fluctuations and uncertainties in imports/exports pose risks for small businesses in Uzbekistan. It is possible to minimize losses by modeling risks with the help of predictive analytics.[11] In general, AI tools create a competitive advantage for small businesses in many areas increasing sales, reducing costs, stimulating innovation, and reducing risks. The full realization of these opportunities will be slowed down due to the lack of technological infrastructure, financial capabilities, and qualified personnel in Uzbekistan.

Assessment of areas of small business competitiveness (conditional %): **Production 85 > Marketing 80 > Financial management 75 > Innovation 70 > Risk management 65%**, average impact: 75%. Range: $85-65 = 20$ p.p., the biggest difference between production (85%) and Risk Management (65%), 20 p.p. gives the top-3 direction (production+marketing+financial): $240/375 = 64\%$ total "influence weight" - therefore we see that resources are more effective in this triad.

Manufacturing (85%). The question arises: Why is driver number 1 higher? Because IoT/RPA/ML directly increases process efficiency: OEE, early detection of malfunctions, waste reduction → cost reduction. Implication: additional margin or price flexibility, increases competitiveness in exports.[12] Marketing and sales (80%) revenue side fast booster CRM/chatbots accelerate customer communication → conversion, LTV, resale, implication means faster growth in market share and revenue. Financial management (75%) - a pillar of sustainability AI-analysis/big data makes costs "visible", stabilizes cash

flow and profitability. Implication: the profitability ratio improves, decisions become more accurate. Innovation (70%) - medium-term growth engine AI design / blockchain new products, reliable transactions → the share of innovative products will increase. A higher value is added because of implication differentiation. [13]

Risk management (65%) – “silent insurance”. Predictive analytics shows market/currency/supply risks earlier. Implication: the rate of failures is decreased, but businesses often finance this direction later - that's why it has a lower price. Quantitative “mini-analysis” averages = 75%, standard deviation ≈ 7 p.p. → distribution is moderate. Normalized weights can be used as a share in the action plan. Production $\sim 22.7\%$, Marketing $\sim 21.3\%$, Financial $\sim 20.0\%$, Innovation $\sim 18.7\%$, Risk $\sim 17.3\%$. This means that it makes sense to assign $\sim 60-65\%$ to the top three in the overall resource allocation. “If...” scenarios: If we raise risk management to 65 → 75: total score 375 → 385, average 75% → 77%. The equalization of only “weak point” significantly increases the overall indicator. If we raise innovation to 70-80%, it will be an average of 77% reducing the dependence on short-term trade/production pressure. [14]

Process map, impact $\times$ complexity, quick achievements, high impact, relatively low complexity.

They usually use CRM regulation in marketing, lead through chatbot/Telegram bot, optimize sales flow; KPI: conversion, CAC, LTV, churning. Cash flow forecast (ML) cost anomalies in the financial aspect; KPI: profitability, OPEX/Revenue, DSO/DPO are applied. It increases production in medium-term leaps, IoT sensors + RPA; KPI: OEE, scrap rate, downtime, cost percentage.

Innovation AI-design, A/B testing, transparency with blockchain; KPI: New product share (%), consists of time-to-market. Currency risk/supply stress test; KPI: losses $-\%$, VaR/ES, can lead to service interruption (SLA).

Therefore, you can start faster in the context of Uzbekistan, because infrastructure differences (regional internet/IT), marketing and finance usually require less capital. Personnel training requires skills for IoT/RPA in production - it is useful to start by selecting pilots, conducting them along with training. Currency supply risk is high - risk analysis should be viewed as “basic hygiene”, and information quality - CRM/ERP purity and integration - should focus on the foundation for all areas.

