THE IMPACT OF ARTIFICIAL INTELLIGENCE AND DIGITAL TRANSFORMATION ON ECONOMIC GROWTH: THE CASE OF THE LABOR MARKET AND PRODUCTIVITY

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Abstract. The article analyzes the impact of artificial intelligence (AI) and digital transformation on economic growth through the labor market and productivity channels. The study uses statistical-comparative, structural and logical analysis methods based on official and international statistical data for Uzbekistan for 2023–2026, the "Digital Uzbekistan – 2030" strategy and the Strategy for the Development of Artificial Intelligence Technologies until 2030, as well as foreign empirical literature. The results show that AI affects growth in three ways: by raising total factor productivity, by reallocating tasks, and by creating new occupations. At the same time, the share of small business in employment (74.9%) is markedly higher than its share in gross domestic product (52.2%), which means that relative labor productivity in this sector is about 70% of the average level. This shows that diffusing AI tools precisely to low-productivity sectors is a major opportunity and, at the same time, a skills challenge. The article concludes with proposals on retraining of personnel, adoption of digital technologies in small business, data infrastructure, and measurement of the effects of AI.

Keywords: artificial intelligence, digital transformation, economic growth, labor market, labor productivity, employment, Uzbekistan.

1. Introduction

In recent years, artificial intelligence has been penetrating almost all sectors of the economy as a general-purpose technology. Unlike the steam engine and electricity, it makes it possible to automate knowledge-based cognitive tasks, which makes its impact on the labor market and productivity especially relevant. In the world literature, the impact of AI on global gross domestic product is expected to be formed mainly through higher labor productivity: according to PwC estimates, about 55% of the total economic effect of AI over 2017–2030 will consist of productivity growth [15].

For Uzbekistan the topic is important for two reasons. First, the country's economy has been growing at a high pace in recent years: real GDP grew by 6.7% in 2024 and by 7.7% in 2025 [9]. Maintaining this growth rate requires raising factor productivity. Second, the number of young people entering the labor market each year is large, and according to the World Bank, the working-age population is expected to increase by 1.4 million people over five years [9]. In such conditions, the impact of technological change on employment is of strategic importance.

At the level of state policy, the "Digital Uzbekistan – 2030" strategy (PF-6079, 5 October 2020) and the Strategy for the Development of Artificial Intelligence Technologies until 2030, approved by Presidential Resolution PQ-358 of 14 October 2024, have been adopted [8]. However, most existing scientific publications are limited to describing the general advantages of AI, and its relationship with labor market and productivity indicators has been little studied on the basis of official statistics.

The aim of the study is to identify the mechanisms through which AI and digital transformation affect economic growth, using the labor market and productivity as examples, and to assess the opportunities and limitations of this process in Uzbekistan. To achieve this aim, the following questions were addressed: (1) Through which channels does AI affect growth? (2) How do Uzbekistan's labor market and sectoral structure shape this impact? (3) What measures does economic policy require?

2. Theoretical framework and methods

Theoretically, the study relies on neoclassical and endogenous growth theories [1; 2] and on the task-based approach in labor economics [3; 4]. The standard form of growth accounting is as follows:

$g(Y) = g(A) + \alpha \cdot g(K) + (1 - \alpha) \cdot g(H)$

where g(Y) is the GDP growth rate, g(A) is the growth of total factor productivity (TFP), g(K) is the growth of capital, g(H) is the growth of human capital (adjusted for labor quality), and α is the share of capital. Digital transformation and AI, first of all, raise g(A) and also change the composition of g(H). According to the model of Acemoglu and Restrepo, the net effect of technology on labor is the sum of two opposing forces: the displacement of labor from tasks and the reinstatement of new tasks that require labor [4].

The empirical part used methods of working with secondary data: (a) statistical-comparative and dynamic analysis (indicators for 2023–2026 from the World Bank, the IMF, the ILO and national statistical sources); (b) structural analysis – assessing relative labor productivity through the ratio of small business shares in employment and GDP; (c) content analysis of regulatory and legal documents; (d) logical comparison with foreign experience. The relative productivity indicator was calculated as follows:

RP = (GDP share) / (employment share)

If RP < 1, the value added per employed person in the sector is below the economy-wide average. An important limitation: the share of small business in GDP is not identical to its share in net value added (because of taxes and net product taxes), so RP should be interpreted as an approximate indicator. Econometric estimation (for example, panel regression) requires a separate database and was therefore not carried out in this article; it is identified as a direction for future research.

3. Results

3.1. Macroeconomic and labor market conditions

Table 1 presents the main indicators describing the macroeconomic and labor market conditions in which the effect of AI takes shape.

Table 1. Key indicators of growth and the labor market in Uzbekistan

Indicator	Value	Source
Real GDP growth, 2024 / 2025 (%)	6.7 / 7.7	[9]
Net job creation (annual average, %): 2017–2021 / 2022–2025	0.4 / 2.5	[9]
Unemployment rate: end-2023 / end-2024 (%)	6.8 / 5.5	[10]
Unemployment rate, 2025 (%)	4.8	[11]
Youth unemployment (ages 15–24), approximately (%)	≈ 11	[10]
Internet users, beginning of 2025	32.7 million (87.2% of the population)	[13]
Growth of the working-age population (over five years)	+1.4 million people	[9]

Source: compiled by the author based on the sources indicated.

