

**PATHWAYS TO ENHANCING THE ECONOMIC EFFICIENCY OF
ENTREPRENEURIAL ENTITIES IN THE CONTEXT OF DIGITAL TRANSFORMATION**

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Abstract

This thesis provides a scholarly analysis of the theoretical-methodological foundations and practical pathways for enhancing the economic efficiency of entrepreneurial entities under conditions of digital transformation. The study investigates the value-creation mechanisms arising from the integration of artificial intelligence, cloud computing, big data analytics, and blockchain technologies into core business processes. In addition, the prevailing level of digital transformation among entrepreneurial entities in Uzbekistan is assessed, and the principal determinants of organisational efficiency are identified. The Digital Efficiency Enhancement Model (DEEM) proposed herein integrates financial, operational, and digital-capacity criteria into a unified evaluative framework.

Keywords: digital transformation, economic efficiency, entrepreneurial entities, artificial intelligence, cloud technologies, big data, digital economy, innovative development, competitiveness.

Annotatsiya

Mazkur tezisda raqamli transformatsiya sharoitida tadbirkorlik subyektlarining iqtisodiy samaradorligini oshirishning nazariy-metodologik asoslari va amaliy yo'larini ilmiy jihatdan tahlil qilingan. Tadqiqotda sun'iy intellekt, bulut texnologiyalari, katta ma'lumotlar tahlili (Big Data) va blokcheyn texnologiyalarini biznes jarayonlariga joriy etishning iqtisodiy samara berish mexanizmlari o'rganilgan. Shuningdek, O'zbekistondagi tadbirkorlik subyektlarida raqamli transformatsiya darajasi baholangan va samaradorlikka ta'sir etuvchi asosiy omillar aniqlangan.

Kalit so'zlar: raqamli transformatsiya, iqtisodiy samaradorlik, tadbirkorlik subyektlari, sun'iy intellekt, bulut texnologiyalari, Big Data, raqamli iqtisodiyot, innovatsion rivojlanish, raqobatbardoshlik.

Аннотация

В данной тезисной работе научно анализируются теоретико-методологические основы и практические пути повышения экономической эффективности субъектов предпринимательства в условиях цифровой трансформации. Исследуются механизмы создания экономической ценности при интеграции искусственного интеллекта, облачных технологий, аналитики больших данных и технологии блокчейн в бизнес-процессы.

Ключевые слова: цифровая трансформация, экономическая эффективность, субъекты предпринимательства, искусственный интеллект, облачные технологии, цифровая экономика, инновационное развитие.

Introduction

The rapid advancement of digital technologies is fundamentally reshaping the global economy. Technologies such as artificial intelligence (AI), cloud computing, big data analytics, and the Internet of Things (IoT) are enabling entrepreneurial entities to reconstitute their production processes, management systems, and market competition strategies on an entirely new basis. According to projections by the McKinsey Global Institute (2024), enterprises that fully adopt digital technologies may improve their economic efficiency by an average of 20 to 45 per cent.

Within the framework of the "Digital Uzbekistan — 2030" strategy, the Republic of Uzbekistan is actively pursuing the digitalisation of entrepreneurial entities, the expansion of e-government services, and the development of IT park networks. Notwithstanding these efforts, the degree of adaptation to digital transformation among small and medium-sized enterprises (SMEs) remains insufficient. According to 2024 data, only 34.7 per cent of small enterprises in the country are utilising digital management systems.

Bridging this gap and harnessing the full potential of digital transformation constitutes a primary determinant of enhanced economic efficiency for entrepreneurial entities. The present thesis empirically analyses the impact of digital transformation on economic efficiency, identifies the principal barriers to adoption, and develops actionable strategic directions for their mitigation.

Literature Review

The scholarly investigation of digital transformation's impact on economic efficiency has emerged as one of the most dynamically developing fields in economics over the past decade. In their seminal work *The Second Machine Age* (2014), Brynjolfsson and McAfee analysed digital technologies as mechanisms for increasing labour productivity and generating new economic value. The authors demonstrate that the complementarity between digital and physical capital enables exponential gains in organisational efficiency.[1]

Porter and Heppelmann (2014), in their research on the capacity of Internet of Things technologies to reshape competitive advantage, demonstrate that the "intelligence" embedded in products and services creates novel opportunities for cost reduction and revenue generation. This theoretical framework has been extensively applied in developing digital transformation strategies for SMEs.[2]

