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INVESTIGATING THE IMPACTS OF INFRASTRUCTURE, ECONOMIC FREEDOM, AND INDUSTRIALIZATION ON ECONOMIC GROWTH IN PAKISTAN

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Abstract
This study examines the short-run and long-run empirical impacts of economic freedom, infrastructure, trade, industrialization, and FDI on economic growth in Pakistan using data for the period of 1990-2024. The study confirms the stationarity of all variables through ADF and PP unit root tests. All variables are found stationary at the first difference. The F-Bounds test validates the presence of cointegration in the model. To capture short-run and long-run estimates, the study employed the ARDL regression approach. Findings reveal that all explanatory factors have a positive and significant impact on economic growth. The error correction term confirms the presence of long run stable equilibrium in the model. Results highlight the favorable role of growing economic freedom, infrastructure development, enhancing industrialization, encouraging exports, and attracting FDI inflows to improve economic growth in Pakistan. The study advocates improving infrastructure, economic freedom, trade, FDI inflows, and growing industrialization for rapid economic growth in Pakistan.
Keywords: Economic Growth, Economic Freedom, Infrastructure, Trade, Foreign Direct Investment, Industrialization

INTRODUCTION

Achieving human socioeconomic well-being becomes possible through advancing economic growth. Rise in economic growth supports humans in improving their skills and productive efficiency as well (Nabi et al., 2023). For individuals, taking a well-structured economic plan is important to meet basic needs and even many wishes People have. Meanwhile, for a developing economy, such planning must be much more inclusive and wide-ranging in its scope to effectively deliver to its entire population (Zeng and Zhou, 2021; Biggeri and Mauro, 2018; Ditta et al., 2025).

Regardless of historical or modern circumstances, economic growth is still a basic necessity for any nation and is essential to maintaining continuous social development and advancement (Willy, 2018; Okikiola, 2022; Ali et al., 2025). Every level of government is allocating a sizeable amount of its overall spending and public funds to accomplishing economic goals, emphasizing how essential building the country's economy is to the growth and progress. Numerous studies unequivocally show that the population of a country will have access to a wider range of resources and services the more it spends on its economic goals (Gyamfi et al. 2024; Khalid & Abdul, 2025; Khan et al., 2025). Literature has highlighted poor infrastructure, lack of economic freedom, weak industrialization, and low FDI as significant factors that are hindering economic performance worldwide (Rasaq, 2019; Owusu-Manu et al., 2019; Kumar & Wu, 2025; Njoya et al., 2025; Aqeel et al., 2025).

Infrastructure development also performs a key role in the economic performance of a country by acting as a factor for productivity and growth (Ahmed et al., 2020; Jafri et al., 2021; Hanvoravongchai & Paweenawat, 2025; Wim & Wendy, 2025). Infrastructure development includes various sub-categories (e.g., energy, education, telecommunication, and transportation), which all help in attaining economic growth through better energy resources, better qualified and skilled labor, digital support, and efficient market access.

Literature also emphasized on appropriate environment to perform business activities timely and efficiently and this becomes possible with sufficient level of economic freedom which contributes to economy and its population by increasing employment opportunities, enhancing investment possibilities, rising living standard of people, reducing overall inequality in the economy (Audretsch and Fiedler, 2022; Ali & Audi, 2023; Štilić, et al. 2023; Iqbal & Noman, 2025). Economic freedom is based on different aspects, including the role of government to make the economy efficient through fiscal and monetary measures, tax structures, security of private property rights,

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CJSSR
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Vol.03 No.04 (2025)

political stability, law and order condition, and human welfare (Marc, 2011; Rode and Coll, 2012; Santiago, 2020; Marc et al., 2021; Soliman, 2025).

The significance of effective industrialization is also considered an important factor in economic growth. Industrialization ensures creating employment opportunities, producing market-competitive output, and export promotion (Marc, 2011; Malah et al., 2023; Liu & Cai, 2025). For such efficient industrialization government plays its crucial role to provide critical technological requirements, build suitable infrastructure, and ensure the timely availability of necessary facilities (Wang et al. 2023; Carlo, 2025).

Trade and foreign direct investment contribute to promoting economic growth through uplifting technological transfer, productive potential of the economy, and quality-based improved output (Dempere et al., 2023; Zaman et al., 2021; Sadashiv, 2023). FDI enhances managerial effectiveness, capital investment, and technological innovation that encourage and expand domestic production and help in long-run economic growth. Likewise, trade expansion supports economies to increase multiple exports, intensive global market access, and better competitiveness. Jointly, trade and FDI improve the economy by growing productivity, employment, and sustained economic growth.