The KPI suggestions are marketing based on indicators in the table: it is depicted in percentages (%) to show sales growth percentage, CVR, LTV/CAC, share of repurchase, financial profitability %, gross margin, cash conversion cycle, production cost percentage, OEE, share of defects, unit of energy/product, innovation, new product revenue share, number of patents/applications, A/B test cycle and risk losses, stockout frequency, VaR/ES. The table shows production and marketing as “first-priority drivers”; finance - stabilizing; innovation - medium-term growth; risk - the necessary protective layer. For the fastest result, start with marketing + Finance (quickly applied), Pilot IoT/RPA in production, launch Risk models in parallel. [15]

Minimizing weaknesses (Risk 65%) significantly increases the overall indicator; this is especially important in currency and supply fluctuations. AI tools: weighted composite index and prioritization, impact points were normalized (0-1) and multiplied by strategic weights (points/amount), see Table 2.

Table 2. Composite index = $\sum w_i \cdot s_i$. Total composite index (0-1): 0.757

Areas	Score (0-100)	Normalized (0-1)	Weight w_i	Weighted contribution	Priority
Production	85	0.85	0.227	0.193	1
Marketing and finance	80	0.80	0.213	0.171	2
Financial management	75	0.75	0.200	0.150	3
Innovation	70	0.70	0.187	0.131	4

Risk management	65	0.65	0.173	0.113	5
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Table 2 demonstrates that production (85 points, priority - 1) is the area with the highest score. The normalized value was 0.85, and the weight was 0.227, with a total weighted share of 0.193. This means that the introduction of AI tools into production processes is the most powerful driver to increase the competitiveness of small business entities. For example, it is possible to effectively use resources and reduce costs applying IoT, RPA, and machine learning.

Marketing and sales (80 points, priority - 2) are in second place. Normalized value 0.80, weight 0.213, and weighted fraction 0.171. Through CRM systems and chatbots, it is easy to communicate with clients, increase sales volumes, and expand market share. This area will become an important area for business, yielding quick results after production.

Financial management (75 points, priority - 3) has a normalized score of 0.75, a weight of 0.200 and a contribution of 0.150. This direction is necessary for ensuring the stability of small businesses. Long-term business competitiveness is ensured by reducing costs, controlling financial flows, and increasing profitability based on AI analytics and Big Data.

Innovation and risk management (70 and 65 points, priority - 4 and 5) innovation (0.70 normalized points, contribution 0.131) is important in the creation of new products and services, but its short-term effectiveness is slightly lower. Risk management received the lowest score (0.65, contribution 0.113). Although risk management with Predictive Analytics is necessary for business security, small businesses often see it as a secondary direction. Nevertheless, in the long term, these two directions provide stability and innovative advantages, see Table 3.

Table 3. Resource allocation recommendation

Main areas	Resource share (%)
Production	22.7
Marketing and finance	21.3
Financial management	20
Innovation	18.7
Risk management	17.3

If we consider a brief overview of the result in Table 3, the total composite index (0-1) is: ≈ 0.565

$$\sum w_i * s_i$$

Here s_i is normalized score (0-1), w_i - strategic weight = points/amount.

Priority ranking, production is 85%, marketing and sales is 80%, financial management is 75%, innovation is 70%, risk management is equal to 65 percent. Resource allocation recommendations, weights % approximately production ~ 22.7%, marketing and sales ~ 21.3%, financial management ~ 20.0%, innovation ~ 18.7%, risk management ~ 17.3%.

Figure 1 Small business → Implementation of AI tools (intervention), 5 business activities: Marketing/trade, Financial management, Production, Innovation, Risk management - all these functional areas are united in a single large result node aimed at increasing competitiveness. The diagram shows the "AI → operational improvements → business outcomes" chain; the presence of production at the center (the central axis of the path) shows a logical architecture, emphasizing its weight in the real sector.