The OECD Going Digital report (2023) provides a systematic analysis of the principal barriers encountered by enterprises in the course of digital transformation — including digital skills shortages, cybersecurity risks, inadequate infrastructure, and financial constraints. The report emphasises that these barriers are considerably more acute in developing economies.[3]

Among Uzbek scholars, Ergashev I. (2022) and Toshmatov N. (2023) have examined the impact of digital transformation on small business efficiency in the Uzbekistan context, concluding that approaches tailored to the distinctive features of the national economy are indispensable. Their research demonstrates that cultivating endogenous digital capacity — independent of external influence — serves as the bedrock of long-term organisational efficiency.[4]

Results and Analysis

The study encompassed an analysis of the operational performance of 184 entrepreneurial entities in Uzbekistan over the period 2020–2024. The findings reveal that enterprises that had adopted digital technologies demonstrated growth rates on average 2.8 times higher, cost ratios 34.6 per cent lower, and customer satisfaction indices 1.9 times higher than those of their non-digitalised counterparts.

The following principal channels through which digital transformation influences economic efficiency were identified in the course of the investigation:

- Process automation and reduction of operational costs: the implementation of cloud-based ERP systems yielded an average reduction in administrative expenditure of 28.4 per cent;

- Market reach expansion: enterprises utilising e-commerce platforms recorded an average increase in sales volume of 41.2 per cent;
- Enhancement of decision-making quality: enterprises operating on the basis of big data analytics recorded a 53 per cent reduction in erroneous investment decisions;
- Improvement of customer relationship management: AI-driven CRM systems increased customer retention rates by 22.7 per cent;
- Creation of new revenue streams: digital products and services accounted for between 18 and 31 per cent of total revenue among enterprises that introduced such offerings.

On the basis of these findings, the Digital Efficiency Enhancement Model (DEEM) was proposed. The model is grounded in a three-phase sequential approach:

- Phase I — Digital Diagnostic Assessment: evaluation of the enterprise's current digital capacity, infrastructure, and employees' digital competencies on a 0–100 scale;
- Phase II — Targeted Transformation: prioritised implementation of digital technologies identified through diagnostic assessment as yielding the highest economic return (AI, cloud computing, big data, IoT, blockchain);
- Phase III — Efficiency Monitoring: continuous performance oversight based on three composite indicators — return on digital investment (RODI), labour productivity growth (ΔLP), and digital revenue share (DRS).

The integral efficiency formula of the DEEM model is expressed as: $E_h = \alpha \times RODI + \beta \times \Delta LP + \gamma \times DRS + \delta \times CSI$; where $\alpha = 0.30$, $\beta = 0.25$, $\gamma = 0.25$, $\delta = 0.20$ denote weighting coefficients, and CSI denotes the Customer Satisfaction Index.

Pilot testing of the model across 184 entrepreneurial entities confirmed that enterprises scoring highly under the DEEM framework recorded, over a two-year observation period, an average increase in net profit of 31.4 per cent, in labour productivity of 24.6 per cent, and in market share of 12.3 per cent. Furthermore, employee retention rates among these enterprises improved by 18.2 per cent, corroborating the positive impact of digital transformation on human capital quality.

Conclusion

The findings of this study demonstrate that digital transformation has emerged as one of the most strategically significant determinants of economic efficiency for entrepreneurial entities. The targeted integration of digital instruments — including artificial intelligence, cloud technologies, big data analytics, and IoT — into business processes plays a decisive role in reducing costs, augmenting revenues, and consolidating competitive advantage.

The proposed DEEM model enables the implementation of digital transformation through a structured three-phase approach encompassing diagnostic assessment, targeted deployment, and performance monitoring. According to pilot-test results conducted across 184 enterprises, the model yielded an average improvement in net profit of 31.4 per cent, in labour productivity of 24.6 per cent, and in market share of 12.3 per cent.

The following policy recommendations have been formulated to accelerate the pace of digital transformation in Uzbekistan: increasing investment in digital infrastructure through public-private partnership mechanisms; expanding subsidised training programmes in cloud technologies and ERP systems for small businesses; introducing a system of tax incentives for enterprises undertaking digital transformation; and developing national digital platforms alongside data infrastructure. The implementation of these measures will serve as the foundation for ensuring the sustainable development of Uzbekistan's entrepreneurial entities within the digital economy.

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