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Institutional Quality and Human Development in Uzbekistan: Evidence from the Reform Period 2017–2024

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ABSTRACT

Research background. Balanced state development is impossible without sustainable human development, and the quality of the institutional environment is recognized as one of its fundamental determinants. Yet the link between institutions and development in the Central Asian states, which are undergoing large-scale reforms, remains empirically underexplored.

Purpose. This study sets out to determine how the relationship between institutional quality and human development has evolved in Uzbekistan during the reform period 2017–2024, and how the country's trajectory compares with that of its Central Asian neighbours.

Research methodology. The study uses a hybrid design that combines a longitudinal country-case analysis of Uzbekistan with a cross-country comparison of the five Central Asian states. It draws on the Worldwide Governance Indicators (WGI) and the Human Development Index (HDI), and applies correlation analysis (Pearson, Spearman, Kendall), composite-index construction, a Chow test for a structural break, and robustness checks (bootstrap, principal component analysis).

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Introduction

The idea that institutions shape long-run development outcomes is now firmly established in economics and the social sciences. The foundational work of North (1991), Acemoglu, Johnson and Robinson (2001) and Rodrik, Subramanian and Trebbi (2004) established that institutional quality — the formal and informal rules that structure economic interaction — determines not only the pace of economic growth but also broader measures of well-being. Building on this foundation, a large body of empirical work has shown a stable positive link between institutional quality, measured through the World Bank's Worldwide Governance Indicators (WGI; Kaufmann, Kraay & Mastruzzi, 2010), and human development, measured through the UNDP Human Development Index (HDI). This link has been confirmed in cross-country samples (Stryzhak, Tupa & Rodzik, 2022; Stryzhak, 2025), in regional groups — the European Union (Keser & Gökmen, 2018), the post-socialist transition economies (Liotti, Musella & D'Isanto, 2018), Sub-Saharan Africa (Tsegaw, 2020), the Asia-Pacific region (Bajada & Shashnov, 2019) — and in single-country studies (Cárcaba et al., 2017; Justus & Uma, 2016). Despite the range of methods used, the findings converge on one point: countries with better institutional environments show higher human development, and the strength of this link varies with the institutional context.

On this basis, the study addresses the following research question: how has the relationship between institutional quality and human development evolved in Uzbekistan during the reform period 2017–2024, and how does Uzbekistan's trajectory compare with that of its Central Asian neighbours? Within this question, we test three hypotheses. H1 — improvements in Uzbekistan's institutional quality over this period are positively associated with measurable gains in human development. H2 — the strength of this link differs across the six

WGI dimensions, with the strongest associations expected for Regulatory Quality, Government Effectiveness and Control of Corruption. H3 — Uzbekistan's institutional trajectory shows a structural break that coincides with the post-2020 acceleration of reform implementation. The study makes a threefold contribution. Empirically, it is the first country-level longitudinal study of the institutional quality–human development link for Uzbekistan. Regionally, it is the first to treat all five Central Asian states as a single comparative group. Substantively, it offers empirical evidence on a reform episode that is of interest for transition economies and for the institutional-development literature more broadly.

The remainder of the paper is organized as follows. Section 1 reviews the literature. Section 2 describes the methodology. Section 3 presents the results. Section 4 discusses the results and draws policy implications. The final section concludes.

1. Literature Review

1.1. Theoretical foundations

The conceptual link between institutions and development goes back to the new institutional economics. North (1991) defined institutions as humanly devised constraints — both formal (laws, constitutions, property rights) and informal (customs, norms, codes of conduct) — that structure economic interaction and shape the incentive structure of an economy. On this view, it is the quality of institutions that determines whether a society's resources are channelled into productive activity or into redistribution, and thereby sets the trajectory of long-run development.

Empirical support for the central role of institutions came from work that has since become canonical. Acemoglu, Johnson and Robinson (2001), using differences in colonial mortality as an instrumental variable, showed that institutional quality has a causal effect on income levels. Rodrik, Subramanian and Trebbi (2004) demonstrated that institutional quality outweighs geography and trade integration as a determinant of development. This study builds on that tradition, treating institutional quality as a factor associated with the dynamics of human development.

