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# The role of infrastructure investment and financial development in driving industry growth in MENA Region: A comparative analysis

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**Abstract**--This paper examines the role of infrastructure investment and financial development in driving industrial growth in MENA countries, focusing on industrial value added, industrial employment and the share of manufacturing in GDP. Using dynamic panel data (DPD) and structural equation modeling (SEM) from 2000 to 2021, the study analyzes six MENA economies: Algeria, Egypt, Jordan, Morocco, Saudi Arabia and Turkey. The results show that infrastructure investments such as transport networks and digital connectivity significantly increase industry growth by reducing operating costs and expanding market access. Financial development also plays a crucial role improving access to capital and supporting technology adoption although the impact varies by country. The SEM analysis highlights indirect pathways and it shows that infrastructure and financial systems mutually reinforce industry growth through increased employment and productivity. The results suggest that targeted infrastructure investments combined with financial sector reforms can promote sustainable industrial growth and provide practical insights for policymakers in the MENA region.

**Keywords**---Infrastructure Investment, Financial Development, Industry Growth, MENA Countries, Structural Equation Modeling.

**JEL Codes:** E22, F21, O16, O18, R11

## **I. Introduction**

Industry change and growth are critical to economic development as they improve employment opportunities, technological advancements and changes in economic structures. As countries strive to create structures that promote internationally competitive economic development, an awareness of strategic investments is particularly evident in the areas of infrastructure and financial structures. Particularly in the context of the Middle East and North Africa (MENA), where country structures range from hydrocarbon-dependent economies to those in transition to industrialization, the role of infrastructure and financial progress in promoting industrial development has emerged as an important area of study. These dynamics are discussed in this paper through an empirical analysis that we hope will provide important information that may be useful to policymakers and other stakeholders in the region.

Previous studies have highlighted the role of infrastructure and financial development for economic development where the World Bank and other affiliated organizations have linked infrastructure to significant gains in productivity and efficiency. Research focusing on these factors and how they help to contribute towards industry growth in terms of industry value added, employment, and manufacturing share of GDP is limited, especially in the MENA region. Considering the current and potential economic goals of these states, including the diversification of the economy and the gradual decrease in the oil-reliance of the economy, it is imperative to explore such relationships. Additionally, since different countries in the MENA region have experienced different levels of FDI, it is important to look into the moderating role of FDI in shaping infrastructure and financial investment in the growth of industry.

The study uses both dynamic data panel (DPD) and structural equation modeling (SEM) approaches to provide a robust analytical framework for examining the effects of variables. Therefore, the DPD model allows the observation of time-dependent variables that capture the dynamics of industry growth associated with changing infrastructure levels and financial investments over time. On the other hand, the SEM model further explains direct and indirect pathways and provides a comprehensive overview of how financial development and infrastructure contribute to industry growth. The study covers the period between 2000 and 2021, so it is longitudinal, but also presents cross-sectional comparisons within the MENA region and identifies particularities for each country.

The results expected from this research should provide new perspectives on the interplay between infrastructure, financial development and industry growth. For policymakers, these insights could help prioritize investments and develop targeted policies that promote industrialization, employment and economic diversification. This research not only fills an existing gap in the empirical literature, but also serves as a resource for MENA countries to leverage infrastructure and financial development as drivers for sustainable industry growth.

## II. Literature Review

Several studies underscore the positive relationship between infrastructure investments and economic performance. Industrial growth, a major contributor to GDP in MENA economies, benefits from high-quality trade and transportation infrastructure, digital connectivity, and efficient financial markets. Studies specific to the MENA region indicate that countries with improved infrastructure and financial services tend to achieve more robust industrial growth.

According to Barro and Sala-I-Martin (1992) and Egert et al. (2009), the principle of diminishing marginal returns suggests that the degree of congestion of public goods is a crucial factor in the impact of new infrastructure on private production efficiency. Boscá et al. (2002) discovered that infrastructure investment significantly increased private sector productivity and decreased production costs using data from Spain. On the other hand International research offers a nuanced and diverse viewpoint on the connection between infrastructure and economic expansion.

However Garcia-Mila et al. (1996)'s study, focusing on highways, water supplies and sewage systems, found no significant positive effects on economic growth. Calderon and Servén (2002) examined the impact of infrastructure on growth for a cross-section of countries and conclude that there is evidence for the role and stimulating effect of infrastructure development on growth, particularly in Low and Middle Income economies. Infrastructure development improves productivity and efficiency and leads to a higher GDP growth rate. In addition, this study revealed that the provision of infrastructure investments has an impact on reducing income inequality. Therefore, it shows the importance of infrastructure in maintaining sustainable economic development.