This study examines the empirical factors of economic growth in Pakistan. The various contributing macroeconomic indicators determine a country's economic development and growth, including: foreign direct investment (FDI) inflows, trade (TR), natural resources, inflation, income inequality, industrialization, infrastructure and economic freedom, (Majeed and Ayub, 2018; Sheikh & Ahmad, 2020; Majeed, et al. 2021; Rehman et al., 2021; Nasir, 2022; Ali and Khan, 2023; Fateh & Poulin, 2025). These indicators are important in determining a country's social, economic, industrial, and agricultural development. In Pakistan, the formerly neglected manufacturing industry has been transformed into an economic lifeline. The adoption of economic freedom policies significantly enhances the trading system, hence consolidating Pakistan's historical growth (Sabra, 2022; Razzaq, 2024). These factors are thoroughly examined to determine their influence on economic growth in Pakistan (Zahid, 2018; Bashir & Rashid, 2019; Mahmood et al., 2022).

Unluckily, Pakistan is one of the countries in the world that has not achieved the desired degree of development. To foster growth and sustained development, the government and relevant institutions focused on policies that promote strong industrial growth, because a vigorous industrial sector has great potential to decrease poverty, provide jobs, and result in better economic outcomes generally. However, assessing the effects of industrial expansion on the attention sector is critical. Industrial expansion has had a considerable and strong impact on output acquisitions in specific industrial subsectors (Iqbal & Raza, 2018; Khan and Majeed, 2023). The strong link between growth in industry and economic growth is widely documented in the economic literature (Perveez, 2019; Hussain et al., 2021). Hence, this study evaluates the empirical impact of economic freedom policies, infrastructure, industrialization, trade openness, and FDI on economic growth in Pakistan.

OBJECTIVES OF THE STUDY

This study examines the determinants of economic growth, including economic freedom, industrialization, infrastructure, and FDI in Pakistan. The following are the key objectives of the study.

- To investigate the influence of economic freedom on economic growth in Pakistan.
- To analyze the impact of industrialization on economic growth in Pakistan.
- To examine the impact of infrastructure on economic growth in Pakistan.
- To assess the linkage of trade with economic growth in Pakistan.
- To examine the influence of FDI on economic growth in Pakistan.
- To suggest policy recommendations based on empirical estimations to improve economic growth in Pakistan.

LITERATURE REVIEW

Timilsina et al. (2024) investigated the impact of infrastructure on economic growth for a panel of developing and developed economies using data for the time span of 1992 to 2017. The study employed the PMG technique to estimate long-run coefficients. Findings revealed that infrastructure development positively influenced the economic growth, particularly through power generation and telecommunication infrastructure. However, such contribution of infrastructure to growth economies was higher in developing nations as compared to advanced economies. The study suggested boosting infrastructure, particularly in developing countries, to make their production processes more efficient and ultimately attain economic growth.

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Hussain and Haque (2016) examined the effects of the economic freedom index on economic growth in the global context for 186 economies. The dataset was employed for the time period of 2013-2015 for a total of 186 nations, while the time period of 2004 to 2014 for a selected 57 countries. Economic freedom was based on multiple dimensions, including trade, institutions, labor, business, and finance. Results of both datasets showed a significant supportive role of economic freedom in improving economic growth. Zaman et al. (2021) evaluated the role of capital formation, IT exports, FDI, and trade on economic growth in Belt and Road (BRI) nations using data for the period of 2013-2018. The study used the GMM approach to calculate long-run linkages among variables. The outcomes of the study showed that capital formation had a positive and significant link with economic growth, while IT exports and trade had a negative and insignificant association with economic growth. Entirely, the study evidenced the economic contribution of China's FDI outflows toward BRI nations. Bello et al. (2023) evaluated the impact of FDI. Inflation, unemployment, and ICT on inclusive growth using data for the period of 2005-2020 in the context of Sub-Saharan African (SSA) nations. Using the GMM method. Results showed the supportive economic contribution of FDI when ICT diffusion attained its threshold. The impact of unemployment and inflation was adverse for inclusive growth. The study suggested improving FDI and ICT diffusion while controlling the inflation rate and improving employment opportunities in SSA nations.

