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Institutions, Corruption and Economic Development: PLS-SEM Analysis

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ABSTRACT

This study inspects the moderating effect of corruption in connection concerning economic development and institutional quality. It's commonly acknowledged that institutional quality is a key factor in determining long-term prosperity, which includes governance aspects including regulatory quality, rule of law, and government efficacy. Corruption, measured using the Corruption Perceptions Index (CPI), is hypothesized to alter this relationship by either weakening or amplifying the effect of institutions on development outcomes. The study utilizes cross-country data for 130 countries from 2014, 2017, 2020, and 2023, distributed into high and low institutional quality clusters. Partial Least Squares Structural Equation Modeling is utilized to test the hypotheses and evaluate the interaction effects. In both governance systems, all results show that institutional quality significantly and favorably influences economic development. The moderation analysis confirms that corruption significantly conditions the institutional quality–development relationship: Corruption reductions bolster the beneficial effects of governance on

development in nations with high institutional quality, but the moderating effect is even more noticeable in those with low institutional quality. These findings offer strong empirical backing for the "sand the wheels" theory, which contends that corruption compromises development outcomes and institutional efficacy. This research contributes to institutional economics by highlighting the interactive dynamics between governance and corruption. It offers practical implications for policymakers, emphasizing the need for integrated governance reforms and anti-corruption strategies to achieve sustainable development goals.
Keywords: Institutional Quality, Corruption, Economic Development, CPI, PLS-SEM

INTRODUCTION

Economic development—often measured by rising income, human development, and welfare—remains a central goal for nations worldwide. Strong development reduces poverty, improves health and education, and secures sustainable living standards. A substantial body of research highlights institutional quality as a critical driver of long-term growth. Effective governance, rule of law, and regulatory quality attract investment and promote stable growth, while weak institutions and pervasive corruption undermine progress (Rodrik, Subramanian, & Trebbi, 2004; Uddin et al., 2023).

Corruption, frequently defined as the misuse of public office for private gain, is widely regarded as an obstacle to development. It undermines trust in governance, inflates transaction costs, distorts public spending, and deters investment (Mauro, 1995). While some scholars have debated whether corruption may occasionally "grease the wheels" in rigid bureaucracies, the consensus is that it overwhelmingly acts as "sand in the wheels," impeding economic progress (Aidt, 2009; Méon & Weill, 2010). Theoretically, institutional quality has been incorporated into both classical and endogenous growth frameworks. North (1990) conceptualizes institutions as the "rules of the game" that shape economic incentives, while empirical studies consistently show that good governance fosters sustainable growth, whereas corruption reduces returns to human and physical capital (Mauro, 1995).

Recent empirical evidence reinforces these insights. Uddin et al. (2023), examining 70 developing countries, demonstrate that institutional quality significantly boosts development outcomes, while corruption has the opposite effect. Herrala (2024) confirm similar results in European regions, showing that governance improvements accelerate growth, especially in lower-income areas. Likewise, Hunjra (2025) find that institutional quality promotes sustainability in emerging economies, but weak corruption control undermines these gains. Collectively, this evidence underscores that strong institutions drive development, while corruption erodes it.

Despite this consensus, a key research gap persists existing studies largely assess the direct effects of institutions and corruption on development, while giving limited attention to how corruption moderates the institutional quality–development relationship. This gap is especially relevant for countries like Pakistan,

where governance indicators remain weak, corruption perceptions are high, and human development lags. Addressing this, the present study investigates the association between institutional quality and economic development and explores the moderating role of corruption in shaping this connection across countries with high versus low institutional quality. By clarifying these conditional dynamics, the study contributes to governance and development literature and provides policy-relevant insights for anti-corruption and institutional reform strategies.

Research Objectives

To examine the association between institutional quality and economic development in countries with low and high institutional strength.

To examine how corruption moderates the association between institutional quality and economic development across varying institutional contexts.

Research Questions

What is the outcome of institutional quality on economic development in countries with low and high institutional strength?

How does corruption moderate the institutional quality–economic development relationship in different institutional settings?

LITERATURE REVIEW

Economic development theories have evolved from classical and Keynesian paradigms to institutional perspectives. Classical thinkers (Lewis, 1954; Smith, 1776) emphasized capital accumulation, specialization, and structural transformation, while neoclassical models Solow (1956) highlighted factor accumulation and technology. However, these frameworks often treated institutions as exogenous. Institutional economics, pioneered by North (1990) and expanded by Acemoglu and Robinson (2012) established that long-term prosperity depends fundamentally on institutional quality—protected property rights, rule of law, and effective governance—rather than on proximate factors alone (Hall & Jones, 1999; Rodrik et al., 2004). Within this literature, corruption emerges as a key obstacle. The 'sand the wheels' perspective (Mauro, 1995) views corruption as harmful, raising transaction costs, distorting investment, and undermining public service delivery. A competing 'grease the wheels' hypothesis (Huntington, 1968; Leff, 1964) suggests corruption might offset bureaucratic inefficiencies, but empirical evidence largely rejects this claim, showing that corruption erodes growth and equity (Aidt, 2009; Svensson, 2005).

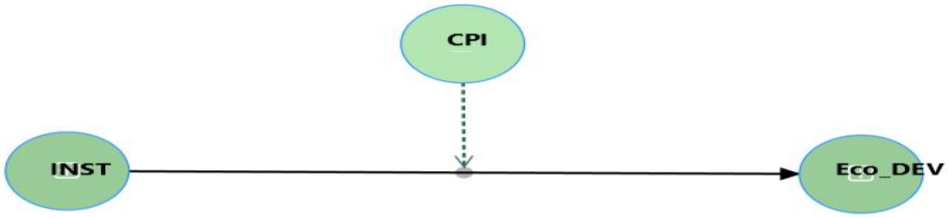
Institutional quality serves as a critical determinant of development outcomes. Robust institutions promote economic growth, draw investment, and enhance human welfare (Knack & Keefer, 1995; Mini, Moyo, & Phiri, 2025; Rodrik et al., 2004). Comparative evidence indicates that governance improvements enhance GDP growth in Europe (Herrala, 2024), whereas in Africa and Asia, the rule of law and regulatory quality are critical for sustainable development (Mini et al., 2025). The quality of governance is closely linked to human development indicators (Stryzhak, Tupa, & Rodzik, 2022). Corruption negatively impacts investment and human capital

(Gupta, Verhoeven, & Tiongson, 2003; Mauro, 2004) and undermines institutional effectiveness (Méon & Weill, 2010). Pakistan exemplifies this dilemma, as inadequate governance, ongoing corruption, and limited Human Development Index outcomes hinder the prospects for sustainable development. Although institutions and corruption have been widely studied independently, fewer studies examine corruption's moderating role in the institutional quality–development nexus. Existing evidence suggests conditional effects, but systematic cross-country analysis remains limited. This study discourses this gap by testing how corruption moderates the connection between institutional quality and economic development, with specific relevance to Pakistan's governance and policy reforms.