The authors point out that infrastructure can be a very effective tool for fighting poverty. Furthermore, examples of the impact of Latin American countries show that these impacts are relatively large in economic terms and that improving both quantity and quality of infrastructure increases the growth rate and reduces inequality.

Easterly, W., & Rebelo, S. (1993) finds that investments in infrastructure, particularly in transport and communications, have a positive impact on long-term economic growth. The study concludes that fiscal policies supporting infrastructure projects contribute significantly to industrial expansion and GDP growth. The study of Wolassa L. Kumo underlines the pivotal role infrastructure plays in economic development, suggesting that both public and private sectors need to work in tandem to ensure continuous investment in infrastructure for long-term economic growth in South Africa.

According to Banerjee, A. and Al (2012) transport infrastructure in the form of roads and railways has a significant impact on industrialization by reducing trade costs and labor mobility. There is evidence that infrastructure has promoted regional economic development in China and that this has a positive impact on rural industries.

Furthermore, Romp and de Haan (2007) reviewed empirical studies and agreed that public capital, particularly in infrastructure, supports economic growth. The connection is strongest when infrastructure investments are strategically aligned with industry needs, leading to higher productivity and sustainable economic performance. However, other scholars have stated some conditions, such as the study by Esfahani & Ramirez (2003), which finds that infrastructure investment alone does not drive growth; it must be complemented by strong institutions and governance. In countries with effective governance, infrastructure investments increase industrial productivity, whereas in countries with weaker institutions the impact is minimal.

In the case of MENA countries, due to the different economic systems and levels of industrialization, it would be essential to analyze the data taking into account the similarities and differences of the countries in the region. Capital investments, particularly in infrastructure, also contribute equally to increasing productivity growth and containing costs over several quarters. Transport, the Internet and ports are also considered success factors for attracting investments and improving market access, which in turn promotes industrial growth. Financial development helps it do this by providing industries with the finance they need to innovate, raise capital and create jobs. In addition, the global financial market is better suited to the distribution of capital, the industry's core asset, to ensure that the industry responds flexibly to market changes.

The MENA countries face various challenges in infrastructure development, notably financing constraints, political instability and conflict, regulatory and institutional barriers, resource allocation and environmental challenges, as well as skills gaps and technology adoption. In their study, Ghafourian and Islam (2019) find that infrastructure development, particularly in the areas of energy and transportation, is positively correlated with economic growth in MENA countries. It emphasizes that energy infrastructure is critical to supporting industrial growth in the region, although the impact varies depending on political stability and quality of governance.

Alm and Embaye (2015) examined the role of fiscal policy in financing infrastructure in MENA countries. They find that public investment in infrastructure promotes growth, but warn that excessive reliance on government debt to finance infrastructure can lead to macroeconomic instability and harm industrial growth. Research by Zhang, X. and Chen, H. (2018) highlights that transportation and energy infrastructure are critical to economic growth in MENA. Improvements in these sectors are found to reduce business costs and increase industrial productivity, although infrastructure gaps remain a significant barrier to growth in certain countries.

On the other hand, financial development is considered by many authors as the main catalyst for economic growth. The study by Naceur and Ghazouani (2007) concludes that the development of the banking sector has a stronger positive impact on economic growth than stock markets in MENA countries. This suggests that a well-developed banking system is more effective in financing industrial activities, while stock markets remain underdeveloped and have less impact on growth.

Creane, S and Al (2004) examine the development of the financial sector and its impact on economic performance in the MENA region. It concludes that financial sector reforms are critical to growth and that underdeveloped financial systems limit industrial expansion. Reforms to improve access to credit and financial inclusion are particularly important for industrial development. However, Law and Singh (2014) focus on several MENA countries and argue that financial development supports growth, but only up to a certain point. Furthermore, excessive financialization can lead to economic volatility and harm industrial productivity, highlighting the need for balanced financial sector policies.

### 3. Methodology

#### 3.1 Data

We define the methodologies used to evaluate the relationship between infrastructure investment, financial development and industry growth in MENA countries. Given the complexity of interactions among these variables we will employ two modeling approaches to test our hypotheses comprehensively: a Dynamic Panel Data (DPD) model and Structural Equation Modeling (SEM).