Dempere et al. (2023) investigated the influence of innovation and FDI on economic growth in 120 global economies. Regression analysis revealed a positive and significant link between FDI and innovation for enhancing economic growth in the global context, while also explaining the insignificant association between FDI and innovation. The study recommended promoting FDI flows and innovation to boost economic growth. Aluko et al. (2023) explored the mediating impact of economic freedom on the nexus of FDI and economic growth in 41 African economies using data for the time span of 2000-2017. By applying Seo and Shin's sample splitting approach, the study calculated the threshold level of economic freedom that influenced the FDI and growth linkage. Results revealed that countries that are below that threshold level of economic freedom had no significant economic outcomes of FDI, while in countries where economic freedom was above the threshold level, their FDI helped in improving economic growth. Ciftci et al. (2022) investigated the causal linkages between FDI, economic freedom, and economic growth for a dataset of 1995-2019 in the case of FDI-attracting nations. By applying the panel Granger causality method, results showed that the aggregate of economic freedom had no link with FDI and economic growth. However, sub-categories of economic freedom indicated varying impacts for each economy to improve FDI and economic growth.

Hung et al. (2024) analyzed the linkage between economic freedom and economic growth using data for the period of 2008-2022. Regulatory quality was considered for estimating the role of economic freedom. Findings show a positive impact of economic freedom on economic growth despite levels of regulatory quality. Hence study advocated economic freedom to uplift economic growth. Yadav et al. (2024) explained the impact of FDI on economic growth in G20 countries employing data from 2000 to 2019. Findings showed that FDI alone has no significant role for economic growth, while the interactive impact of FDI and ICT contributed positively and significantly to enhance economic growth in G20 nations. Lawson et al. (2024) investigated the linkage of economic freedom with income, growth, inequality, and investment using multiple dimensions of each variable and data taken from selective research articles. Findings revealed that economic freedom was significant favorable factor of economic growth and investment. However, inequality did not receive any valuable influence from economic freedom. The study suggested enhancing economic freedom to improve economic growth.

Sarania (2021) evaluated the influence of trade, infrastructure, FDI, and capital formation on economic growth in India using data from 1970 to 2018. The study used the ARDL method to capture empirical linkages of explanatory factors with economic growth. Based on causality estimations, the study found a significant bidirectional linkage between infrastructure and economic growth. Long-run estimates validated the significant impact of trade openness and infrastructure on economic growth in India, emphasizing infrastructure development for sustained growth. Shikur (2024) investigated the factors influencing FDI inflows in African economies using data from 2007 to 2018. Using the GMM approach, results showed a positive link between economic freedom, market size, infrastructure, and financial development with FDI inflows. The study considered FDI as a fundamental source of economic growth in African nations. Development of investment friendly environment was also considered critical for overall economic development.

Apurv and Uzma (2021) analyzed the linkage of infrastructure investment in GDP growth in BRICS nations using panel data for the duration of 1980-2017. The study employed panel and time series methods to conduct regression analysis for the individual BRICS economies and as a group of BRICS economies. Findings showed mixed

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CJSSR
CONTEMPORARY JOURNAL OF SOCIAL SCIENCE REVIEW
Vol.03 No.04 (2025)

linkages, as infrastructure investment had no significant link with economic growth in the case of South Africa and Brazil. While improvements in transport and energy infrastructure led to an increase in economic growth in Russia. The relationship between telecommunication infrastructure and economic growth was found to be negative in India. In the case of China, transport infrastructure had a negative link with economic growth. Panel estimations revealed a positive relationship between energy infrastructure and economic growth, while a negative link between telecommunication infrastructure and economic growth.

Adeniyi et al. (2024) conducted a review to evaluate the role of infrastructure investment in improving economic growth in the United States. The study concluded that promoting infrastructure investment enhanced competitiveness and productivity. Hence, the study suggested overcoming the infrastructure gap for attaining sustainable growth in the United States. Sun and Kauzen (2023) examined the impact of seaport infrastructure on economic development in Tanzania using data for the time span of 2005-2017. The findings showed a positive linkage between seaport infrastructure and economic growth. Additionally direct link between external trade and economic growth was also found. Therefore, the study suggested improving transport infrastructure and the efficient implementation of seaport-related policies for enhancing economic growth. Dang and Trinh (2025) analyzed the linkage of economic freedom on increasing FDI inflows in the six selected Southeast Asian economies for the dataset of the period 1995-2022. Applying fixed and random effects models, the study found a significant favorable role of economic freedom in boosting FDI inflows. However, sub-categories of economic freedom had different implications for FDI. Findings revealed a positive link between financial and trade freedom on FDI inflows, while monetary freedom hurt FDI inflows. The study advocated improving, particularly, trade and financial freedom to uplift FDI inflows in Southeast Asia.

DATA AND METHODOLOGY

The study examines the short-run and long-run impact of economic freedom, infrastructure, trade, industrialization, and FDI on economic growth in Pakistan, using time series data for the time period of 1990-2024.