Conceptual Model

This study presents a moderating paradigm in which corruption influences the association amongst institutional quality and economic progress. Economic development, the dependent construct, includes both growth indicators and social well-being, whereas institutional quality reflects the governing structures that guide policy and service delivery. The model, which is based on institutional economics and development theory, combines Mauro (1995) insights into the economic costs of corruption with North (1990) definition of institutions to provide a strong lens for analyzing how governance quality and integrity influence national development trajectories.

Figure 1: Conceptual Model



ECO_DEV = Economic Development, INST = Institutional Quality, CPI: Corruption perception Index
Authors own contribution

Hypotheses

H1: Institutional quality has a direct effect on economic development.

H3: Corruption moderates the association between institutional quality and economic development.

The proposed model is formally expressed as:

$$\textbf{Eco Dev} = \beta_0 + \beta_1 \textbf{Institution} + \beta_2 (\textbf{Institution})(\textbf{corruption}) + \textbf{u} \ldots\ldots (1)$$

Variables of the Model and their theoretical justification

Economic Development (dependent variable) is a multidimensional construct that reflects both economic growth and human well-being. While GDP growth measures short-term output expansion, it does not fully capture welfare

improvements. The Human Development Index (HDI), integrating life expectancy, education, and income, offers a more inclusive, people-centered measure (Sen, 2014). In this study, Economic Development is modeled as a reflective construct using two indicators: GDP growth which represents economic dynamism, and Human Development Index (HDI), reflecting long-term welfare outcomes. This dual-indicator approach aligns with calls to move beyond GDP and account for multidimensional development (Pickett & Wilkinson, 2015). Although these indicators differ in scale, PLS-SEM standardization ensures both contribute proportionately to the latent construct (Hair & Alamer, 2022).

Institutional Quality (Independent variable) measures the efficacy, stability, and legitimacy of government in promoting economic growth and human development. Strong institutions lower transaction costs, foster confidence, and encourage investment by enforcing regulations, preserving property rights, and ensuring stability (North, 1990). This study assesses institutional quality using five characteristics of the World Bank's Worldwide Governance Indicators: government effectiveness, political stability, regulatory quality, rule of law, and voice and accountability. Together, these metrics provide a holistic picture of governance performance, combining functional competence and democratic accountability. According to Kaufmann, Kraay, and Mastruzzi (2009), stronger governance leads to better economic outcomes, more effective service delivery, and poverty reduction. In the PLS-SEM paradigm, these five dimensions are used to reflect the Institutional Quality construct. The link between Institutional Quality and Economic Development is discussed in literature repeatedly. Institutional economics emphasizes that inclusive and transparent institutions are fundamental to sustained growth, as they protect property rights, enforce contracts, reduce uncertainty, and direct resources toward productive uses (Acemoglu & Robinson, 2012; North, 1990; Rodrik et al., 2004). Strong institutions foster investment, innovation, and the provision of public goods essential for long-term development.

Corruption (Moderating Variable) is defined here as the abuse of public authority for private advantage, encompassing practices such as bribery, embezzlement, and nepotism. Its inclusion as a moderating variable reflects the premise that even strong formal institutions may fail to deliver developmental benefits when corruption undermines enforcement and policy execution (Mauro, 1995; Treisman, 2000). The Corruption Perceptions Index (CPI), produced annually by Transparency International, is taken to measure corruption. The CPI scores countries from 0 (highly corrupt) to 100 (very clean) based on expert assessments and business surveys. Countries with high CPI scores, such as Denmark or New Zealand, are characterized by transparent governance, independent judiciaries, and effective accountability mechanisms. Conversely, countries with CPI scores below 30 often experience systemic bribery, weak law enforcement, and institutional fragility. The CPI is widely used in governance and development research due to its comprehensive geographic coverage, standardized methodology, and year-to-year comparability (Emara & El Said, 2021; Hoinaru, Buda, Borlea, Văidean, & Achim,

2020). Recent studies confirm its suitability for moderation analysis, showing that higher CPI scores (lower corruption) enhance the positive effects of governance on development outcomes (Jetter & Parmeter, 2018). In this study, corruption is hypothesized to moderate the Institutional Quality–Economic Development relationship, such that the positive influence of strong institutions is amplified in low-corruption environments and weakened in high-corruption contexts.

Corruption, in the present study, is treated as a Moderating Variable. Corruption influences how effectively institutions drive development. While the "grease the wheels" view suggests bribery may offset bureaucratic inefficiencies in weak systems (Huntington, 1968; Leff, 1964), the prevailing "sand the wheels" perspective holds that corruption distorts resource allocation, undermines legitimacy, and weakens governance outcomes (Aidt, 2009; Shleifer & Vishny, 1993). Empirical evidence overwhelmingly supports the latter, showing that corruption dampens the positive impact of institutional quality. The theoretical model therefore posits that institutional quality enhances economic development, but corruption moderates this effect whereas, governance reforms are more effective in low-corruption settings and substantially weakened in high-corruption contexts.

METHODOLOGY

This study explores the influence of institutional quality on economic development, through corruption modeled as a moderating variable. The objective is to examine whether corruption acts as 'sand in the wheels' or 'grease in the wheels' in the context of Pakistan. This section outlines the estimation technique, measurement model, structural model, and evaluation criteria employed in the analysis.

Estimation Technique

The study uses Partial Least Squares Structural Equation Modeling (PLS-SEM), a variance-based method introduced by Wold (1975). PLS-SEM simultaneously estimates measurement (outer) and structural (inner) models, combining principal component analysis with ordinary least squares regression to support both exploratory and predictive research (Hair & Alamer, 2022). It is particularly suitable for small sample sizes, non-normal data, and complex models with moderating variables (Sarstedt, Ringle, & Hair, 2017). Given the study's focus on corruption as a moderator between institutional quality and economic development, PLS-SEM is more appropriate than traditional econometric techniques such as OLS, which fail to capture mediation, moderation, and latent construct measurement (Henseler et al., 2014).

Measurement Model

The measurement (outer) model defines how latent constructs are operationalized through observed indicators. In reflective models, indicators represent manifestations of the same underlying concept and are anticipated to be highly correlated (Hair & Alamer, 2022). In this study, Institutional Quality is

modeled reflectively through indicators, for instance Government Effectiveness, Regulatory Quality, and Rule of Law. Similarly, Economic Development (GDP growth, HDI) and Corruption are also treated as reflective constructs, consistent with governance and development literature (Kaufmann et al., 2009). Evaluation criteria comprise internal consistency reliability (Cronbach's alpha, composite reliability ≥ 0.70), indicator reliability (factor loadings ≥ 0.708), convergent validity (AVE ≥ 0.50), and discriminant validity, tested using the Fornell-Larcker criterion and the Heterotrait-Monotrait (HTMT) ratio.