1.2. Empirical studies of the institutions–human development link

A large empirical literature has examined the link between institutional quality — most often operationalized through the Worldwide Governance Indicators (Kaufmann, Kraay & Mastruzzi, 2010) — and human development. Several stable patterns stand out in this work.

First, the link is almost always positive. Keser and Gökmen (2018) found, for a sample of European countries, that governance indicators have a positive effect on human development. Tsegaw (2020) confirmed this link for 49 African countries. Bajada and Shashnov (2019) showed, for the Asia-Pacific region, that stronger institutions are associated with lower corruption. Liotti, Musella and D'Isanto (2018), using System-GMM on a sample of post-socialist countries, found a positive effect of democratic institutions on human development. None of these studies found a negative link.

2. Methodological Approach

2.1. Research design

The study uses a longitudinal country-case design with regional comparators. Uzbekistan is the focal case, examined over time across 2017–2024, while the other four Central Asian states — Kazakhstan, the Kyrgyz Republic, Tajikistan and Turkmenistan — serve as a comparison group. This approach offers both depth (one country over time) and breadth (comparison with the countries of the region). The 2017–2024 period was not chosen at random: it covers the reform period that began after the 2016 transfer of power.

2.2. Data sources and variables

Two main data sources are used. Institutional quality is measured through the World Bank's Worldwide Governance Indicators (WGI), which comprise six dimensions: Voice and Accountability (VA), Political Stability and Absence of Violence (PS), Government Effectiveness (GE), Regulatory Quality (RQ), Rule of Law (RL) and Control of Corruption (CC). Each dimension is reported on a standardized scale of roughly −2.5 to +2.5. Human development is measured through the UNDP Human Development Index (HDI) and its components: life expectancy at birth, expected and mean years of schooling, and gross national income per capita. Both sources are widely used in the empirical literature on the institutions–development link.

Table 1. Variables and data sources

Variable	Code	Source	Period
Institutional quality (6 dimensions)	VA, PS, GE, RQ, RL, CC	World Bank WGI	2017–2024
Composite institutional-quality index	IQ	Authors' calculation	2017–2024
Human Development Index	HDI	UNDP HDR	2017–2023
HDI components	LE, EYS, MYS, GNIpc	UNDP HDR	2017–2023

2.3. Analytical strategy

Given the limited time series for the focal case (eight annual observations), the analytical strategy comprises six steps: (i) analysis of the time dynamics of each WGI dimension and of HDI and its components; (ii) construction of the composite institutional-quality index; (iii) assessment of the bivariate link between institutional quality and human development; (iv) a comparative analysis with the four Central Asian comparators on a pooled panel (n = 35); (v) a test for a structural break; and (vi) robustness checks.

The strength of the association between institutional quality and human development (steps iii–iv) is assessed using the Pearson correlation coefficient:

$$r = \frac{\mathrm{cov}(x,y)}{s_x \cdot s_y} \qquad (2)$$

where cov(x, y) is the covariance between the paired composite-IQ values x and the HDI values y, and s_x and s_y are their standard deviations; the coefficient ranges from −1 to +1. To check robustness to distributional assumptions, the non-parametric Spearman (ρ) and Kendall (τ) rank coefficients are also computed over the overlapping period 2017–2023.

To test for a structural break in Uzbekistan's institutional trajectory (hypothesis H3, step v), the Chow test is applied. It compares a single regression fitted to the whole period against two separate regressions fitted to the sub-periods before and after a candidate break point:

$$F = \frac{\frac{\left(SSR_p - (SSR_1 + SSR_2)\right)}{k}}{\frac{(SSR_1 + SSR_2)}{(n-2k)}} \qquad (3)$$

where SSRp is the residual sum of squares of the pooled (single-line) regression, SSR1 and SSR2 are those of the two sub-period regressions, k is the number of estimated parameters (k = 2: intercept and slope), and n is the number of observations. A statistically significant F-statistic indicates that two regimes describe the data better than one, that is, that a structural break exists at the tested point. The test is applied to several candidate break years to locate the break precisely.

