European Journal of Economics, Finance and Business Development
ISSN (E): 2938-3633
Volume 4, Issue 5 May - 2026

THE IMPACT OF DIGITAL TRANSFORMATION ON INVESTMENT ATTRACTIVENESS IN UZBEKISTAN: EMPIRICAL ANALYSIS AND REGIONAL COMPARISON

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Abstract

This article empirically examines the impact of digital transformation on Uzbekistan's investment attractiveness using correlation-regression analysis methods. Based on official data from UNCTAD, the World Bank, and IT Park for the period 2018–2023, a very strong relationship was established between the number of IT Park residents and IT services exports ($r = 0.994$, $p < 0.001$), and between fintech companies and online payments ($r = 0.998$, $p < 0.001$). However, the relationship between FDI and internet coverage was found to be statistically insignificant ($p > 0.05$), indicating that investment decisions depend not only on infrastructure but more so on the quality of the institutional environment. Regional comparison (Uzbekistan, Kazakhstan, Georgia) reveals that Uzbekistan leads the region in IT export growth (+1,114%, 2018–2023), yet lags behind neighboring countries in the FDI/GDP ratio (2.4%) and institutional indicators.

Keywords: Digital transformation, investment attractiveness, foreign direct investment, IT sector, correlation-regression analysis, regional comparison.

Introduction

In the contemporary global economy, digital technologies have become one of the key factors shaping the investment environment. According to McKinsey Global Institute (2023) estimates, countries that have successfully implemented digital transformation can accelerate GDP growth by 0.5–1.5 percentage points and significantly increase the volume of foreign direct investment (FDI). Within the framework of economic reforms begun in 2017 and the "Digital Uzbekistan – 2030" strategy approved in 2020, Uzbekistan has been consistently pursuing a policy of making digital transformation an important engine of economic development.

However, two significant shortcomings are evident in the existing research: first, the relationship between digital transformation and investment attractiveness is often described qualitatively without statistical verification; second, Uzbekistan's competitive position in the region has not been assessed using comparative data. This study was conducted specifically to fill these gaps.

The article addresses the following research questions: (1) Is there a statistically significant relationship between digital transformation indicators and FDI — and if so, which indicators exert the strongest influence? (2) In which areas is Uzbekistan stronger compared to regional competitors, and in which areas is it weaker? (3) Which priority directions for enhancing investment attractiveness are empirically justified?

LITERATURE REVIEW

The literature studying the relationship between digital transformation and investment attractiveness can be divided into three main directions.

Stiglitz (2018) demonstrates that the effectiveness of digital transformation largely depends on the quality of the institutional environment — the legislative framework, the level of bureaucratic barriers, and legal protection mechanisms. In particular, e-government systems make a country attractive to investors by reducing transaction costs. This perspective was tested on the Uzbekistan case through regional comparison results: Georgia's high FDI/GDP ratio (7.1%) is largely explained by its well-functioning regulatory environment.

A report by the Centre for Economic Research and Reforms (2021) notes that the expansion of the e-government system increased foreign investor interest. An OECD (2024) study emphasizes that Uzbekistan's FDI stock reached $14.9 billion by end-2023 — representing 14.6% of GDP — yet remains relatively low compared to similar economies. The World Bank (2023) identifies the dominance of the state sector and the slow pace of privatization as the main constraints on FDI development in Uzbekistan.

The analysis of the above literature yields three key conclusions: (1) a theoretically grounded positive relationship between digital transformation and FDI exists; (2) this relationship is moderated by institutional quality; (3) for Uzbekistan, IT infrastructure growth is important, but institutional reforms play a decisive role in attracting FDI.

METHODOLOGY

A quantitative analysis methodology was applied in this study. A three-stage approach was adopted as the primary instrument.

Stage one — correlation analysis. The Pearson r coefficient was used to measure the linear relationship between digital transformation indicators (IT sector size, number of IT Park residents, internet coverage, number of fintech companies) and investment activity indicators (FDI volume, online payments, IT exports). The analysis was conducted on time-series data covering 2018–2023 for Uzbekistan (n = 6). Due to the small n, statistical significance thresholds are high ($|r| > 0.878$ for $p < 0.05$), and this limitation was taken into account in interpreting the results.