Structural Model

The structural (inner) model specifies the hypothesized associations amongst latent variables. Corruption is introduced as a moderating variable influencing the relationship between Institutional Quality and Economic Development. PLS-SEM permits for estimation of both direct and interaction effects, supported by institutional economics and corruption literature. Key assessment elements include path coefficients (β) to measure the strength and direction of relationships, significance testing via bootstrapping with 5,000 resamples, and the coefficient of determination (R^2) to evaluate explanatory power. Consistent with Hair and Alamer (2022), R^2 values of 0.75, 0.50, and 0.25 indicate substantial, moderate, and weak explanatory power, respectively. Effect sizes (f^2) are also reported to capture the contribution of all predictors to the dependent variable.

Evaluation Criteria

Evaluation of PLS-SEM results involves assessing both the measurement and structural models. Indicator reliability is confirmed when factor loadings exceed 0.708, while internal consistency is ensured through Cronbach's alpha and composite reliability values above 0.70. Convergent validity is established if AVE exceeds 0.50. Discriminant validity is tested using the Fornell-Larcker criterion and HTMT ratio. For the structural model, significance of path coefficients is tested through bootstrapping, and model explanatory power is assessed using R^2. Effect sizes (f^2) further indicate the contribution of each predictor variable to the explained variance in Economic Development. Together, these criteria ensure the robustness and validity of the proposed moderated model.

Data and Sample

The study employs a cross-national dataset of 130 countries observed in four waves (2014, 2017, 2020, 2023). Key variables include Institutional Quality (measured by Worldwide Governance Indicators), Corruption (Transparency International's CPI), and Economic Development (GDP Growth from the World Bank and HDI from UNDP). Data sources were selected for their reliability and wide use in governance–development research (Kaufmann et al., 2009; Mauro, 1995; Uddin et al., 2023). A large-N cross-country design ensures global variation in governance and development, enhances statistical power, and allows meaningful subgroup comparisons. The inclusion of 130 countries balances external validity, policy relevance, and data availability. Countries were chosen based on complete data coverage across all variables, ensuring comparability and minimizing bias. This

design supports generalizable conclusions while accommodating geographic, historical, and cultural diversity (Acemoglu, Johnson, & Robinson, 2005; North, 1990).

Data Transformation

Countries were stratified as high and low institutional quality clusters using the dataset's mean of institutional quality score (0.0254543). This classification divides the whole set of countries as high institution countries or low institution countries. It will enable examination of whether corruption moderates' governance–development relationships differently across institutional contexts. Grouping reflects theoretical arguments that corruption may act as 'grease' in weak institutions but 'sand' in stronger governance settings (Méon & Weill, 2010). Sub-sample analysis provides policy-relevant insights by highlighting context-dependent effects of corruption on development (Beyaert, García-Solanes, & Lopez-Gomez, 2023).

Time Invariance test

The study attempts to test for the existence of time invariance and institutions were found not to vary across the time period of data collection. Time invariance tests (one-way ANOVA) were applied to Institutional Quality, CPI, GDP Growth, and HDI across four periods. No significant mean differences ($p > 0.05$) were found, allowing panel data to be averaged into a cross-sectional dataset while preserving information. Data was converted into cross section by averaging across all periods. Combined average across all countries is used as a threshold to categorize the countries into high institutions or low institution countries. Time invariance test justifies the estimation of the model with cross section data.

Estimation and Results

The Structural Equation model which is presented by equation (1) is estimated through Smart PLS 4.2.1 Measurement model (outer model) and structural model (inner model) results and analysis is presented in next section.

Measurement Model Results

The measurement model performance is based on validity and reliability of constructs which is reported below. Figures below represent the pls algorithm results for high and low institution countries respectively.

Figure 2: High Institutions Countries (PLS- Algorithm)

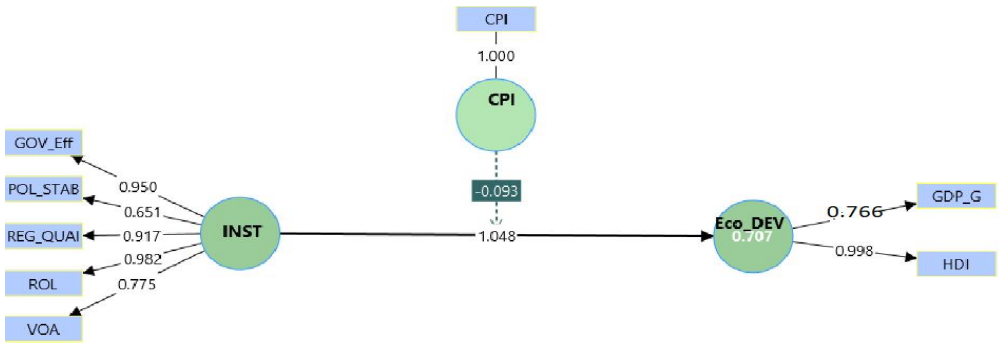
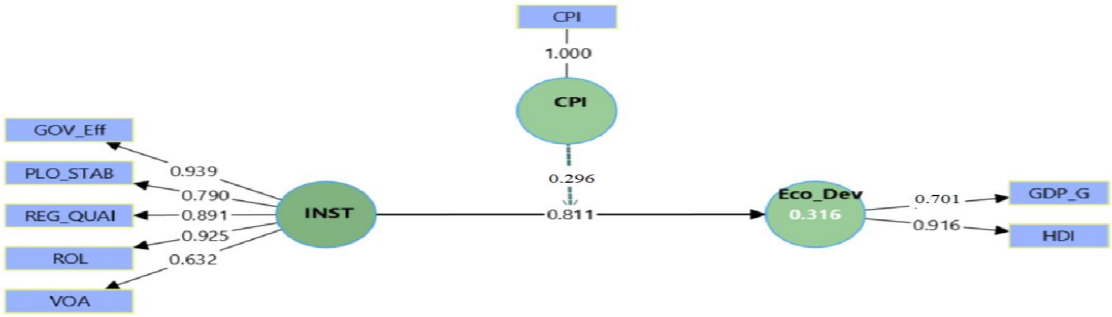


Figure 3: Low Institutions Countries (PLS- Algorithm)



Reliability Tests

Internal Consistency

Two commonly used indicators of internal reliability, which are comprised of Composite Reliability (CR) and Cronbach's alpha (α). The estimation of measurement model is conducted for Low institution countries and High institution countries separately. Table 1 reports the result of reliability. As can be seen, internal consistency reliability is established for both high institution and low institution countries as the value of Cronbach alpha and composite reliability values are much above the required threshold.

Table 1: Internal Consistency Reliability

Countries with High Institutions Quality			**Countries with Low Institutions Quality**		
	Cronbach's alpha	Composite reliability		Cronbach's alpha	Composite reliability
ECO_DEV	0.877	0.727	**ECO_DEV**	0.727	0.797
INST	0.911	0.948	**INST**	0.9	0.96

Source: Author's Own Creation

For countries with high institutional quality, Composite Reliability values ranged between 0.727 and 0.948, and Cronbach's alpha values between 0.877 and 0.911, exceeding the recommended threshold of 0.70 and indicating strong construct reliability. Similarly, for countries with low institutional quality, Cronbach's alpha values of 0.727 and 0.900, with Composite Reliability scores of 0.797 and 0.960, confirm that constructs are measured consistently across governance contexts. These results demonstrate that both ECO_DEV and INST exhibit satisfactory internal consistency, supporting the dependability of the measurement model for hypothesis testing.