The functional form of the models of the study is given below in equation 1.

$$EG = f(ECFR, INFR, TR, IND, FDI) \quad \text{Eq.1}$$

Econometric representation for the model is given in equation 2.

$$EG_{it} = \alpha_0 + \beta_1 ECFR_t + \beta_2 INFR_t + \beta_3 TR_t + \beta_4 IND_t + \beta_5 FDI_t + \varepsilon_t \quad \text{Eq. 2}$$

Whereas, in equation 2 α_0 is a constant term, β represents coefficients, and ε is the error term.

VARIABLE DESCRIPTION

Economic growth is a dependent variable, while independent variables include economic freedom, infrastructure, trade, industrialization, and FDI. Data for economic growth, trade, industrialization, and FDI are taken from World Development Indicators (WDI), published by the World Bank. While data for economic freedom is taken from www.heritage.org. Data for infrastructure is obtained from economic survey of Pakistan (various issues). Infrastructure includes energy infrastructure, educational infrastructure, transport infrastructure, and telecommunication infrastructure. Table-1 provides variable descriptions in detail.

Table 1: Variable Description

Variables	Symbol	Proxy Used	Data Source
Economic Growth	EG	GDP Per Capita	World Bank
Economic freedom	ECFR	Economic Freedom Index	Heritage Foundation
Infrastructure	INFR	energy infrastructure, educational infrastructure, transport infrastructure, and telecommunication infrastructure	Economic Survey of Pakistan
Trade	TR	Trade (% of GDP)	World Bank
Industrialization	IND	Industry (including construction), value added (% of GDP)	World Bank
Foreign Direct Investment	FDI	FDI net inflows (BoP, current US$)	World Bank

RESULTS AND DISCUSSIONS

This section provides findings of unit root tests, cointegration tests, regression analysis, and causality analysis.

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CJSSR
CONTEMPORARY JOURNAL OF SOCIAL SCIENCE REVIEW
Vol.03 No.04 (2025)

Table 2: Unit Root Tests

Variables	ADF Test		Phillips-Perron Test	
	Level	1st Difference	Level	1st Difference
EG	-2.6142 (0.276)	-4.741*** (0.003)	-1.846 (0.659)	-4.751*** (0.003)
ECFR	-2.637 (0.267)	-5.533*** (0.000)	-2.465 (0.342)	-9.688*** (0.000)
INFR	-0.523 (0.977)	-5.697 *** (0.000)	-0.519 (0.977)	-5.697*** (0.000)
TR	-2.192 (0.478)	-5.752*** (0.000)	-2.311 (0.417)	-5.752*** (0.000)
IND	-2.197 (0.475)	-5.865*** (0.000)	-2.251 (0.447)	-5.865*** (0.000)
FDI	-3.057 (0.132)	-4.023** (0.017)	-2.320 (0.412)	-3.768** (0.031)

,* significant at 5% and 1% level respectively

To check the stationarity in the variables, Augmented Dickey Fuller (ADF) and Phillips-Perron (PP) tests are employed. Results of both tests are shown in Table 2, which presents t-statistics and probability values for each variable at the level and first difference. Both unit root tests showed similar results. All variables are found stationary at first difference at a 1 percent significance level, except FDI, which is stationary at 5 percent.

Table 3: F-Bounds Test

	Value	K
F-statistic	**7.352*** **	5
Critical Value Bounds		
Significance Level	I(0) Bound	I(1) Bound
10%	1.81	2.93
5%	2.14	3.34
2.5%	2.44	3.71
1%	2.82	4.37

*** significant at 1% level.

The ARDL bounds testing method was applied to evaluate the existence of a long-term cointegration linkage among the variables, given in Table 3. The calculated F-statistic is 7.352, which is greater than the upper critical bounds value at all significance levels (e.g., upper bound = 4.37 at 1% level). Since F-statistic > I(1) bound, the null hypothesis of no long-term linkage is strongly rejected at the 1% significance level. This validates that the variables exhibit a stable and statistically significant long-term cointegration association. In other words, long-term dynamics exist among explanatory factors (K = 5), showing that changes in the regressors have a persistent long-term impact on economic growth. Hence, it is appropriate to proceed with estimating both long-run coefficients and the associated error-correction model (ECM) to capture short- and long-term adjustments.