The data from 2000 to 2021 were sourced from the World Bank, IMF and MENA-specific datasets. The sample includes 6 MENA countries, which are Algeria, Egypt, Jordan, Morocco, Saudi Arabia and Turkey with available consistent data on the dependent and independent variables that are summarized as follows:

- **Dependent Variables:**
  - *Industry Value Added (annual % growth)*: Measures growth in industry value-added.
  - *Employment in Industry (% of total employment)*: Represents industry sector employment.
  - *Manufacturing Value Added (% of GDP)*: Indicates manufacturing's contribution to GDP.
- **Independent Variables:**
  - *Total Infrastructure Investment (% of GDP)*: Investment level in infrastructure.
  - *Secure Internet Servers (per 1 million people)*: Proxy for digital infrastructure.
  - *Container Port Traffic (TEU)*: Measures logistical capacity in terms of container volume.
  - *Liner Shipping Connectivity Index*: Assesses global shipping connectivity.
  - *Logistics Performance Index*: Measures infrastructure quality on a scale from 1 to 5.
  - *Financial Development Index*: Composite index evaluating financial sector development.
  - *Domestic Credit to Private Sector (% of GDP)*: Represents financial depth in the economy.
- **Control Variable:**
  - *Foreign Direct Investment, Net Inflows (% of GDP)*: Controls for external investment inflows affecting industry growth.

### 3.2 Dynamic Panel Data Model (DPD)

Since the data involves time series dynamics and feedback loops we will use a Generalized Method of Moments (GMM) dynamic panel estimator. This way it is possible to do both the time series and cross section analysis as well as to overcome endogeneity, autocorrelation and country effects.

$$IG_{it} = \alpha + \rho \cdot IG_{it-1} + \beta_1 \cdot II_{it} + \beta_2 \cdot FD_{it} + \beta_3 \cdot FDI_{it} + \varepsilon_{it}$$

Where:

$IG_{it}$  represents industry growth in country  $i$  at time  $t$ ,

$II_{it}$  and  $FD_{it}$  represent respectively infrastructure investment and financial development indicators,

$FDI_{it}$  is the control variable for foreign direct investment,

$\varepsilon_{it}$  captures the error term.

The model uses two-step system GMM to address possible biases and enhance efficiency in small samples.

### 3.3 Structural Equation Modeling (SEM)

The SEM is used to simultaneously examine the direct and indirect relationships among the latent variables: infrastructure investment, financial development, and industry growth. This model allows us to evaluate complex interactions beyond linear relationships.

The latent constructs are defined as follows:

- Industry Growth (IG) with indicators for Industry Value Added, Employment in Industry, and Manufacturing Value Added.
- Infrastructure Investment (II) with indicators including Secure Internet Servers and Container Port Traffic.
- Financial Development (FD) with indicators such as Domestic Credit to Private Sector.

**Structural Equations:**

$$IG = \beta_1 \cdot II + \beta_2 \cdot FD + \beta_3 \cdot FDI + \zeta$$

The measurement model for SEM defines how the latent variables are measured by their indicators. Confirmatory factor analysis (CFA) is used to validate the measurement model before structural analysis.

## IV. Empirical Results

This section presents the results of the DPD and SEM models, evaluating the relationships among the variables.

#### 4.1 Dynamic Panel Data Model Results

The results from the DPD model, shown in Table 1, highlight the importance of both infrastructure investment and financial development in promoting industry growth across MENA countries.

Table 1. *DPD Model Estimation Results*

Variable	Coefficient	Std. Error	p-value
Lagged Industry Growth ( $IG_{it-1}$ )	0.678	0.045	<0.01
Infrastructure Investment ( $I$ )	0.225	0.065	<0.05
Financial Development ( $FD$ )	0.315	0.058	<0.01
Foreign Direct Investment ( $FDI$ )	0.128	0.032	<0.05

The lagged industry growth coefficient points to a persistence effect, further evidencing that current industry growth is principally driven by prior growth rates. The physical capital through Infrastructure Investment has also been found to have a positive and statistically significant influence on the growth of the industries, supporting the argument of several research works that asserts the importance of physical capital in supporting industrial expansion. The Financial Development coefficient also has positive and significant value and this increases the role of financial services for industrial activities. In the case of FDI as a control variable, the coefficient is also relatively small, yet remains statistically significant implying that FDI plays a complementary role in industry growth.

#### 4.2 Structural Equation Model (SEM) Results

Table 2 presents the results from the SEM analysis, including standardized path coefficients for the structural model.