Indicator Reliability

Indicator reliability was evaluated by examining outer loadings, which reflect the correlation strength between observed indicators and their latent constructs. A loading of 0.70 or higher is considered acceptable, as it indicates that the indicator describes at least 50% of the variance in the construct (Hair & Alamer, 2022).

For countries with high institutional quality (Table 2), all indicators exceeded

the threshold. Institutional Quality indicators loaded strongly, ranging from 0.751 (Political Stability) to 0.982 (Rule of Law), while Economic Development indicators also showed high loadings—0.766 (GDP Growth) and 0.998 (HDI).

For countries with low institutional quality, indicator reliability also remained robust. As all cross loadings exceed the threshold. Overall, the results confirm that the indicators are valid and reliable representations of their respective constructs across both high- and low-institutional quality settings.

Table 2: Indicator Reliability (Countries with High- and low-Quality Institutions)

		High Inst	**Low Inst**
Construct	**Indicators**	**Factor Loading**	**Factor Loading**
COR	COR	1	1
	GOV_Eff	0.95	0.939
	POL_STAB	0.751	0.79
INST	REQ_QUAI	0.917	0.891
	ROL	0.982	0.925
	VOA	0.875	0.732
	HDI	0.998	0.916
ECO_DEV	GDP_G	0.766	0.701

Source: Author's Own Creation

Validity Tests

Convergent Validity: AVE

Convergent validity was measured using the Average Variance Extracted (AVE), that evaluates the degree to which a construct describes variance in its indicators(Fornell & Larcker, 1981). An AVE value of 0.50 or higher indicates acceptable convergent validity, signifying that the construct explains at least 50% of indicator variance (Hair & Alamer, 2022)..

Table 3: Convergent Validity

Countries with High Institutions Quality		**Countries with Low Institutions Quality**	
Construct	AVE	**Construct**	AVE
INST	0.511	**INST**	0.64
ECO_DEV	0.746	**ECO_DEV**	0.711

Source: Author's Own Creation

Results show that in high-institutional quality countries, AVE values were 0.511 for Institutional Quality (INST) and 0.746 for Economic Development (ECO_DEV), both above the cut-off. For low-institutional quality countries, AVE values were similarly acceptable, with 0.640 for INST and 0.711 for ECO_DEV (Table 3). These findings confirm that indicators are strongly associated with their

constructs across governance contexts, providing evidence of good convergent validity. The measurement model is therefore well-grounded for subsequent structural analysis.

Fornell Lacker Criteria

Discriminant validity assesses whether constructs represent distinct dimensions of a concept, ensuring that indicators designed for one construct are not inadvertently capturing another. Without discriminant validity, constructs may overlap, compromising the accuracy of inter-construct relationships (Fornell & Larcker, 1981). This study employed three complementary approaches: the Fornell–Larcker criterion, the Heterotrait–Monotrait (HTMT) ratio, and cross-loadings analysis. Together, these tests provide a robust assessment of whether constructs are empirically distinct.

As reported in Tables 4, this condition was met in both governance contexts. For countries with high institutional quality, the square root of the AVE for Institutional Quality (INST) was 0.864, greater than its correlations with Corruption (COR = 0.498) and Economic Development (ECO_DEV = 0.512). A similar outcome was observed in the low institutional quality group, where the square root of the AVE for INST was 0.843, again exceeding correlations with other constructs. These results approve that the constructs are empirically distinct and satisfy the Fornell–Larcker criterion, supporting the validity of the measurement model.

Table 4: Fornell Lacker Criteria

High Institutions				Low Institutions			
Constructs	**COR**	**ECO_DEV**	**INST**	**Constructs**	**COR**	**ECO_DEV**	**INST**
COR	1			**COR**	1		
ECO_DEV	0.415	**0.715**		**ECO_DEV**	0.415	**0.713**	
INST	0.498	0.512	**0.864**	**INST**	0.447	0.518	**0.843**

Source: Author's Own Creation

Heterotrait–Monotrait (HTMT) ratio

In addition to the Fornell–Larcker criterion, discriminant validity was further assessed by means of the Heterotrait–Monotrait (HTMT) ratio, which is regarded as a more stringent test of construct distinctiveness. The HTMT estimates the ratio of correlations across constructs (heterotrait–heteromethod) to correlations within the same construct (monotrait–heteromethod). According to (Henseler et al., 2014), HTMT values below 0.90 indicate satisfactory discriminant validity, whereas higher values suggest insufficient differentiation between constructs.

As shown in Tables 5, all HTMT values for both high and low institutional quality groups fell below the 0.90 threshold. For example, in the high

institutional quality group), the HTMT ratio between Institutional Quality (INST) and Economic Development (ECO_DEV) was 0.788, well within the acceptable range. Similar results were observed in the low institutional quality group. These findings provide further evidence that the constructs employed in the model are empirically dissimilar, thus supporting the validity of the measurement model.

Table 5: HTMT

High Institutions				Low Institutions			
	COR	ECO_DEV	INST		COR	ECO_DEV	INST
COR				COR			
ECO_DEV	0.791			ECO_DEV	0.498		
INST	0.819	0.788		INST	0.555	0.706	
COR x INST	0.102	0.355	0.06	COR x INST	0.156	0.26	0.12

Source: Author's Own Creation

Cross-Loadings

As a final check of discriminant validity, cross-loadings were inspected to ensure that each indicator loads most strongly on its designated construct rather than on alternative constructs. This analysis confirms that indicators are exclusively associated with their proposed latent variable and do not display significant cross-associations.

Results presented in Table 6 demonstrate that all indicators achieved their highest loadings on their respective constructs. For example, in the high institutional quality group), the indicator Government Effectiveness (GOV_Eff) loaded 0.950 on Institutional Quality, compared with substantially lower loadings on Corruption (0.566) and Economic Development (0.524). A similar pattern was observed across all indicators and in the low institutional quality group. These findings confirm that indicators are uniquely associated with their constructs, thereby reinforcing the robustness and discriminant validity of the measurement model.