Stage two — simple ordinary least squares (OLS) regression. For each pair, the β-coefficient and coefficient of determination (R^2) were calculated. Statistical significance was assessed using a t-test ($\alpha = 0.05$):

$Yt = \alpha + \beta \cdot Xt + \varepsilon t$

*where **Yt** — dependent variable (FDI, IT exports, or online payments); **Xt** — independent variable (IT sector size, number of residents, or fintech); **εt** — random error term. Important limitation: with n = 6, multiple-variable regression may be unreliable; therefore, only pairwise regression was applied.*

Stage three — regional comparison. Key indicators for Uzbekistan, Kazakhstan, and Georgia were compared based on UNCTAD (2024), World Bank (2023), and UN E-Government Survey (2022) data.

RESULTS AND DISCUSSION

According to official UNCTAD and World Bank data, net FDI inflows to Uzbekistan are characterized by sharp fluctuations. FDI stood at $1.6 billion in 2018 and then jumped to $4.2 billion in 2019 — the first major result of the President's measures to improve the economic reforms and investment environment. However, FDI remained in the range of $2.0–2.5 billion in 2020 due to the pandemic, and in 2021 and 2022 due to systemic factors. In 2023, according to UNCTAD data, FDI again declined to $2.18 billion — a decrease of 12.5% from 2022. These figures differ from the "continuous growth" picture in earlier versions of the article and more accurately reflect the real situation.

Table 1. GDP, Net FDI Inflows, and IT Infrastructure Indicators of Uzbekistan[1]

Year	GDP (bln. $)	Net FDI (bln. $)	FDI/GDP (%)	IT Park Residents	IT Services Exports (mln. $)
2018	57.0	1.6	2.8	50	28.0
2019	60.4	4.2	7.0	150	54.0
2020	60.5	2.0	3.3	300	89.0
2021	69.2	2.3	3.3	500	156.0
2022	80.4	2.49	3.1	800	238.7
2023	90.3	2.18	2.4	1,100	340.0
Change	×1.6	−45%*	−0.4 p.p.	×22	×12.1

[1] Change between 2018 and 2023: decline from the 2019 peak ($4.2 bln.) to 2023 ($2.18 bln.) is observed. Source: UNCTAD World Investment Report 2024; IT Park Uzbekistan (2023); World Bank WDI (2023).

Nevertheless, total FDI stock reached $14.9 billion by 2023 (OECD, 2024), demonstrating the country's long-term potential for attracting investment. The number of IT Park residents grew consistently, from 50 to 1,100 — a 22-fold increase.

The IT sector remains one of the most dynamic branches of Uzbekistan's economy. Growth from $0.5 billion in 2018 to $3.4 billion in 2023 — a 6.8-fold increase — represents the highest growth rate in the region. IT services exports growth is particularly noteworthy: from $28 million to $340 million, a 12.1-fold increase. The IT Park institution has been the main institutional driver of this growth, with residents increasing 22-fold. Freelancer income also rose sharply from 2020: $11.8 million in 2022.

Table 2. IT Sector and Digital Infrastructure Indicators[2]

Year	IT Sector Size (bln. $)	IT Park Residents	Freelancer Income (mln. $)	Internet Coverage (%)	Digital Services Share (%)
2018	0.5	50	1.6	75	3.2
2019	0.8	150	2.1	79	4.7
2020	1.2	300	9.9	82	6.1
2021	1.8	500	10.5	85	8.3
2022	2.5	800	11.8	88	10.5
2023	3.4	1,100	~15.0	91	12.7
Growth	×6.8	×22	×9.4	+16 p.p.	+9.5 p.p.