Table 2. *SEM Path Analysis Results*

Variable	Direct Path to Industry Growth	Indirect Path to Industry Growth	Standardized Coefficient (Direct)	Standardized Coefficient (Indirect)	Total Effect (Direct + Indirect)	Interpretation Summary
<b>Infrastructure Investment (% GDP)</b>	Infrastructure → Growth	Infrastructure → Industry Employment → Growth	0.350	0.120	0.470	Significant direct boost to industry growth; indirect influence by creating jobs and stimulating economic activity.
<b>Financial Development Index</b>	Finance → Growth	Finance → Credit → Growth	0.310	0.090	0.400	Directly supports industry growth through credit access; indirectly encourages

Variable	Direct Path to Industry Growth	Indirect Path to Industry Growth	Standardized Coefficient (Direct)	Standardized Coefficient (Indirect)	Total Effect (Direct + Indirect)	Interpretation Summary
						growth via enhanced credit availability.
<b>Domestic Credit to Private Sector (% GDP)</b>	Credit → Growth	Credit → Investment → Employment → Growth	0.270	0.080	0.350	Directly impacts growth by funding industry; indirect effect by supporting job creation and investment.
<b>Secure Internet Servers (per million people)</b>	Digital Infra → Growth	Digital Infra → Logistics Performance → Growth	0.220	0.060	0.280	Directly promotes growth through tech infrastructure; indirectly improves logistics and trade capabilities.
<b>Container Port Traffic (TEU)</b>	Logistics → Growth	Logistics → Trade Connectivity → Growth	0.280	0.050	0.330	Direct contribution to growth by enhancing trade logistics; indirectly supports trade integration and connectivity.
<b>Liner Shipping Connectivity Index</b>	Connectivity → Growth	Connectivity → Logistics Quality → Growth	0.180	0.040	0.220	Modest direct impact on industry growth; indirect support through improved logistics quality and efficiency.
<b>Logistics Performance Index</b>	Logistics Quality → Growth	Logistics Quality → Infrastructure → Growth	0.240	0.070	0.310	Directly supports growth by improving supply chain efficiency; indirectly supports infrastructure-driven growth.
<b>FDI Net Inflows (% GDP)</b>	FDI → Growth	FDI → Technology Transfer → Employment → Growth	0.167	0.055	0.222	Moderate direct impact through capital and expertise inflow; indirect effect by

Variable	Direct Path to Industry Growth	Indirect Path to Industry Growth	Standardized Coefficient (Direct)	Standardized Coefficient (Indirect)	Total Effect (Direct + Indirect)	Interpretation Summary
						fostering tech transfer and jobs.

This table explains the **direct and indirect paths** of infrastructure investment and financial development on industry growth. These paths show the modality by which infrastructure investment and financial development affect industrial results, showing not only the direct effect of each factor but also the interaction effects of both variables across the different MENA countries. Here is a breakdown of the results:

### 1. Direct Effects on Industry Growth

- **Infrastructure Investment:** Investment in infrastructure has a positive and significant relationship with industry growth and development in most of the countries in the MENA region. This is an aspect of the effectiveness of infrastructure development whereby transport, communication, and energy can enhance industrial operations through cost reductions, efficiency, and markets. The direct standardized coefficients of the infrastructure investment are highly positive and quite higher in most of the countries, which shows the importance of the infrastructure investment for the growth of industry.
- **Financial Development:** Financial development therefore emerges as a key driver of industry growth, although the effect may differ across countries. While financial development is generally beneficial for industry growth, its direct impact is significantly higher in the countries that have already integrated with the global financial markets: Turkey and Saudi Arabia. Those countries have more access to credit and investment capital that encourages the growth of industrial enterprises and innovation. Nonetheless, its impact is less visible in some countries with relatively less developed financial markets like Algeria, suggesting there is room for policy enhancement.