Table 6: Cross Loadings

High Institutions Countries					Low Institutions Countries				
Constructs	Indicators	COR	ECO DEV	INST	Constructs	Indicators	COR	ECO DEV	INST
COR	CPI	1	0.689	0.589	COR	CPI	1	0.415	0.867
ECO_DEV	GDP_G	-0.121	0.766	-0.07	ECO_DEV	GDP_G	0.07	0.701	0.168
	HDI	0.687	0.998	0.632		HDI	0.385	0.916	0.478
INST	GOV_Eff	0.566	0.524	0.95	INST	GOV_Eff	0.42	0.415	0.939
	POL_STAB	0.549	0.383	0.751		POL_STAB	0.524	0.524	0.79
	REG_QUAI	0.627	0.44	0.917		REG_QUAI	0.544	0.384	0.891
	ROL	0.606	0.503	0.982		ROL	0.577	0.407	0.925
	VOA	0.525	0.39	0.875		VOA	0.405	0.149	0.732

Source: Author's Own Creation

Multicollinearity (outer model)

To assess potential redundancy among indicators, Variance Inflation Factor (VIF) values were calculated. VIF quantifies the extent to which the variance of an indicator is inflated due to correlations with other indicators, with values below 5 considered acceptable (Pallant, 2020).

As reported in Table 7, all indicators across both high- and low-institutional quality groups recorded VIF values well below the cutoff, indicating no serious multicollinearity issues. In the high institutional quality group, Government Effectiveness (GOV_Eff) and Rule of Law (ROL) had the highest VIF values at 3.482 and 4.029, respectively, but remained within acceptable limits. Similarly, in the low institutional quality group, GOV_Eff (4.527) and Regulatory Quality (REG_QUAI) (4.259) also fell below the critical threshold. These results confirm that multicollinearity does not compromise the model, ensuring that each indicator contributes independently to its construct and that subsequent structural model estimates remain stable and reliable.

Table 7: Multicollinearity Diagnosis (VIF)

	High Quality Institution	Low Quality Institutions
CPI	1	1
GDP_G	1.011	1.045
GOV_Eff	3.482	4.527
HDI	1.011	1.045
POL_STAB	1.679	1.773
REG_QUAI	4.001	4.259
ROL	4.029	3.561
VOA	2.608	2.071

Source: Author's Own Creation

Structural Model Results

The structural model was estimated to test the hypothesized associations among Institutional Quality, Corruption, and Economic Development across countries having high and low institutional quality. Assessment included the coefficient of determination (R^2), inner model collinearity (VIF), path coefficients, and the moderating role of Corruption in the Institutional Quality–Economic Development link. Implication of structural paths was tested using bootstrapping with 5,000 resamples. Figure 4 and 5 provide information on bootstrapping results for High and low institutions countries respectively.

Figure 4: High Institutions Countries (Bootstrapping)

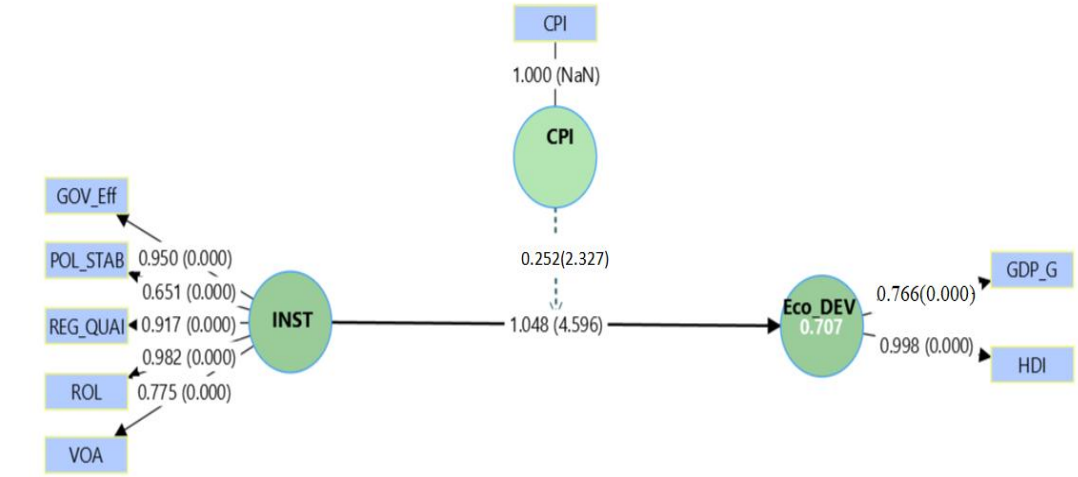
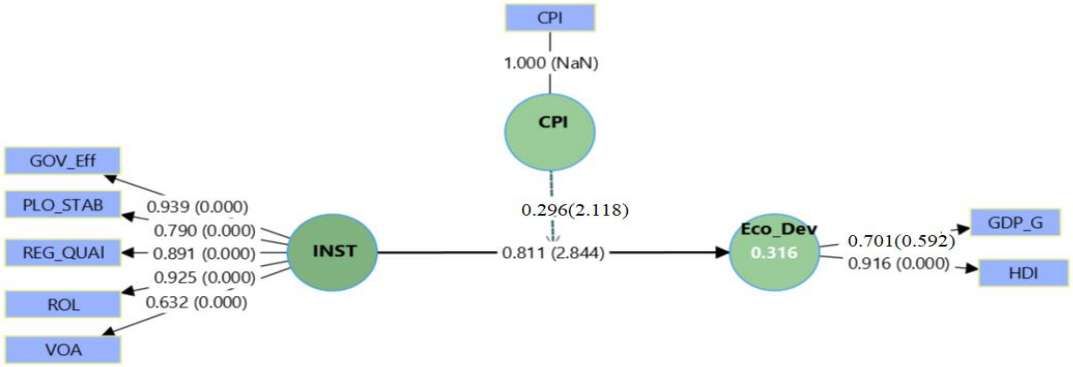


Figure 5: Low Institutions Countries (Bootstrapping)



Source: Author's Own Creation

Coefficient of Determination (R^2)

The coefficient of determination (R^2) measures the percentage of variance in the dependent construct described by its predictors. The present study, R^2 reflects the extent to which Institutional Quality and Corruption jointly explain changes in Economic Development. Following (Hair & Alamer, 2022), R^2 values of 0.75 or higher indicate substantial explanatory power, 0.50 moderate, and 0.25 weak.

As reported in Table 8, the high-institutional quality group recorded an R^2 of 0.707, meaning that 70.7% of the variance in Economic Development is explained by Institutional Quality and Corruption. The adjusted R^2 of 0.691 further confirms strong predictive accuracy, indicating that the model provides substantial explanatory capacity in well-governed contexts.

For the low-institutional quality group, the model produced an R^2 of 0.516,

with an adjusted R^2 of 0.484, reflecting a moderate level of explanatory power. While Institutional Quality and Corruption remain significant determinants of development outcomes in weaker governance contexts, these results suggest that additional unobserved factors may also play an significant role in driving economic development in such environments.

Table 8: R Square

	High Institutions		Low Institutions	
	R-square	R-square adjusted	R-square	R-square adjusted
ECO_DEV	0.707	0.691	0.516	0.484

Source: Author's Own Creation

Effect Size (f^2)

The effect size (f^2) was inspected to estimate the relative contribution of each predictor to the explanatory power of the structural model. Unlike R^2, which reflects overall variance explained, f^2 quantifies the unique impact of each independent variable by assessing changes in R^2 when the predictor is excluded from the model. Following Cohen (1992) guidelines, f^2 values of 0.02, 0.15, and 0.35 are interpreted as small, medium, and large effects, respectively.