Three robustness checks are then performed. The first re-estimates the correlation excluding the COVID-affected year 2020. The second is a bootstrap procedure: the seven paired observations are resampled with replacement B = 5,000 times, the Pearson coefficient is recomputed for each resample, and a 95% confidence interval is obtained from the empirical distribution of these coefficients as its 2.5th and 97.5th percentiles:

$$CI_{95} = [r^*(2.5), r^*(97.5)] \qquad (4)$$

where r*(q) denotes the q-th percentile of the B bootstrap correlation coefficients. A confidence interval that excludes zero indicates a statistically reliable association. The third check reconstructs the composite using principal component analysis. The six standardized dimensions are summarized by their first principal component, defined as the linear combination with the largest variance:

$$PC_1 = w_1 z_1 + w_2 z_2 + \cdots + w_6 z_6 \qquad (5a)$$

$$\textit{proportion of variance explained} = \frac{\lambda_1}{\sum_k \lambda_k} \qquad (5b)$$

where $z_1 \ldots z_6$ are the standardized WGI dimensions, $w_1 \ldots w_6$ are the loadings given by the first eigenvector of the correlation matrix, λ_1 is its largest eigenvalue, and $\Sigma\lambda_k$ is the sum of all eigenvalues (equal to the number of dimensions). The correlation of this PCA-based composite with HDI is then compared with that of the

simple-mean composite. All computations were carried out in Python using the pandas, numpy, scipy and scikit-learn libraries.

3. Results

3.1. Dynamics of Uzbekistan's institutional quality

Figure 1 presents the trajectories of the six WGI dimensions for Uzbekistan over 2017–2024. All six dimensions improve. The composite institutional-quality index rose from −0.956 in 2017 to −0.525 in 2024, a cumulative gain of +0.43 points on the WGI scale. The gain was markedly uneven across dimensions. The largest improvement is in Regulatory Quality (+0.77), followed by Control of Corruption (+0.49), Voice and Accountability (+0.43) and Government Effectiveness (+0.38). The smallest gains are in Political Stability (+0.19) and the Rule of Law (+0.34). Uzbekistan's institutional improvement was thus concentrated mainly in the economic and regulatory dimensions.

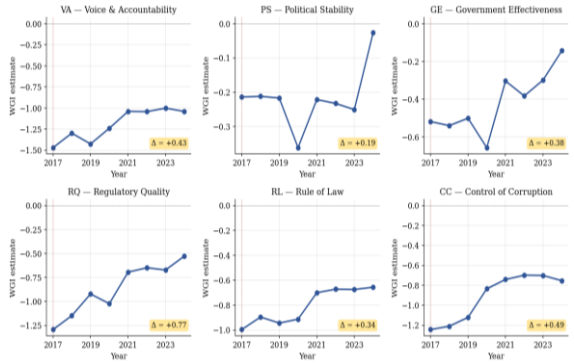

Figure 1. Trajectories of the six WGI dimensions for Uzbekistan, 2017–2024

3.2. Dynamics of human development

Figure 2 shows the dynamics of HDI and its components. The Human Development Index rose from 0.719 in 2017 to 0.740 in 2023. The improvement holds across all three components: life expectancy at birth rose from 71.7 to 72.4 years, expected years of schooling from 11.86 to 12.46 years, and gross national income per capita (in constant terms) from 7,286 to 8,826 international dollars. The HDI trajectory shows a clear slowdown in 2020, consistent with the impact of the COVID-19 pandemic, followed by recovery in 2021–2023.

