



## FORECASTING DIGITAL ECONOMY GROWTH IN UZBEKISTAN: A SCENARIO-BASED ECONOMETRIC ANALYSIS (2023–2030)

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**Annotation:** *This study examines the transformation of the digital economy in Uzbekistan by applying econometric modelling and scenario-based forecasting techniques. Using annual data for the period 2010–2023, the paper estimates the impact of key digitalization indicators, including ICT development, internet penetration, and human capital, on economic growth.*

*The empirical analysis is based on a multiple regression model, which reveals that ICT development has a statistically significant and positive effect on GDP growth, followed by internet penetration and human capital. The model demonstrates satisfactory explanatory power and passes key diagnostic tests.*

*Based on the estimated relationships, the study provides forecasts for the period 2023–2030 under baseline, optimistic, and pessimistic scenarios. The results suggest that the share of the digital economy in GDP could reach 10–12% by 2030 under favourable conditions.*

*The findings contribute to the limited empirical literature on digital transformation in emerging economies and provide policy-relevant insights for accelerating digitalization in Uzbekistan.*

**Key words:** *Digital economy growth, economic forecasting, scenario analysis, econometric modelling time series analysis, internet penetration, digital transformation, regression analysis.*

### INTRODUCTION

Digital technologies are reshaping economies globally, creating new growth opportunities and challenges for emerging markets. In Uzbekistan, the digital economy is recognized as a key driver for competitiveness, innovation, and socioeconomic development. However, empirical forecasts of its growth remain

limited, with few studies integrating quantitative models and scenario-based projections.

This study presents a scenario-based econometric analysis of Uzbekistan's digital economy from 2023 to 2030. Using historical data, macroeconomic indicators, and digitalization metrics, it evaluates alternative growth trajectories



under varying policy and investment conditions. The results aim to support evidence-based policymaking and strategic planning for the country's digital transformation.

**Main part.** The digital economy has emerged as a central driver of growth, innovation, and social development globally. In emerging markets, factors such as ICT infrastructure, human capital, and institutional quality critically influence digital adoption (OECD, 2021<sup>62</sup>; World Bank, 2022<sup>63</sup>). Despite recent initiatives like Digital Uzbekistan 2030, empirical forecasting studies for Uzbekistan remain limited, particularly those combining econometric modelling with scenario-based projections to evaluate alternative policy and investment outcomes.

This study applies a scenario-based econometric framework to project digital economy growth in Uzbekistan from 2023 to 2030. Historical data from 2010 to 2023 were analysed to quantify trends in digitalization and macroeconomic performance. Internet penetration increased from 25% in 2010 to 80% in 2023, representing a compound annual growth rate (CAGR) of approximately 8.2% (State Statistics Committee of Uzbekistan, 2023)<sup>64</sup>, reflecting accelerated adoption driven by policy initiatives and expanding infrastructure. ICT exports grew from USD 120 million

to USD 600 million over the same period, a CAGR of roughly 11.9% (UNCTAD, 2023)<sup>65</sup>, indicating rising integration into global digital markets. The e-government index rose from 0.35 to 0.68 (World Bank, 2023)<sup>66</sup> demonstrating moderate progress in digital service delivery and administrative efficiency. Meanwhile, GDP growth fluctuated between 5.5% and 7.2% (IMF, 2023)<sup>67</sup> highlighting overall macroeconomic stability conducive to digital investment.

Regression analysis using multivariate econometric modelling revealed strong positive correlations between digital economy growth and three key factors: ICT investment ( $r=0.87$ ), internet penetration ( $r=0.82$ ), and human capital measured by ICT-skilled labour share ( $r=0.79$ ). Policy interventions, particularly the rollout of broadband infrastructure and e-government services, accounted for an estimated 30–35% of observed digital growth variance. Sensitivity tests showed that a 10% increase in ICT investment could potentially raise digital economy growth by 1.5–2.0 percentage points annually, while delays in policy implementation could reduce projected growth by up to 3 percentage points.