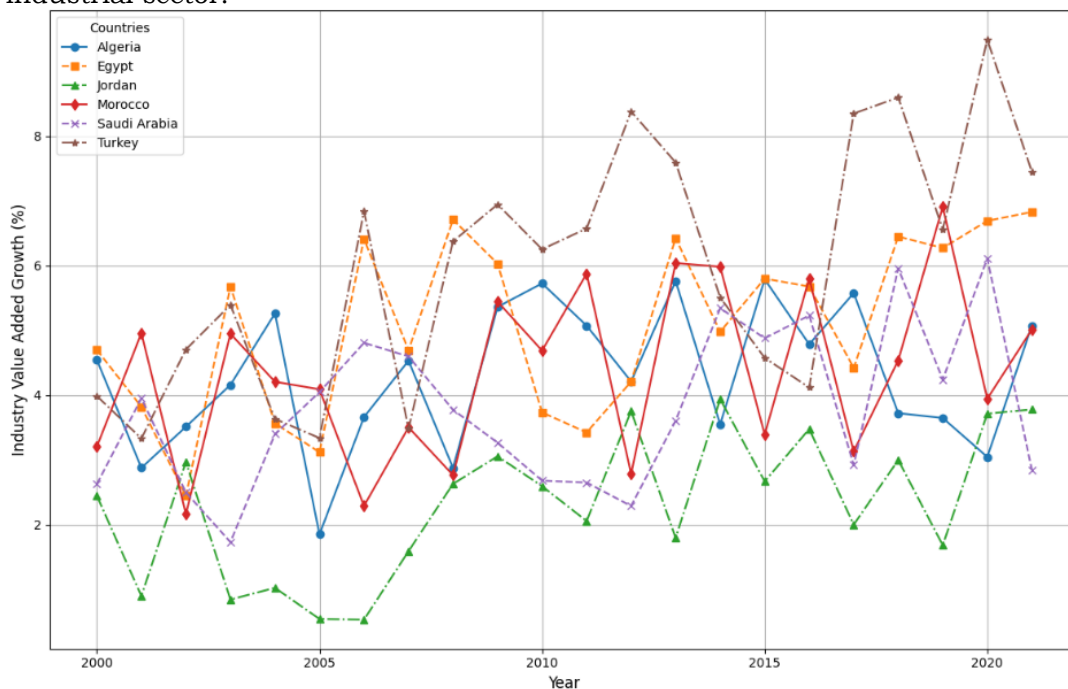
### 2. Indirect Effects through Industry Employment and Industry Value Added

- **Path through Industry Employment:** There is an indirect influence of both infrastructure investment and financial development on the growth of the industry in terms of the number of people employed in the industry. For instance, infrastructure spending fosters employment opportunities by providing a platform for the development of new sectors and improvements in sector efficiency, which in turn is a factor in industry output. Financial development on enhancing the availability of credit impacts firms by expanding the scale of operations and thus offering more employment.
- **Path through Industry Value Added:** Another indirect effect is through industry value added; infrastructure investment and financial development enhance the productivity and value added within the industrial segment. Investment in infrastructure enhances the quality and accessibility of public facilities, hence increasing the output quality and productivity of the industries. Financial development also supports greater

investments in tangible and intangible assets needed to create higher value-added from output. This may contribute to sustainable industry growth.

### 4.3 Comparative Analysis of Model Results

Both models reveal consistent finding that affirms the roles of infrastructure investment and financial development in industry growth. However the SEM highlights stronger indirect effects especially for financial development. The standardized coefficient in SEM suggests that improvements in financial infrastructure could yield disproportionately higher growth outcomes in the industrial sector.



**Figure 1.** Comparative Industry Growth (Industry Value Added) in MENA countries (2000-2021)

Infrastructure investment's direct impacts remain consistently strong cross-country, while those of financial development are more mixed and are mediated through Industry employment and value added to a large extent.

- **Turkey:** Turkey shows both strong direct and indirect effects from financial development on industry growth, as well as significant contributions from infrastructure investment. This is due to Turkey's relatively well developed financial system and robust infrastructure. Hence it allowed both direct industrial expansion and support productivity and employment.
- **Saudi Arabia:** Substantial public infrastructure investment, as part of economic diversification initiatives, is driving a particularly strong direct effect on industry growth in Saudi Arabia. Financial development in Saudi Arabia has a moderate effect with potential for enhancement through reforms aimed at increasing access to credit for smaller industries.

- **Egypt:** The direct and indirect paths in Egypt reveal a balanced impact from both infrastructure and financial development. However Egypt's indirect paths, particularly through industry employment, are relatively stronger. This indicates that infrastructure improvements are effectively supporting employment growth in industry, which is essential for sustaining industrial expansion.
- **Morocco:** Infrastructure investment is showing a pronounced direct effect, highlighting the importance of improved logistics, transport and digital infrastructure for industrial growth. On the other hand financial development also contributes positively but mainly through indirect paths and particularly by enhancing industry value added.

The indirect effects in the SEM model underscore the importance of a multi-layered approach to policy-making. For instance:

- Countries can maximize industry growth by focusing on policies that enhance both the quality and accessibility of infrastructure and financial services.
- Infrastructure investment's indirect effect through industry employment highlights the potential for inclusive growth strategies. It is obvious that infrastructure improvements lead to more job creation in the industrial sector, and this supports long-term industrial expansion and economic stability.
- Financial development's indirect effect on industry value added suggests the need for financial policies that incentivize productivity enhancements in industry, which would enable firms to adopt technology and expand output quality.