Marketing sales (CRM, Chatbots), combines customer data, converts leads into quick response conversions. KPI conversion (CVR), LTV/CAC, share of repurchase, sales growth %, financial management (AI-analysis, Big Data) finds

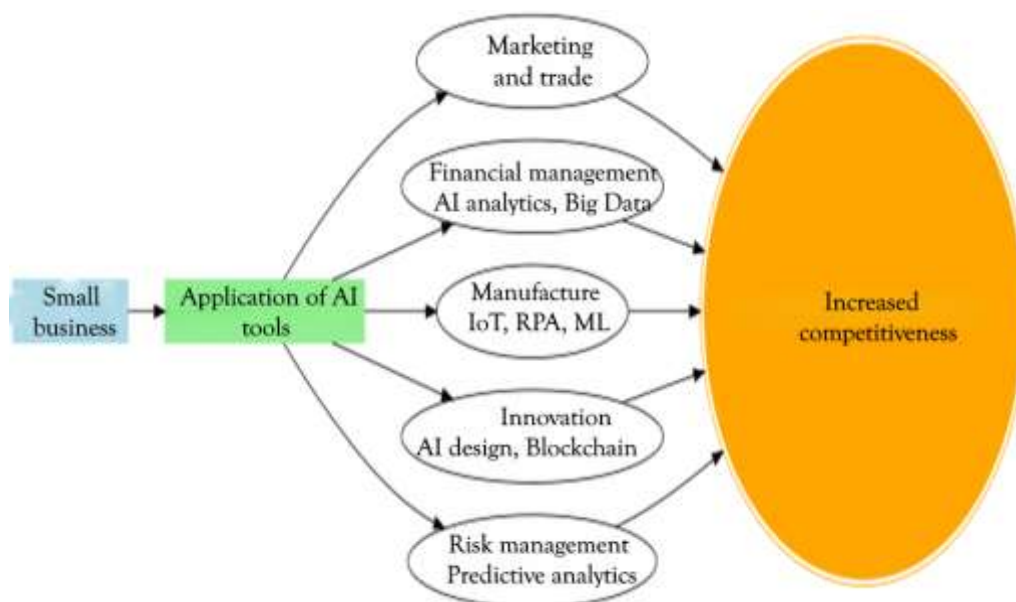


Figure 1. Mechanism for increasing the competitiveness of small businesses using AI tools

Cost anomalies, forecasts cash flow, optimizes prices. *KPI* profitability %, gross margin, DSO/DPO, cash conversion cycle, production (IoT, RPA, ML): fault prevention, process automation, energy/resource reduction and *KPI* OEE, cost percentage, share of defects, downtime, innovation (AI design, Blockchain) new product/service, transparent transactions, differentiations, *KPI* share of new product revenue percentage, time-to-market, number of A/B tests, risk management (Predictive Analytics): forecasting shifts in currency, demand and supply, *KP*: losses %, stockout frequency, VaR/Expected Shortfall the mechanism of each direction is affected.

Based on priorities and previous resource estimates, according to our previous calculations (85/80/75/70/65), the composite index ≈ 0.565 ; resource weights are approximately, Production 22.7% · marketing 21.3% · financial 20.0% · innovation 18.7% risk 17.3%.

4. Conclusion

In conclusion, we consider marketing+financial (quickly implemented), pilot IoT/RPA in parallel production, risk models as basic hygiene. Significant dependencies and risks, information base: Without CRM/ERP/Account systems integration, all streams operate at “half-power”. → Data governance, a single customer/product catalog is required. Model drift is a change in quality demand, currency fluctuations - models need to be constantly retrained. Some changes should be implemented in management: employee and resistance training, *KPI* linking, small wins, cybersecurity confidentiality, especially in SCRM/Blockchain, role-based access, audit log, backups. The drawing demonstrates that AI tools simultaneously increase revenue, reduce costs, reduce risk, and ultimately enhance competitiveness. For the fastest effect, marketing launches financial flows, enables the target pilot in production, and serves as the foundation for data quality and security.

AI tools should be considered as a strategic resource for increasing the competitiveness of small businesses. They not only increase the efficiency of production and service provision, but also expand opportunities for forecasting market conditions, risk management, and the development of innovative activity. The state policy on the digitalization of small businesses within the framework of the “Digital Uzbekistan – 2030” strategy further increases the relevance of this area.

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