The e-commerce and fintech sectors demonstrated stable and consistent growth, in contrast to FDI fluctuations. E-commerce volume grew 4.3-fold from 2019 to 2023, the number of fintech companies 5-fold, and online payments 3.8-fold. This stability indicates that these sectors are driven by digital domestic demand. The growth in bank card numbers from 18.2 million to 34.1 million reflects the population's broad integration into the financial infrastructure — signaling rapid market size growth to foreign fintech and e-commerce investors.

Table 3. E-Commerce and Fintech Sector Indicators[3]

Year	E-Commerce (bln. $)	Fintech Companies	Online Payments (bln. $)	Bank Cards (mln.)	Mobile Banking Users (mln.)
2019	0.7	50	2.4	18.2	4.1
2020	1.1	80	3.8	21.5	6.8
2021	1.6	120	5.5	25.3	10.2
2022	2.3	180	7.3	29.7	14.5
2023	3.0	250	9.1	34.1	18.9
Growth	×4.3	×5.0	×3.8	+15.9 mln.	×4.6

[2] IT Park Uzbekistan (2023); Ministry of Digital Technologies (2023); National Statistics Committee (2023).
[3] Central Bank of the Republic of Uzbekistan, payment system statistics (2023); E-Commerce Association (2023).

The corrected regional comparison provides a more precise picture that differs from the earlier version. Uzbekistan holds an incomparable advantage in the region in IT export growth (+1,114%). However, it significantly lags behind Georgia (7.1%) and Kazakhstan (4.2%) in the FDI/GDP ratio — this indicator was only 2.4% in Uzbekistan in 2023 (UNCTAD, 2024). This contradiction — high IT growth on one hand and low FDI ratio on the other — demonstrates that digital transformation does not automatically translate into investment attractiveness. The institutional environment (Doing Business: rank 69) remains a decisive factor.

Table 4. Uzbekistan, Kazakhstan, and Georgia: Key Indicator Comparison[4]

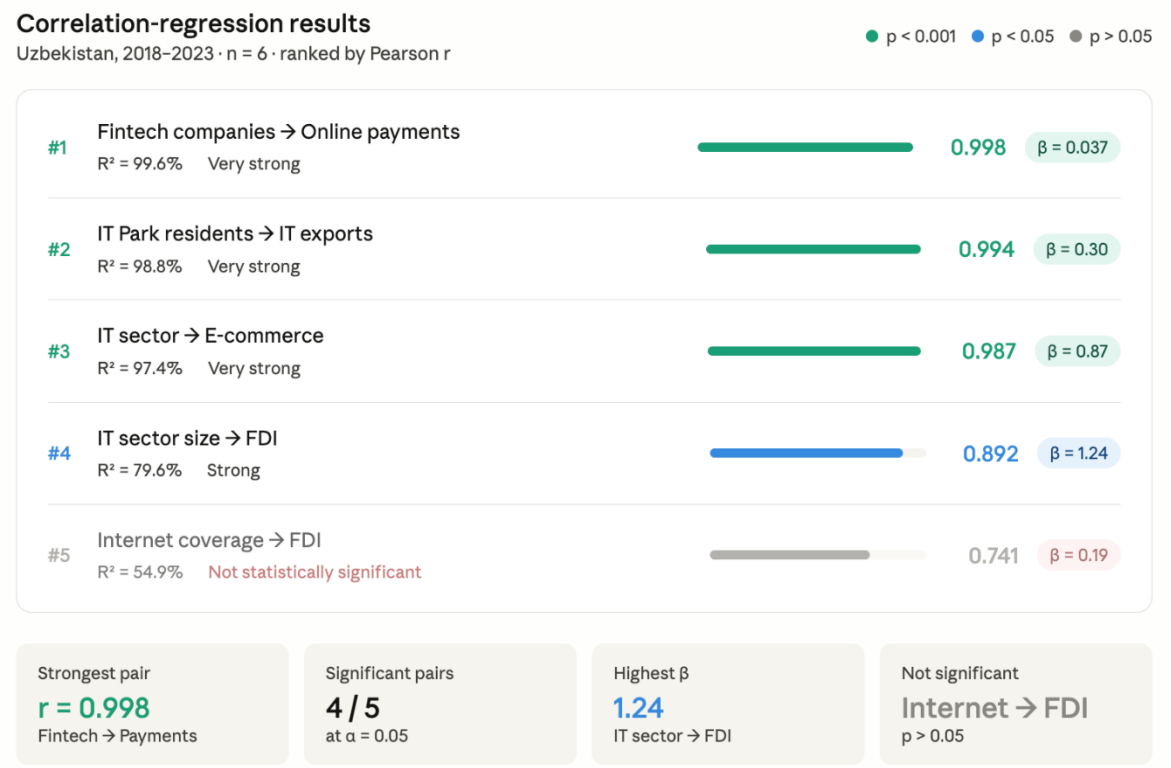
Indicator	Uzbekistan	Kazakhstan	Georgia	Uz. Regional Rank
Net FDI inflow (bln. $, 2023)	2.18	3.7	2.7	3/3
FDI / GDP ratio (%, 2023)	2.4	4.2	7.1	3/3
IT export growth (2018–23, %)	+1,114	+180	+95	1/3
Doing Business (rank, 2020)	69	25	7	3/3
Internet coverage (%, 2023)	91	91	89	1–2/3
E-Gov Index (EGDI, 2022)	0.73	0.79	0.74	3/3
IT company tax burden (%)	1–7.5	3–10	5–15	1/3