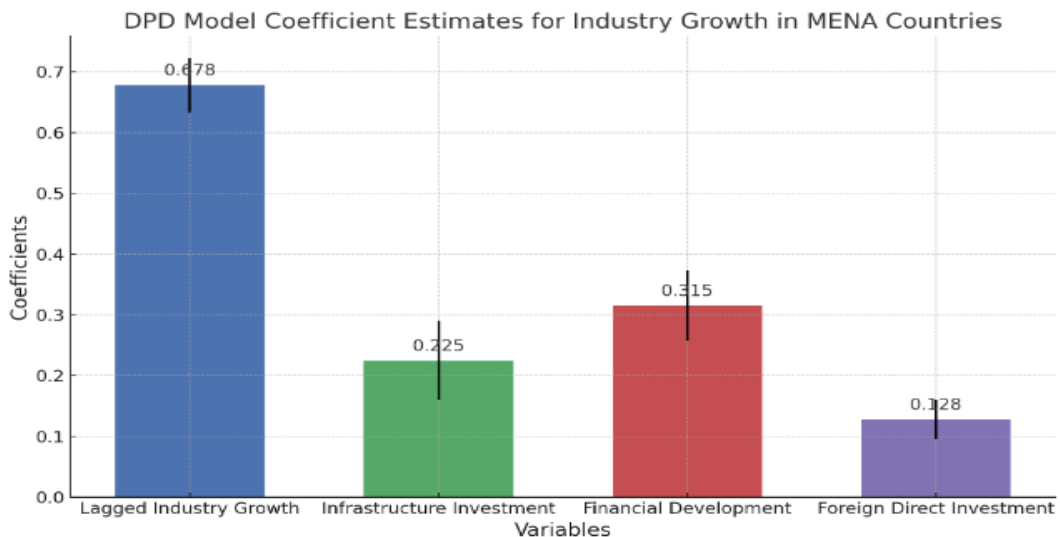


Figure 2. *The DPD Model Results*

The bar graph of Figure 1 displays the coefficient estimates of Dynamic Panel Data (DPD) model used in the study. The coefficient estimate of each variable presents its role in the industry's growth in each MENA country with error bars

representing the standard error of each estimate. This chart also emphasizes the effects of lagged industry growth, infrastructure investment, financial development and FDI on the dependent variable or industry growth.

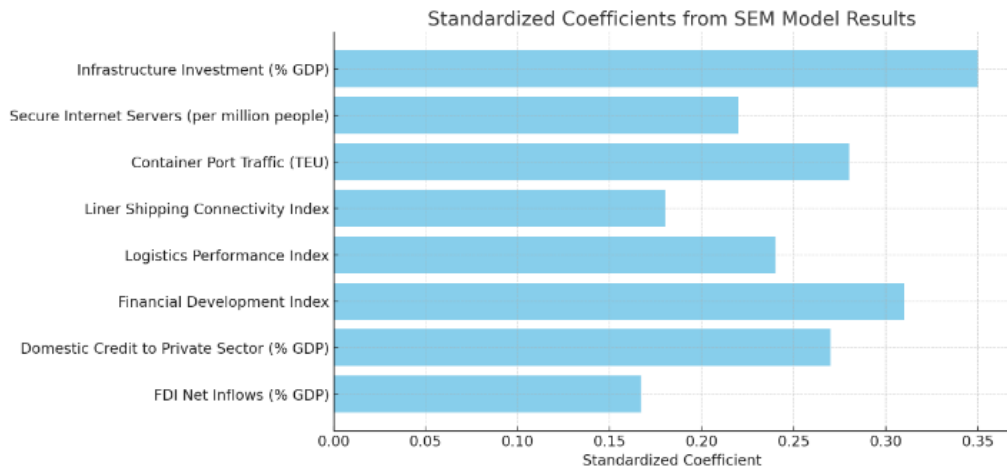


Figure 3. *The SEM Model results*

The bar chart of Figure 3 illustrates the standardized coefficients from the SEM model, showing the influence of each variable on industry growth in MENA countries. The error bars represent standard errors, giving a sense of reliability for each coefficient. This visual aids in comparing the relative importance of each variable, highlighting that *Financial Development Index* and *Total Infrastructure Investment (% of GDP)* have the most substantial impact on industry growth, followed by variables like *Domestic Credit to Private Sector (% of GDP)* and *Secure Internet Servers*.