As revealed in Table 9, clear differences emerge between high and low institutional quality groups. For high institutional quality countries, Institutional Quality (INST → ECO_DEV) demonstrated a large effect (f^2 = 0.40), underscoring the strong role of governance in driving development outcomes where institutions are already well established. Corruption (COR → ECO_DEV) showed a small effect (f^2 = 0.04), indicating that its direct influence on development is relatively limited in strong institutional contexts. The interaction term (COR × INST → ECO_DEV) yielded a moderate effect (f^2 = 0.15), suggesting that corruption still conditions the governance–development link, even where institutions are robust.

In contrast, effect sizes were more pronounced in low institutional quality countries. Institutional Quality again exhibited a large effect (f^2 = 0.52), highlighting the critical importance of governance reforms in weaker institutional environments. The direct effect of Corruption (f^2 = 0.06) was slightly stronger compared to high-quality countries, reflecting its greater independent role in such contexts. Most notably, the interaction term (COR × INST → ECO_DEV) reached a stronger moderate effect (f^2 = 0.28), indicating that corruption plays a more influential moderating role where institutional structures are weaker.

These results collectively emphasize that while Institutional Quality is the dominant driver of development across contexts, corruption exerts greater conditional influence in governance systems characterized by institutional fragility.

Table 9: f square

Pathway	High Quality Institution	Low Quality Institution	Interpretation
COR → ECO_DEV	0.04	0.06	Small effect, stronger when IQ is low
COR × INST → ECO_DEV	0.15	0.28	Medium effect, stronger in low IQ
INST → ECO_DEV	0.4	0.52	Large effect, especially in low IQ

Source: Author's Own Creation

Inner Model Collinearity (VIF)

Before evaluating the hypothesized relationships in the structural model, it is important to measure the presence of multicollinearity amongst predictor constructs. Excessive collinearity may inflate standard errors, destabilize path coefficient estimates, and obscure the unique effects of predictors on the dependent variable.

In this study, collinearity was examined using the Variance Inflation Factor (VIF). VIF values below 5 are generally considered acceptable in PLS-SEM, indicating no severe multicollinearity concerns (Hair & Alamer, 2022).

As reported in Table 10, all VIF values fell within acceptable ranges for both high- and low-institutional quality groups. In the high institutional quality sample, Institutional Quality (INST) and Corruption (COR) recorded VIF values of 4.791 and 4.824, respectively, relatively higher but still below the cutoff. The interaction term (COR × INST) showed a minimal VIF of 1.016, indicating negligible collinearity. In the low institutional quality group, values were even lower, with INST and COR at 3.716 and 2.754, and the interaction terms at 1.456.

These results confirm the absece of problematic multicollinearity across both governance contexts. The findings ensure that predictors contribute unique explanatory value, allowing reliable interpretation of their individual and interactive effects on Economic Development (ECO_DEV).

Table10: Inner Model-VIF

	High Quality	Low Quality
COR -> ECO_DEV	4.824	2.754
COR x INST -> ECO_DEV	1.016	1.456
INST -> ECO_DEV	4.791	3.716

Source: Author's Own Creation

Path Coefficients and Hypothesis Testing

Path coefficients (β) in the structural model capture the magnitude and direction of relationships among constructs. In this study, they reflect how

Institutional Quality (INST), Corruption (COR), and their interaction (INST × COR) influence Economic Development (ECO_DEV). To test the significance of these associations, a bootstrapping procedure with 5,000 subsamples was applied. Paths were deemed significant if p-values were below 0.05 and confidence intervals excluded zero (Hair & Alamer, 2022).

As shown in Table 15, results for high institutional quality countries indicate that Institutional Quality exerts a positive and significant effect on Economic Development (β = 0.048, t = 4.596, p = 0.001), confirming that robust governance promotes stronger development outcomes. Corruption (CPI) also has a positive and significant effect (β = 0.252, t = 2.327, p = 0.007), suggesting that reductions in corruption (i.e., higher CPI scores) enhance development under strong governance. Importantly, the interaction term (COR × INST → ECO_DEV) is significant and positive (β = 0.043, t = 2.703, p = 0.002), representing that lower corruption amplifies the beneficial influence of institutional quality on development in these settings.

For countries with low institutional quality, the results disclose similar relationships but with stronger magnitudes. Institutional Quality shows a large and significant positive effect (β = 1.811, t = 2.844, p = 0.004), underscoring the critical role of institutional reform in weaker governance contexts. Corruption again exerts a positive and significant effect (β = 0.296, t = 2.118, p = 0.009), suggesting that even modest reductions in corruption support development when institutional frameworks are fragile. The interaction effect (COR × INST → ECO_DEV) is also significant (β = 0.091, t = 2.213, p = 0.007), demonstrating that lowering corruption substantially strengthens the positive role of institutions in promoting development in weak governance environments.

Taken together, these findings offer robust support for both hypotheses:

H1: Institutional Quality positively affects Economic Development.

H2: Corruption moderates the Institutional Quality–Economic Development relationship, such that the effect of Institutional Quality is stronger when corruption is lower (higher CPI).

A full summary of the path coefficients, t-values, and p-values is presented in Table 11.

Table 11: Path Coefficients and Hypothesis Testing

	High Institution Countries				Low Institutions Countries			
Hypothesis	**Path**	**B**	**p-value**	**t-value**	**B**	**p-value**	**t-value**	**Result**
H1: Institutional Quality positively affects Economic Development.	INST → ECO_DEV	0.048	0.001	4.596	1.811	0.004	2.844	Supported
H2: Corruption moderates the association among Institutional Quality and Economic	COR × INST → ECO_DEV	0.043	0.002	2.703	0.091	0.007	2.213	Support (Moderation Effect)

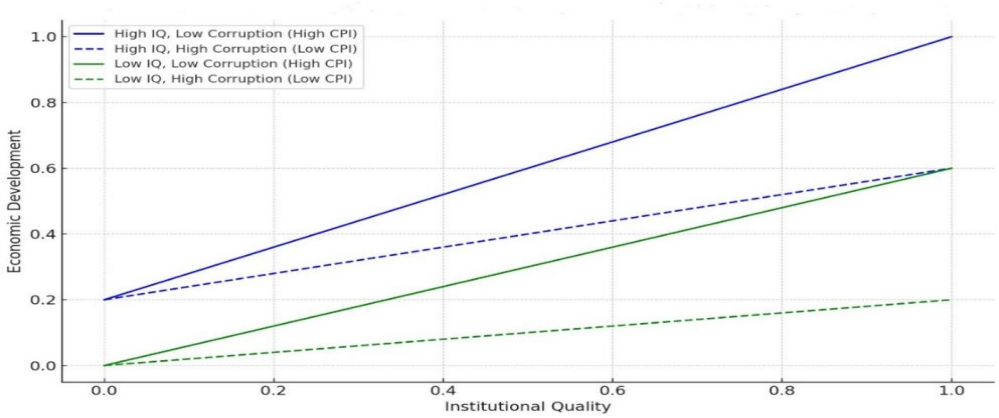
Development.								
Exploratory: Corruption positively influences Economic Development.	COR → ECO_DEV	0.252	0.007	2.327	0.296	0.009	2.118	Supported