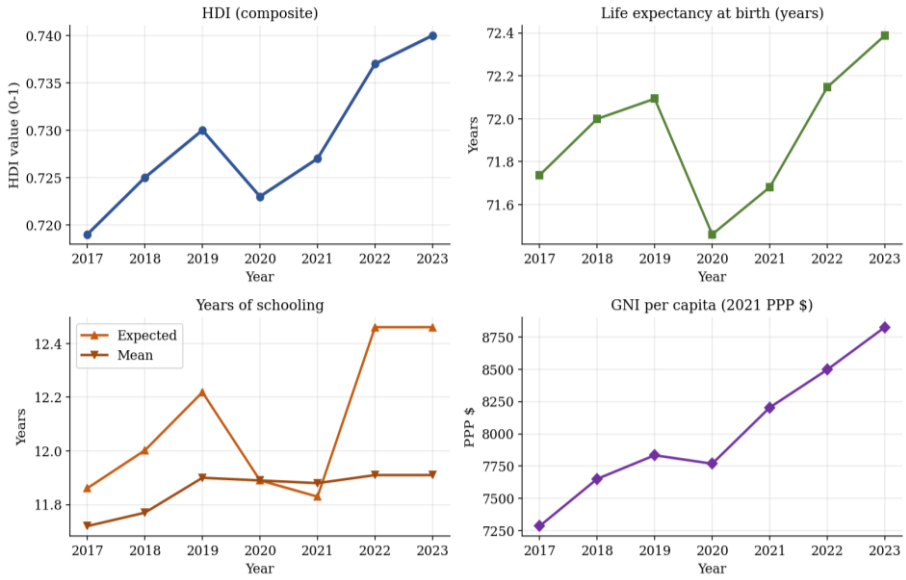

Figure 2. HDI and its components for Uzbekistan, 2017–2023

3.3. The link between institutional quality and human development

Correlation analysis over the overlapping period 2017–2023 (n = 7) reveals a strong positive link between the composite institutional-quality index and Uzbekistan's HDI. The Pearson coefficient is r = +0.801 (p = 0.030), confirmed by non-parametric measures: Spearman's ρ = +0.821 (p = 0.023) and Kendall's τ = +0.714 (p = 0.030). The agreement between the parametric and rank coefficients points to the robustness of the link. Figure 3 shows Uzbekistan's trajectory in the institutional-quality–HDI space.

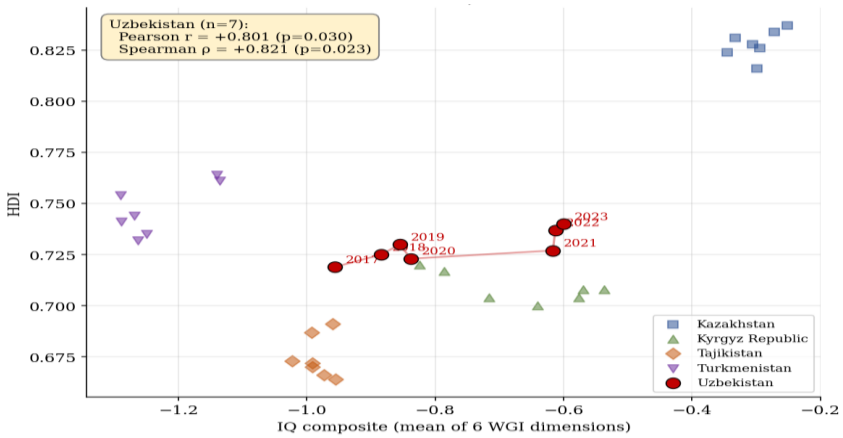

Figure 3. Scatter plot: institutional quality and HDI; Uzbekistan's trajectory by year

3.4. Differences in the strength of the link across WGI dimensions

Table 2 presents the correlations between HDI and each of the six WGI dimensions individually. The strength of the link differs substantially across dimensions, which supports hypothesis H2. The strongest and statistically significant correlations are found for Regulatory Quality (r = +0.845, p = 0.017) and the Rule of Law (r = +0.793, p = 0.033). Voice and Accountability, Government Effectiveness and Control of Corruption show moderately strong associations that do not reach the significance threshold at this sample size. Political Stability shows the weakest and non-significant link (r = +0.114, p = 0.807).

Table 2. Pearson correlation between HDI and the WGI dimensions, Uzbekistan, 2017–2023 (n = 7)

WGI dimension	Correlation (r)	p-value	Significance
Regulatory Quality (RQ)	+0.845	0.017	significant
Rule of Law (RL)	+0.793	0.033	significant
Voice and Accountability (VA)	+0.710	0.074	not significant
Government Effectiveness (GE)	+0.684	0.090	not significant
Control of Corruption (CC)	+0.671	0.099	not significant
Political Stability (PS)	+0.114	0.807	not significant

3.5. Comparative analysis: Uzbekistan and its Central Asian neighbours

Figure 4 compares the institutional-quality and HDI trajectories for all five Central Asian states. The pooled panel analysis (n = 35) confirms the positive link at the regional level: the Pearson correlation is r = +0.584 ($p < 0.001$). At the level of individual dimensions, the strongest associations are found for Government Effectiveness (r = +0.789) and Control of Corruption (r = +0.717). Notably, the pattern of significance in the regional panel differs from that for Uzbekistan: in the panel, Political Stability shows a significant link (r = +0.433, p = 0.009), whereas for Uzbekistan this link is not significant. This divergence indicates that Uzbekistan's within-country dynamics follow patterns of their own.