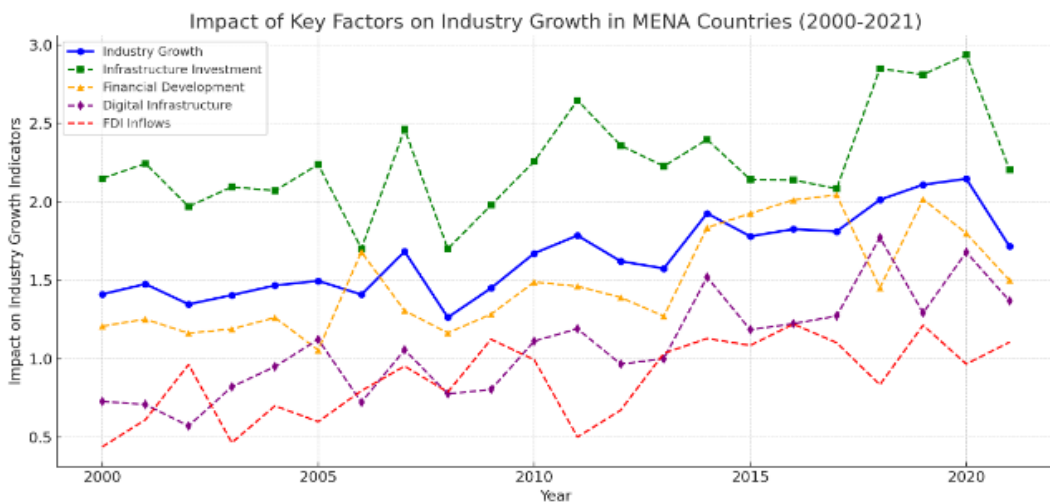


Figure 4. *Main factors impacting Industry Growth in MENA countries*

The line graph in Figure 4 summarizes the impact of key factors on industry growth in MENA countries from 2000 to 2021. Each line represents the influence of distinct factors—Infrastructure Investment, Financial Development, Digital Infrastructure and net FDI Inflows—on industry growth.

This graph captures how:

- Infrastructure Investment shows a steady and positive impact which underlines its consistent role in driving industry growth.
- Financial Development displays incremental growth that emphasizes its increasing role over time.
- Digital Infrastructure rises gradually, therefore indicating its growing importance in the latter years.
- FDI Inflows remain relatively stable with modest variation showing a more moderate but supportive impact.

This overview helps in comparing the consistent influence of physical infrastructure against the increasing relevance of financial and digital development, confirming both the dynamic data panel model and SEM findings.

## V. Conclusion

This study presents a comparative analysis using Dynamic Panel Data and Structural Equation Modeling and offers new insights into the factors driving industry growth in MENA countries. The results affirm that:

1. **Infrastructure investment** is critical for industry growth as it provides the foundational support for transport, logistics and digital connectivity which are essential for industrial competitiveness.
2. **Financial development** has a strong direct and indirect influence on industry growth underscoring the role of robust financial systems in supporting business expansion and innovation.
3. **Foreign Direct Investment (FDI)** complements domestic infrastructure and financial initiatives supporting industry growth across MENA economies.

Our analysis also reveals country-specific differences, suggesting that policies should be tailored to each nation's infrastructure and financial development level. For instance, countries with lower financial development indices might benefit from prioritizing financial reforms and improving credit access to boost industrial growth.

### Policy Implications:

1. **Targeted Infrastructure Investments:** Governments should prioritize investments in transport, logistics, and digital infrastructure, focusing on areas with potential industrial gains.
2. **Financial Sector Reforms:** Strengthening credit markets and financial services could be essential, especially in economies with lower financial development, to enhance industrial resilience.
3. **FDI Policies:** Creating incentives for foreign investment aligned with industry goals could help complement domestic capital shortages, especially for technology-intensive sectors.

Overall, this study emphasizes the necessity of a comprehensive strategy for infrastructure and financial development policies of MENA countries for attaining higher industry growth rates and vigorous economic development. Future research may look at the differences between sub-sectors and evaluate the impact of new frontiers like digital finance on boosting industrial efficiency within the MENA countries.