The table shows that unemployment has declined over the past two years (from 6.8% to 4.8–5.5%), and the pace of net job creation has risen from 0.4% in 2017–2021 to 2.5% in 2022–2025. At the same time, youth unemployment remains more than twice as high as the overall rate. Young people

are precisely the group that adopts new technologies quickly but also faces a high risk of being displaced by AI (for example, entry-level administrative and information-related jobs).

3.2. Institutional and practical framework

The institutional framework for AI and digital transformation is summarized in Table 2.

Table 2. Policy objectives and practical results in AI and digital transformation

Area	Content	Source
Strategic document	Strategy for the Development of AI Technologies until 2030 (PQ-358, 14.10.2024); action plan for 2024–2026	[8]
IT sector targets (2030)	Raise exports of IT services and software products to USD 5 billion; provide employment in this sector for 300 thousand young people	[12]
Practical projects	About 100 practical projects and more than 200 pilot initiatives; USD 24 million invested in AI infrastructure with a GPU cluster	[12]
Industrial example	In one of the projects at the Almalyk Mining and Metallurgical Complex, energy consumption fell by 10%, production costs fell by 15%, and labor productivity rose by 10%	[12]

Source: compiled by the author based on [8] and [12]. The industrial example is based on official reports and has not been independently audited.

The example given shows the effect of AI on productivity and costs at the enterprise level, but the result of a single project cannot be generalized to the whole economy. Experimental results from foreign experience also confirm the unevenness of the effect: when generative AI was used in customer service, employee productivity rose by about 14% on average, and the largest effect was observed among low-skilled workers [5]; in written professional tasks, the time needed to complete a task fell by about 40% and quality ratings rose [6]. At the same time, Acemoglu, in a macro-level assessment, stresses that the overall effect of AI on TFP over a decade may be modest, around one percent or lower [7]. Expectations should therefore be formed with caution.

3.3. Structural imbalance: the case of small business

Table 3. Share of small business in employment and GDP and relative productivity (RP)

Indicator	2015	2025	Change
Share in employment (%)	77.9	74.9	−3.0 pp
Share in GDP (%)	64.6	52.2	−12.4 pp
RP = GDP share / employment share	0.83	0.70	−0.13

Source: author's calculations based on data from [16]. RP is an approximate indicator.

Table 3 shows that the share of small business in employment has hardly changed (from 77.9% to 74.9%), while its share in GDP has fallen from 64.6% to 52.2% [16]. As a result, relative productivity has declined from 0.83 to 0.70: the value per person employed in small business is about 70% of the economy-wide average. Small business dominates in agriculture (97.1%), retail trade (81.8%) and services (55.0%) [17], and these are in turn sectors with low productivity and a high share of informal employment [14].

4. Discussion

The results make it possible to explain the impact of AI on growth through three channels.

– Productivity channel. AI raises TFP by processing information, forecasting, quality control and automating administrative processes. The high share of internet users in Uzbekistan (87.2%) and the launch of the 5G network in 2023 have created the infrastructural conditions for this channel [13]. However, the largest reserve lies precisely in sectors with low RP, that is, small business, retail trade and agriculture.

– Tasks channel. Within the Acemoglu–Restrepo framework, AI displaces routine cognitive tasks but creates new ones (working with data, supervising AI products, integration) [4]. The net result depends on the speed of the labor education and retraining system. In Uzbekistan, the high youth unemployment and the predominance of informal employment require retraining measures to be targeted.

– New sectors channel. The goal of raising IT services exports and providing employment for 300 thousand young people [12] supports structural change by creating jobs with high value added.

The scientifically important result is that the macro-level effect of AI is determined not by the technology itself but by how widely and deeply it spreads. Good results at a few large enterprises (for example, savings of 10–15% [12]) will have a noticeable effect on average productivity across the economy only if the technology reaches small business. Since small business provides nearly three-quarters of employment, raising its RP from 0.70 to 0.80 could yield a significant additional contribution to GDP even without changing the employment structure. (This is a logical illustration, not a precise forecast.)

Limitations of the study: (1) no econometric estimation was carried out, so descriptive associations, not causal relationships, are shown; (2) reliable enterprise-level statistics on the use of AI are limited; (3) the RP indicator is based on the GDP share, not on net value added; (4) foreign experimental results cannot be transferred directly to the conditions of Uzbekistan.

5. Conclusion and recommendations

According to the results of the study, AI and digital transformation affect Uzbekistan's economic growth through the channels of raising TFP, reshaping the structure of tasks and creating new occupations. The relative productivity of small business, which accounts for 74.9% of employment (about 0.70), shows that the greatest potential of AI, and also the greatest challenge, lies precisely in this segment. The following proposals are put forward:

– Target retraining programs, taking into account youth unemployment and the employment of occupations at high risk from AI; integrate digital and data literacy into secondary and vocational education.

– Distribute inexpensive, ready-made AI and cloud solutions for small business (accounting, sales forecasting, customer communication) through subsidies or grants; develop sector-specific model adoption guidelines.

– Expand open and high-quality data infrastructure, and improve the regulatory framework for data protection and AI ethics.

– To measure the effect of AI, regularly collect statistics on the adoption of digital technologies by enterprises (sector, scale, personnel); include relative productivity in the system of official indicators.

– Introduce retraining vouchers and temporary social protection mechanisms for workers at high risk of technological unemployment.

In future studies, based on enterprise-level surveys and panel data, AI's impact on productivity should be estimated econometrically.

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