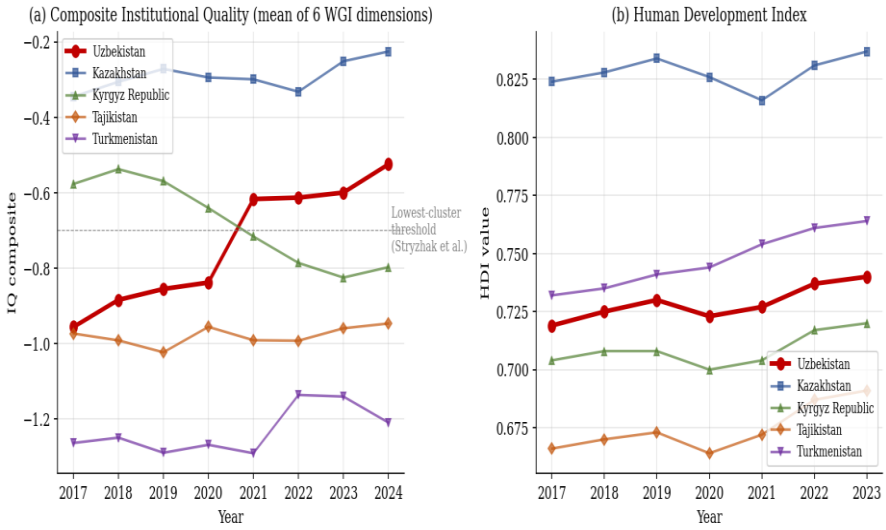

Figure 4. Comparative institutional-quality and HDI trajectories, the five Central Asian states

3.6. Test for a structural break

To test hypothesis H3, a Chow test was applied. The results confirm a statistically significant structural break at 2020–2021 ($F = 11.32$, $p = 0.022$). Tests for a break at alternative points — 2019 and 2021 — found no significant regime change ($p > 0.05$), which locates the structural break precisely in the 2020–2021 period. This result is consistent with the visual pattern in Figure 1, where most WGI dimensions show an acceleration of their upward movement after 2020.

3.7. Robustness checks

Three robustness checks were carried out. First, excluding 2020 left the main correlation almost unchanged ($r = +0.79$ against the original +0.80). Second, a bootstrap procedure (5,000 resamples) produced a 95% confidence interval of [+0.30, +0.99], which does not include zero. Third, a composite index built with principal component analysis (the first component explains 67.7% of the variance) yielded a correlation with HDI of $r = +0.78$, comparable to the result for the simple mean. The agreement across the three checks supports the robustness of the main finding.

4. Discussion

4.1. Main findings in the context of the literature

This study documents three interrelated findings. First, Uzbekistan's institutional quality improved substantially, moving the country from the lowest institutional cluster to the middle one — which is independently confirmed by the classification in Stryzhak (2025). Second, this trajectory is strongly and significantly correlated with improvements in human development. Third, the improvement was uneven over time (a structural break in 2020–2021) and across dimensions (the dominance of the regulatory and legal dimensions). The positive link found here is consistent with the stable finding of the empirical literature (Keser & Gökmen, 2018; Liotti et al., 2018; Tsegaw, 2020). The result for Uzbekistan ($r = +0.80$) reproduces the general pattern rather than being an isolated observation.

4.2. The cluster effect

Comparison with Stryzhak's work is especially telling. Stryzhak (2022, 2025) showed that the strength of the link is uneven: it is most pronounced in the cluster of countries with high indicator values. Uzbekistan's move from the lower to the middle cluster thus takes on additional meaning: the country moved into the group for which the institutions–development link is more clearly expressed. The moderately strong correlation ($r = +0.80$) is consistent with the country's position in the middle cluster.