Source: Author's Own Creation

Moderation Plot Interpretation

To further study the moderating effect of corruption on the Institutional Quality–Economic Development relationship, interaction plots were analyzed. These visualizations illustrate how the strength of the relationship varies with changes in corruption, as measured by the Corruption Perceptions Index (CPI). As presented in Figure 6, countries with stronger institutional frameworks demonstrate a steeper slope in the Institutional Quality–Economic Development relationship at higher CPI scores. This indicates that lower corruption levels enhance the positive effect of institutional performance on development outcomes. Put differently, in low-corruption environments, institutional reforms translate more effectively into improved economic performance, whereas in higher-corruption contexts, the developmental benefits of institutional quality are diminished.

Figure 6: Moderating Effect of Corruption on Institutional Quality–Development Link



In countries with weaker institutional foundations, the moderating influence of corruption is particularly pronounced. The interaction plots show that at higher CPI levels—indicating lower corruption—the positive association between institutional quality and economic development strengthens substantially. Conversely, in highly corrupt environments (lower CPI scores), the developmental gains from institutional reforms are significantly constrained. This highlights the compounded challenges faced by low-institutional-quality countries, where corruption not only suppresses economic growth directly but also undermines the

effectiveness of governance reforms.

These findings reinforce the view that the developmental benefits of institutional quality are contingent upon the level of corruption. Reducing corruption increases the positive effects of governance improvements in both high- and low-institutional-quality settings. Overall, the study contributes to a deeper understanding of how governance and corruption jointly shape development outcomes. It confirms that while institutional quality remains a critical driver of progress, its impact is conditioned by corruption levels. Importantly, the results underscore the requirement for governance and anti-corruption reforms tailored to each country's institutional context to achieve sustained and meaningful development.

DISCUSSION

This study examines how institutional quality, corruption, and their interaction shape economic development across countries with varying governance capacities. By situating the findings within established theoretical frameworks and prior empirical evidence, the discussion highlights both the consistency and novelty of the results.

Institutional Quality and Economic Development

The results confirm that institutional quality significantly and positively influences economic development in both strong and weak governance contexts. In high-quality institutional settings, the estimated path coefficient ($\beta = 0.048$, $t = 4.596$, $p = 0.001$) illustrates that robust institutional frameworks foster superior development outcomes. This finding resonates with the New Institutional Economics framework (North, 1990), which underscores the role of formal rules and credible enforcement in reducing transaction costs and facilitating productive activity. Similarly, Acemoglu et al. (2005) emphasize that inclusive institutions, characterized by secure property rights and impartial rule enforcement, underpin sustained economic growth. Hall and Jones (1999) likewise attribute much of cross-country productivity variation to the quality of social infrastructure.

In low-institutional quality countries, institutional quality remains a significant driver of development but with greater magnitude ($\beta = 1.811$, $t = 2.844$, $p = 0.004$). Incremental improvements in governance thus generate disproportionately large developmental returns in weaker states. This supports Uddin et al. (2023), who found that governance reforms in developing economies can dramatically alter growth trajectories. It also aligns with Kaufmann et al. (2009), who stress the developmental potential of even modest institutional improvements in fragile contexts.

The Role of Corruption

Corruption, measured inversely through the Corruption Perceptions Index (CPI), shows a consistent negative effect on development across governance contexts. In high-quality institutional settings, the positive coefficient for CPI ($\beta = 0.252$, $t = 2.327$, $p = 0.007$) indicates that reducing corruption enhances development

outcomes. In low-quality contexts, the effect is stronger (β = 0.296, t = 2.118, p = 0.009), highlighting the amplified costs of corruption where institutions are fragile.

These findings are consistent with Mauro (1995), who demonstrated that corruption deters investment and impedes growth, and Gupta et al. (2003), who showed its distortionary impact on public spending in health and education. Treisman (2000) also emphasized how corruption undermines service delivery and erodes trust in institutions, constraining long-term growth potential.

Moderating Role of Corruption

The analysis confirms that corruption moderates the institutional quality–development relationship. The interaction term is statistically significant in both governance contexts, underscoring that corruption conditions the developmental returns to institutional reform.

In high-quality institutional environments, the moderation effect (β = 0.043, t = 2.703, p = 0.002) suggests that reducing corruption enhances the efficiency of governance, consistent with the 'sand the wheels' hypothesis (Aidt, 2009; Méon & Weill, 2010). Corruption in such settings primarily undermines policy enforcement, weakens credibility, and diverts resources away from productive uses.

In low-quality institutional environments, the moderation effect is larger (β = 0.091, t = 2.213, p = 0.007). Here, corruption not only directly obstructs development but also undermines the potential benefits of governance reform. This finding corroborates (Beyaert et al., 2023; López-Gómez, 2023), who argue that the developmental impact of corruption is particularly severe in fragile governance systems.

Overall, the discussion confirms that both institutional quality and corruption are central determinants of development, with their interaction playing a decisive role in shaping outcomes.

CONCLUSION, RECOMMENDATIONS, AND LIMITATIONS

This study investigated how institutional quality influences economic development, and how corruption moderates this relationship, using cross-sectional data from 130 countries spanning 2014, 2017, 2020, and 2023. Employing PLS-SEM, the analysis confirmed three central findings:

1. Institutional quality positively affects economic development in both strong and weak governance contexts.

2. Corruption reduction (higher CPI scores) is associated with improved development outcomes.

3. Corruption moderates the institutional quality–development relationship, with lower corruption amplifying the benefits of institutional reforms, particularly in countries with weak governance.

The results contribute to the literature on institutional economics by confirming the foundational role of governance (Acemoglu et al., 2005; North, 1990) and by advancing the understanding of corruption's role as a moderator. They

strongly support the 'sand the wheels' perspective, indicating that corruption undermines institutional functionality and constrains development.

Policy Recommendations

- Strengthen institutional foundations: Improving government effectiveness, regulatory quality, and rule of law remains critical for fostering sustainable development.
- Prioritize anti-corruption strategies: Reducing corruption is essential for maximizing the developmental returns of institutional reforms, particularly in fragile governance environments.
- Adopt a dual approach: Governance reforms and anti-corruption efforts should be pursued in tandem, as one without the other risks diminishing developmental impact.
- Tailor reforms to institutional context: Strategies must be sensitive to whether countries face strong or weak governance foundations, as the interaction with corruption differs across contexts.