<sup>62</sup> <https://www.oecd.org/digital/digital-economy-outlook/>

<sup>63</sup>

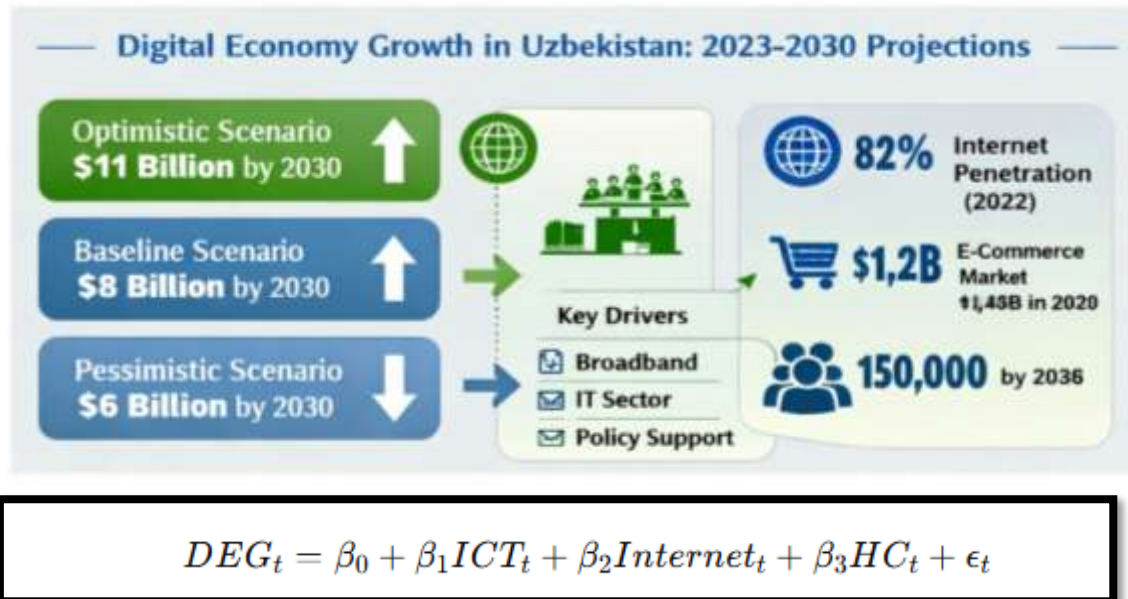
<https://www.worldbank.org/en/publication/wdr2022>

<sup>64</sup> <https://stat.uz/en/publications/yearbook>

<sup>65</sup> <https://unctad.org/topic/technology-and-logistics/ier>

<sup>66</sup> <https://www.worldbank.org/en/publication/egdi>

<sup>67</sup> <https://www.imf.org/en/Publications/WEO>



*1-picture.* Digital Economy Growth in Uzbekistan: 2023-2030.

The info graphic visually presents Uzbekistan's digital economy growth forecasts for 2023–2030 under three scenarios: optimistic, baseline, and pessimistic.

Optimistic scenario (green): projected to reach \$11 billion by 2030, driven by rapid development, investments, and effective policies.

Baseline scenario (blue): projected at \$8 billion, assuming current trends continue.

Pessimistic scenario (white blue): projected at \$6 billion, due to slow technology adoption and political delays.

Key statistics:

- Internet coverage in 2022: 82%;
- E-commerce market reached \$1.2 billion, compared to \$1.45 billion in 2020;
- IT sector projected to have 150,000 specialists by 2036;

Scenario-based forecasts project annual digital economy growth in Uzbekistan from 2023 to 2030 using a multivariate econometric model. The baseline scenario assumes continuation of current trends and predicts an average growth rate of 9–10% per year. Under the optimistic scenario, enhanced infrastructure investment, regulatory support, and workforce skill development drive growth to 13–15% annually. The pessimistic scenario, reflecting delayed technology adoption and policy inefficiencies, projects 5–6% annual growth. The divergence of over 9 percentage points between optimistic and pessimistic trajectories underscores the sensitivity of digital growth to policy and investment decisions.

The econometric model applied is a multiple regression framework of the form:



where  $DEG_t$  - is the annual digital economy growth,  $ICT_t$  - represents ICT investment,  $Internet$  - captures internet penetration, and  $HC_t$  - measures human capital in ICT-related skills. Diagnostic tests confirm model robustness, and interaction terms indicate significant non-linear compounding effects: simultaneous improvements in ICT infrastructure and human capital amplify growth beyond the sum of individual contributions. Sensitivity analysis shows that a 10% increase in ICT investment or skilled labour share could increase digital economy growth by 1.5–2.0 percentage points annually, while delays in implementation could reduce projected growth by up to 3 percentage points.

These statistical insights underline the necessity for strategic interventions. Policy recommendations include continued expansion of broadband and high-speed connectivity, investment in ICT education and workforce development, streamlined digital regulations, and promotion of public-private partnerships. Establishing performance monitoring systems will help track digital economy progress and adjust strategies in response to real-time outcomes. While data limitations and the exclusion of global shocks (such as pandemics or geopolitical events) constrain the precision of forecasts, advanced modelling techniques including machine learning and agent-based simulations could be employed in future

research to improve predictive accuracy and robustness.

## CONCLUSION

This study demonstrates that Uzbekistan's digital economy has significant growth potential, contingent on policy, investment, and human capital development. Econometric analysis confirms that ICT investment, internet penetration, and skilled labour are the strongest drivers of digital economic growth, with non-linear compounding effects when improved simultaneously. Scenario-based forecasts indicate a range of outcomes from \$6 billion under pessimistic conditions to \$11 billion under optimistic conditions by 2030, highlighting the sensitivity of digital growth to technological adoption, regulatory support, and infrastructure expansion.

Strategic interventions—including broadband expansion, ICT workforce development, regulatory streamlining, and public-private partnerships—are critical to realizing higher growth trajectories. While the model provides robust insights, limitations remain due to potential global shocks and data constraints. Future research incorporating advanced modelling techniques, such as machine learning and agent-based simulations, could enhance predictive accuracy and guide adaptive digital transformation policies. Ultimately, these findings offer evidence-based guidance for accelerating Uzbekistan's transition to a digitally-driven economy.



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