4.3. Asymmetry across dimensions and the political-stability puzzle

The most theoretically interesting result concerns the unevenness of the link across dimensions. The strongest associations are found for Regulatory Quality and the Rule of Law, which is consistent with the results of Keser & Gökmen (2018) and Tsegaw (2020). There is, however, an important divergence regarding Political Stability. In cross-country studies, including the regional panel of this study ($r = +0.433$, $p = 0.009$) and the

results of Tsegaw (2020), Political Stability is significantly linked to development. For Uzbekistan alone, by contrast, this link is essentially absent ($r = +0.114$, $p = 0.807$).

There is a clear interpretation for this divergence. Cross-country studies pick up the link between political stability and development because their samples include both stable and unstable states. Uzbekistan, however, was marked throughout the whole period — under both Karimov and Mirziyoyev — by consistently high political stability with minimal variation. Because political stability barely changed, it cannot, by definition, explain the changes in human development that occurred during the reform period. In other words, the observed HDI gains are linked not to political stability (which was a constant) but to the dimensions that actually changed — above all Regulatory Quality and the Rule of Law. This result illustrates the value of a longitudinal within-country design: it can reveal patterns that are hidden in cross-country averages.

4.4. Mechanisms

The dominance of the regulatory and legal dimensions is consistent with the actual content of Uzbekistan's reforms. Regulatory Quality showed the largest gain (+0.77), which matches the nature of the reforms: exchange-rate liberalization in 2017 and the easing of conditions for doing business. According to World Bank (2024) data, the number of newly registered firms nearly tripled — from fewer than 33,000 in 2016 to 93,000 in 2022. The expansion of economic opportunity through regulatory liberalization is a plausible channel through which institutional change is linked to the income-related components of HDI (Pomfret, 2021).

At the same time, the structure of the results — strong progress in the economic and regulatory dimensions alongside limited movement in the political ones — is consistent with the characterization of Uzbekistan's reforms as a 'controlled opening' (Anceschi, 2019) and as a transformation whose depth remains under debate (Levin, 2024). The qualitative literature documents the selective character of the liberalization (Ubaydullaeva, 2021). This asymmetry is independently confirmed by the BTI transformation index (Bertelsmann Stiftung, 2024), which rates Uzbekistan's economic transformation (5.04) considerably higher than its political one (3.75). The quantitative results and the qualitative assessments thus converge on a single picture: Uzbekistan's institutional improvement was real but selective.

Conclusion

This study analysed how the relationship between institutional quality and human development evolved in Uzbekistan during the reform period 2017–2024, using a hybrid design that combines a longitudinal country-case analysis with a cross-country comparison of four Central Asian neighbours. The results show that over this period Uzbekistan moved from the lowest institutional cluster to the middle one, and that this institutional improvement is strongly and positively associated with gains in human development — both at the country level ($r = +0.80$) and across the regional panel ($r = +0.58$). The institutional trajectory shows a structural break in 2020–2021, and the link with human development is strongest for the regulatory-quality and rule-of-law dimensions.

The study contributes in three respects. Empirically, it offers the first longitudinal, country-level analysis of the institutions–human development link for Uzbekistan, extending the cross-country, cross-sectional work of Stryzhak et al. (2022) and Stryzhak (2025). Regionally, it is the first to treat all five Central Asian states as a coherent comparative group. Methodologically, comparing within-country and cross-country patterns revealed a result hidden in cross-country averages: unlike cross-country samples, where political stability is significantly linked to development, in Uzbekistan this link is absent, and the gains in human development are tied mainly to the dimensions that actually changed during the reforms.

The findings matter beyond Uzbekistan. They show empirically that measurable institutional improvement is achievable over a short period through targeted regulatory reform, and that its translation into human development is mediated by which institutional dimensions are affected. At the same time, the character of the reforms — strong progress in the economic and administrative sphere alongside limited movement in the political one — points to the selective nature of the improvement, which is consistent with the idea of a controlled institutional opening.

The findings should be read in light of the study's limitations, above all the correlational design and the small sample. Establishing the causal direction remains a task for future research. Promising directions include the use of causal-inference methods, the extension of the time window, and the comparative study of several

reform episodes. As Uzbekistan's reform course continues, further monitoring of the country's institutional trajectory and its link with human development will be of both scholarly and practical value.

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