Methodological Contributions

The study also demonstrates the usefulness of moderation analysis within PLS-SEM, enabling exploration of complex governance relationships often overlooked in regression-based models. By operationalizing corruption as a moderator, the study highlights interaction effects critical for understanding governance–development dynamics.

Limitations and Directions for Future Research

Despite its contributions, the study faces limitations:

- Perception-based data: Reliance on indices such as WGI and CPI may not fully capture on-the-ground realities of governance.
- Cross-sectional design: The use of four time points constrains the ability to establish causal dynamics over time.
- Lack of sectoral or subnational analysis: Future research could explore variation across sectors (e.g., health, education) or regions within countries.

Future work should employ longitudinal designs, examine regional case studies, and disaggregate institutional and corruption measures at sectoral levels to provide richer policy insights.

Final Remark

The evidence presented underscores that robust institutional frameworks are indispensable for economic growth, but their potential is only realized when corruption is effectively controlled. The results highlight the necessity of synchronized governance and anti-corruption reforms to achieve lasting and inclusive development progress.

REFERENCES

Acemoglu, D., Johnson, S., & Robinson, J. (2005). The rise of Europe: Atlantic trade, institutional change, and economic growth. *American economic review, 95*(3), 546-579.

Acemoglu, D., & Robinson, J. (2012). Institutions, political economy and growth.

Nobel prize 2012 presentations.
Aidt, T. S. (2009). Corruption, institutions, and economic development. *Oxford review of economic policy, 25*(2), 271-291.
Beyaert, A., García-Solanes, J., & Lopez-Gomez, L. (2023). Corruption, quality of institutions and growth. *Applied economic analysis, 31*(91), 55-72.
Cohen, J. (1992). Statistical power analysis. *Current directions in psychological science, 1*(3), 98-101.
Emara, N., & El Said, A. (2021). Sovereign ratings, foreign direct investment and contagion in emerging markets: Does being a BRICS country matter? *International Journal of Finance & Economics, 26*(4), 5217-5234.
Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of marketing research, 18*(1), 39-50.
Gupta, S., Verhoeven, M., & Tiongson, E. R. (2003). Public spending on health care and the poor. *Health economics, 12*(8), 685-696.
Hair, J., & Alamer, A. (2022). Partial Least Squares Structural Equation Modeling (PLS-SEM) in second language and education research: Guidelines using an applied example. *Research Methods in Applied Linguistics, 1*(3), 100027.
Hall, R. E., & Jones, C. I. (1999). Why do some countries produce so much more output per worker than others? *The quarterly journal of economics, 114*(1), 83-116.
Henseler, J., Dijkstra, T. K., Sarstedt, M., Ringle, C. M., Diamantopoulos, A., Straub, D. W., . . . Calantone, R. J. (2014). Common beliefs and reality about PLS: Comments on Rönkkö and Evermann (2013). *Organizational research methods, 17*(2), 182-209.
Herrala, R. (2024). *A comparative look at the economic and environmental performances of India and China*. Retrieved from
Hoinaru, R., Buda, D., Borlea, S. N., Văidean, V. L., & Achim, M. V. (2020). The impact of corruption and shadow economy on the economic and sustainable development. Do they "sand the wheels" or "grease the wheels"? *Sustainability, 12*(2), 481.
Hunjra, A. I. (2025). The green intentions of capital: How green finance is changing the boundaries of corporate sustainability strategies. *Journal of Environmental Management, 390*, 126362.
Huntington, S. (1968). P.(1968). *Political order in changing societies*.
Jetter, M., & Parmeter, C. F. (2018). Sorting through global corruption determinants: Institutions and education matter–Not culture. *World development, 109*, 279-294.
Kaufmann, D., Kraay, A., & Mastruzzi, M. (2009). Governance matters VIII: aggregate and individual governance indicators, 1996-2008. *World bank policy research working paper*(4978).
Knack, S., & Keefer, P. (1995). Institutions and economic performance: cross-country tests using alternative institutional measures. *Economics & politics, 7*(3), 207-

227.
Leff, N. H. (1964). Economic development through bureaucratic corruption. *American behavioral scientist, 8*(3), 8-14.
Lewis, W. A. (1954). Economic development with unlimited supplies of labour.
López-Gómez, L. (2023). On the relationship between income and control of corruption in the Eurozone. *The European Journal of Comparative Economics (EJCE), 20*(1), 3-37.
Mauro, P. (1995). Corruption and growth. *The quarterly journal of economics, 110*(3), 681-712.
Mauro, P. (2004). The persistence of corruption and slow economic growth. *IMF staff papers, 51*(1), 1-18.
Méon, P.-G., & Weill, L. (2010). Is corruption an efficient grease? *World development, 38*(3), 244-259.
Mini, L., Moyo, C., & Phiri, A. (2025). Governance, institutional quality and economic complexity in selected African countries. *International Journal of Economic Policy Studies, 19*(1), 159-181.
North, D. C. (1990). *Institutions, institutional change and economic performance*: Cambridge university press.
Pallant, J. (2020). *SPSS survival manual: A step by step guide to data analysis using IBM SPSS*: Routledge.
Pickett, K. E., & Wilkinson, R. G. (2015). Income inequality and health: a causal review. *Social science & medicine, 128*, 316-326.
Rodrik, D., Subramanian, A., & Trebbi, F. (2004). Institutions rule: the primacy of institutions over geography and integration in economic development. *Journal of economic growth, 9*(2), 131-165.
Sarstedt, M., Ringle, C. M., & Hair, J. F. (2017). Treating unobserved heterogeneity in PLS-SEM: A multi-method approach *Partial least squares path modeling: Basic concepts, methodological issues and applications* (pp. 197-217): Springer.
Sen, A. (2014). Development as freedom (1999). *The globalization and development reader: Perspectives on development and global change, 525*.
Shleifer, A., & Vishny, R. W. (1993). Corruption. *The quarterly journal of economics, 108*(3), 599-617.
Smith, A. (1776). An inquiry into the nature and causes of the wealth of nations: Volume One: London: printed for W. Strahan; and T. Cadell, 1776.
Solow, R. M. (1956). A contribution to the theory of economic growth. *The quarterly journal of economics, 70*(1), 65-94.
Stryzhak, O., Tupa, M., & Rodzik, J. (2022). Relationship between the level of human development and institutional quality.
Svensson, J. (2005). Eight questions about corruption. *Journal of economic perspectives, 19*(3), 19-42.
Treisman, D. (2000). The causes of corruption: a cross-national study. *Journal of public economics, 76*(3), 399-457.
Uddin, I., Ahmad, M., Ismailov, D., Balbaa, M. E., Akhmedov, A., Khasanov, S., &

Haq, M. U. (2023). Enhancing institutional quality to boost economic development in developing nations: New insights from CS-ARDL approach. *Research in Globalization, 7*, 100137.

Wold, H. (1975). Soft modelling by latent variables: the non-linear iterative partial least squares (NIPALS) approach. *Journal of Applied Probability, 12*(S1), 117-142.