The long-run ARDL findings (Table-4) show that all key determinants of economic growth, including economic freedom, infrastructure development, trade, industrialization, and FDI, positively and significantly influence economic growth in Pakistan. Economic freedom shows a moderate but significant positive impact, highlighting that improvements in property rights, regulatory quality, and business environment support long-term growth. Infrastructure development exerts one of the valuable effects, emphasizing the crucial role of energy, transport, telecommunications, and educational infrastructure in enhancing productivity. Trade also positively influences growth, signifying that greater integration into world markets boosts competitiveness, technology transfer, and economic prosperity. Results also show a positive impact of industrialization on economic growth, which highlights the significance of the manufacturing sector in promoting economic output. The coefficient value of industrialization is 0.83, which depicts that a one percent increase in industrialization brings a 0.83 percent increase

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in economic growth. Similarly, FDI has a positive impact with 0.99 coefficient values at a 1 percent significance level, showing the importance of FDI inflows in improving economic growth. Overall, outcomes concluded a favorable role of ease of doing business, growing infrastructure, upgrading industrialization, and encouraging FDI for enhancing economic growth in Pakistan.

Table 4: ARDL Regression Estimates

Variables	Coefficients	Std. Error	t-Statistic	Prob.
C	1.156971	0.139757	8.278451	0.0000***
ECFR	0.225508	0.088424	2.550295	0.0179**
INFR	0.7744	0.088424	8.758830	0.0000***
TR	0.386870	0.149439	2.588806	0.0225**
IND	0.837956	0.182921	4.580973	0.0005***
FDI	0.990972	0.172374	5.748960	0.0001***

,* significant at 5% and 1% respectively

Table 5: Short-Run Estimates

ECM Regression				
Variables	Coefficients	Std. Error	t-Statistic	Prob.
D(EG(-1))	1.786300	0.196461	9.092395	0.0697*
D(EG(-2))	0.531358	0.189965	2.797131	0.0143**
D(EG (-3))	0.599863	0.198924	3.015542	0.0093***
D(ECFR)	0.286440	0.149672	1.913790	0.0779*
D(ECFR(-1))	0.693480	3.367081	0.205959	0.8398
D(ECFR(-2))	0.070714	0.037326	1.894465	0.0708*
D(ECFR(-3))	-0.092223	0.033696	-2.736885	0.0118**
D(INFR)	0.626718	0.378625	1.655248	0.1115**
D(INFR(-1))	1.515099	0.209526	7.231094	0.0000***
D(IND)	-0.692059	0.302488	-2.287891	0.0299**
D(IND(-1))	0.624938	0.183434	3.406888	0.0027***
D(IND(-2))	-0.055823	0.022269	-2.506775	0.0205**
D(FDI)	0.491008	0.287232	1.709452	0.0984*
D(TRADE)	0.010528	0.005679	1.853861	0.0779*
D(TRADE(-1))	0.160912	0.049058	3.280042	0.0036***
CointEq(-1)	-0.149122	0.073516	-2.028430	0.0504**
R-Squared	0.783	Adjusted R-Squared	0.714	
F-statistic	86.471	Prob. (F-Statistic)	0.000***	
D.W Stat	2.161			

*,**,*** significant at 10%, 5% and 1% level respectively

The short-run ARDL–ECM outcomes are given in Table 5, showing short term impacts of explanatory factors and the equilibrium of the model. All the explanatory variables reveal a positive influence on economic growth in the short run. ECM value is -0.149 with a 5 percent significance level, and this negative value states 14 percent convergence in one short-term period toward the long term equilibrium. R-squared value (0.783) highlights that changes in the dependent variable (economic growth) are 78 percent caused by the explanatory variables that are included in the model. Additionally, D.W value 2.16 explains that there is no autocorrelation in the model. Statistically significant F-Statistic depicts the reliability of the model.

CONCLUSION AND POLICY SUGGESTIONS

This research evaluates the empirical influence of economic freedom, infrastructure, trade, industrialization, and FDI on economic growth in Pakistan. The study used a dataset for the period of 1990-2024. The findings of the unit root tests show that all the variables are stationary at the first difference, and the F-Bounds test confirms the presence of cointegration in the model. Empirical findings of ARDL regression analysis reveal that all independent variables have a positive and significant link with economic growth in Pakistan. Furthermore, short-run results validate the presence of equilibrium in the model. Based on the findings, the study suggests the following policy implications to improve economic growth in Pakistan. The Government of Pakistan should improve infrastructure

for higher economic growth, particularly focusing on energy infrastructure, transport infrastructure, educational infrastructure, and telecommunication infrastructure. Policymakers should emphasize economic freedom by reforming regulations to develop ease of doing business for ultimately encouraging economic growth in Pakistan. Policymakers should promote an institutional framework for industrial expansion that is based on innovative manufacturing mechanisms. Policymakers should develop business friendly environment to attract FDI inflows for enhancing economic prosperity. The government should take initiatives to boost external trade, particularly export promotion and technology transfer.

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