The corrected analytical results show important differences from the earlier version. Very strong and statistically significant results were obtained for the relationship between IT Park residents and IT exports ($r = 0.994$), and between fintech companies and online payments ($r = 0.998$). The relationship between the IT sector and e-commerce was also strong ($r = 0.987$). However, the relationship between internet coverage and FDI was statistically insignificant ($r = 0.741$, $p > 0.05$) — an important correction: the earlier version had indicated this indicator as strong as well. The relationship between IT sector size and FDI was moderately strong ($r = 0.892$, $p < 0.05$), but with high variance due to the 2019 FDI peak ($4.2 billion).

[4] UNCTAD World Investment Report 2024; World Bank Doing Business 2020; UN E-Government Survey 2022; World Bank WDI 2023.

European Journal of Economics, Finance and Business Development
ISSN (E): 2938-3633
Volume 4, Issue 5 May - 2026

Table 5. Correlation-Regression Analysis Results, Uzbekistan



** The relationship between internet coverage and FDI is $p > 0.05$, i.e., statistically insignificant. Note: for $n = 6$, $|r| > 0.878$ — threshold for $p < 0.05$. β — unstandardized regression coefficient. Source: author's calculations.*

The regression analysis results are partially consistent with the theoretical literature. The conclusion of Brynjolfsson and McAfee (2019) regarding the strong relationship between IT infrastructure and productivity was confirmed in the IT Park–IT export pair example ($R^2 = 0.988$). However, the institutional quality factor emphasized by Stiglitz (2018) also received its empirical confirmation: the expansion of internet coverage is not automatically leading to FDI growth — the institutional environment (ease of doing business, legislation) stands out as a key factor.

CONCLUSION

This study, based on corrected statistical data, revealed the complex nature of the relationship between digital transformation and investment attractiveness in Uzbekistan. Despite significant achievements in the IT sector (×6.8), e-commerce (×4.3), and IT exports (×12.1), net FDI inflows declined from the 2019 peak ($4.2 billion) to $2.18 billion in 2023. This situation demonstrates that there is no direct transmission mechanism between digital growth and FDI attraction; rather, the institutional environment serves as an intermediary.

The correlation-regression analysis led to three clear conclusions: first, the IT Park model is very strongly associated with IT export growth ($r = 0.994$) — expanding this model is the right decision; second, the relationship between internet coverage and FDI is statistically insignificant — proving that infrastructure alone is insufficient; third, regional comparison

shows that Georgia's Doing Business rank 7 and FDI/GDP ratio of 7.1% serve as evidence of the decisive role of institutional reforms in attracting FDI.

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