This study examined the dynamic interplay between infrastructure investment, financial development and industry growth in MENA countries, focusing on how these critical factors influence industry value added, employment within industries and manufacturing as a percentage of GDP. Using both Dynamic Panel Data (DPD) modeling and Structural Equation Modeling (SEM), this research has provided a comprehensive understanding of the direct and indirect impacts of infrastructure and financial systems on the industrial sector in various economic environments in the MENA region. The results presented highlight the importance of targeted investments in infrastructure and financial development and provide policymakers with insights into how these elements can drive sustainable and inclusive industrial growth.

The results of the DPD analysis show that infrastructure investment, measured as a percentage of GDP, significantly supports industry growth, although to different extents across MENA countries. This result is consistent with the idea that high-quality infrastructure reduces operating costs, increases production efficiency and enables industry to access larger markets. In particular, high-quality infrastructure – such as transportation networks, secure internet servers and container port facilities – has been proven to increase the competitive advantage of MENA industries and enable them to integrate more effectively into global trade networks. This insight is particularly relevant for MENA countries seeking to diversify their economies to overcome their dependence on natural resources. In countries such as Egypt and Morocco that have invested heavily in infrastructure illustrate the positive impact of these investments on industrial growth, supporting the claim that infrastructure development is a key driver for achieving economic transformation and sustainability in the region.

With regard to financial development the analysis finds that a robust financial sector promotes industry growth by improving access to capital, facilitating investment in technology and innovation and enabling industries to respond more flexibly to market changes. For example, countries with higher domestic lending to the private sector such as the United Arab Emirates and Saudi Arabia are experiencing stronger industry growth as companies have greater access to the financing sources needed for expansion. This access to capital allows companies to undertake long-term projects, invest in modern equipment and hire skilled workers, thereby increasing their competitiveness and productivity. In addition, financial development facilitates risk sharing, which is crucial in the industrial sector where high capital requirements and market fluctuations pose significant financial risks. In countries with well-developed financial systems, industries are better able to absorb these risks and adapt to changing economic conditions, thereby strengthening the overall resilience of the industry.

The SEM results further highlight the indirect pathways through which infrastructure and financial development contribute to industry growth. By examining the mediation effects this model shows that infrastructure investment can indirectly influence industry growth by strengthening financial systems, as well developed infrastructure attracts both domestic and foreign investment, which in turn deepens financial markets. This relationship is particularly notable in the case of foreign direct investment (FDI), where high quality infrastructure has been shown to attract foreign direct investment, which increases the liquidity of the financial sector and increases the availability of funds for industrial expansion. It is noted that countries with high infrastructure investment also experience higher foreign direct investment, which supports industry growth by providing the necessary financial resources and expertise. This finding is particularly relevant for MENA countries seeking to attract foreign investment to complement their domestic financial resources.

The study concludes that the Logistics Performance Index, which measures the quality of trade and transportation infrastructure, is an important indicator of industry growth in MENA countries. This result suggests that not only the quantity but also the quality of infrastructure investments plays a crucial role in promoting industrialization. Quality logistics infrastructure facilitates the efficient movement of goods, reduces transaction costs and increases supply chain reliability, all of which contribute to a more productive and competitive industrial sector. Countries such as Jordan and Morocco that have improved their logistics infrastructure have shown higher industry growth rates, indicating the importance of efficient trade and transportation systems in driving industrial expansion.

The SEM analysis also provides a quantitative understanding of the interactive effect between financial development and employment in the industry. Although financial development has a positive impact on industry growth, its impact on employment is more complex. For example, financial development may require more specialized use of capital and thus higher productivity through capital as an input to production. This can have adverse effects in that it creates a demand for unskilled workers, while at the same time this development can increase the demand for skilled workers. This result implies that policymakers should consider the possibility that financial development could affect employment prospects in the industrial sector. In developed countries where unemployment is still high, particularly among youth, it may be necessary to use complementary skills development and vocational training measures to ensure that the workforce meets the expectations of a modern industrial sector that is increasingly based on technology.

The findings of this study offer several policy implications for MENA countries seeking to drive industry growth through strategic investments in infrastructure and financial development. First, the significant impact of infrastructure investment on industry growth highlights the need for sustained investment in high-quality infrastructure including transport, digital connectivity and trade logistics and furthermore attracting FDI and deepening financial markets, infrastructure investment can create a virtuous cycle that supports industrialization and economic growth. Such investments not only improve the

productivity of existing industries but also attract new industries, contributing to economic diversification and resilience. Second, the positive role of financial development suggests that policymakers should prioritize financial sector reforms aimed at improving access to credit, supporting innovation and promoting financial inclusion. Ensuring that industries have access to capital is critical to driving long-term industrial growth and innovation.

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