

THE IMPACT OF FDI, LABOUR FORCE AND INNOVATION ON VIETNAM'S ECONOMIC GROWTH: THE IMPLICATIONS OF STATE MANAGEMENT POLICIES IN THE NEW CONTEXT

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ABSTRACT

This research employs the VECM estimation method and Johansen cointegration analysis to examine the short run and long run impacts of FDI, labour force (LF), and innovation on economic growth (EG) in Vietnam during the period 1996–2024. The empirical results indicate that in both the short and long run, FDI has a negative impact on EG. Meanwhile, LF has a positive impact on EG. Innovation is not statistically significant. Based on these results, the study proposes policy recommendations aimed at promoting EG in Vietnam in the new context.

Keywords: FDI, LF, innovation, EG, Vietnam.

1. Introduction

Since the launch of the *Đổi mới* reforms in 1986, Vietnam has become one of the fastest-growing economies in Southeast Asia. The transition toward a socialist-oriented market economy has enabled rapid industrialization, export expansion, and deeper global integration. Among the key drivers of this growth, FDI, LF (LF) development, and innovation have played central roles. However, in the context of global economic volatility, digital transformation, and structural change, the effectiveness of these drivers increasingly depends on the quality of state management policies.

FDI has been a major engine of Vietnam's economic expansion. Following its accession to the World Trade Organization and participation in new-generation trade agreements such as the Comprehensive and Progressive Agreement for Trans-Pacific Partnership and the Regional Comprehensive Economic Partnership, Vietnam has attracted substantial foreign capital inflows. FDI has contributed to capital formation, export growth, job creation, and technology transfer. Nevertheless, concerns remain about the quality of FDI, limited spillover effects on domestic firms, and heavy reliance on foreign-invested enterprises.

Vietnam's relatively young and abundant LF has also supported EG (EG). Yet, the shift toward Industry 4.0 and knowledge-based production requires higher-skilled labour and stronger human capital development. Without improvements in labour productivity and skill levels, the long-term contribution of the workforce may be constrained.

In addition, innovation is increasingly recognized as a crucial determinant of sustainable growth. Vietnam aims to transition from factor-driven to innovation-driven development, but institutional limitations and weak linkages between research institutions and enterprises remain challenges.

Given these conditions, effective state management policies are essential to enhance the synergy among FDI, LF development, and innovation. This study examines

their impact on Vietnam's EG and discusses policy implications for sustainable development in the new context.

2. Literature review

2.1. The relationship between FDI and EG

There are many approaches when it comes to studying EG. In this study, EG is understood as the increase in output/income achieved over a certain period of time. This increase is reflected in the size and rate of growth. In essence, Foreign Direct Investment (FDI) is an investment activity by a business in another country with the aim of making a profit.

In empirical research, Muhammad, B. (2019), through the Generalized Method of Moments (GMM) affirmed the positive impact of FDI on EG in some ASEAN countries in the period 2001-2012. Triatmanto, B. (2023) also had the same opinion as Muhammad, B. (2019) when finding a favorable relationship between FDI and EG in 4 ASEAN countries in 2000-2020. When studying this relationship in the United States in 1990-2022, Jiao, L. (2024) also showed similar results

However, some empirical studies show an inverse relationship between FDI and EG. Damijan, J. P. et al. (2001) studied in Estonia, Slovenia, Hungary, Slovakia, Bulgaria, the Czech Republic, Romania and Poland and concluded that FDI has a negative impact on EG. In addition, Alfaro, L. (2003) FDI can reduce the competitiveness of domestic enterprises, leading to a negative impact on EG. Carkovic, M. and Levine, R. (2005) gave similar results for 72 countries. Ang, J. B. (2009), using the VECM found the negative impact of FDI on EG. Bouchoucha, N. and Ali, W. (2019) show a similar relationship in African countries between 1996 and 2016.

Meanwhile, some empirical studies show that there is no relationship between FDI and EG. Using the ARDL model, Karimi, M. S. et al. (2009) concluded that there was no link between FDI and EG in Malaysia in 1970-2005. Temiz, D. (2014) came to the same conclusion

2.2. The relationship between LF and EG

In Viet Nam, the concept of LF refers to the International Labour Organization's (ILO) definition that classifies the working-age population, as those aged 15 years and over, and the LF as those aged 15 years and over, in the previous week, who are working, temporarily quit their jobs but have jobs and those who are unemployed and looking for work.

Several empirical studies have shown a positive relationship between the LF and EG. Research by Chirwa, T.G., & Odhiambo, N.M. (2017) in Zambia shows that in short and long run, LF has a positive impact on EG. Dong, P. T., & Binh, D.H. (2019) gave the same conclusion in Vietnam in the period 1996-2017. This is also the conclusion of Nguyen, H. C., & Do, H. H. (2020) when researching in Vietnam in the period 1998 – 2018. Han, X (2023) research in China in the period 2001-2020 shows that the LF is one of the important drivers of the country's economic development.

However, there are some studies that show that the LF has the opposite effect or no impact on EG. In the Harrod-Domar-Singer model of growth, a Keynesian approach, population growth is thought to adversely affect growth. Since high population growth will lead to a decrease in per capita and per capita savings, it will adversely affect the growth process. Ahasan, U.H et al. (2019) studied in Bangladesh and found that both total LF participation and female LF participation have significant positive impacts in the short run on Bangladesh's economic development but negative impacts in the long run.

Meanwhile, Anggraeni, W (2001) argues that LF participation rates do not correlate with EG.

2.3. The relationship between innovation and EG

Innovation is the process of creating and applying new solutions, technologies, techniques, or management methods to improve the productivity, quality, and added value of products, services, and processes. Several empirical studies have used the patent application index to assess the impact of innovation on EG. Using the VAR estimator of the GMM estimation method, Gyedu, S et al. (2021) have shown that research and development, patents, and trademarks have a significant impact on the GDP per capita of the G7 and BRICS countries. Pham, T. M. (2023) shows that the number of patent applications (non-residents), R&D expenditures, and R&D staff have a positive effect on GDP per capita.

Meanwhile, some empirical researches show that innovation has the opposite impact or no impact on EG. Research by Crosby, M (2000) indicates that there is an inverse relationship between EG and the number of patents in the short term. Because patents involve different fees that make patenting expensive in the short term. Law, S.H et al. (2020) studying this relationship in Malaysia shows that innovation as measured by the total number of patent applications is statistically insignificant. Pham, T.C. (2025) showed similar results when studying in Vietnam in the period 1990-2020 using the self-regression delay delivery model. The results of the study show that innovation reflected in the total number of patent applications (domestic and foreign) is not yet a driving force for EG in Vietnam

In summary, existing studies on the impact of FDI, LF, and innovation on EG show different conclusions about the impact of these factors on EG. Therefore, this issue needs to be studied, analyzed and evaluated cautiously.

3. Methodology

3.1. Research methodology

This study takes the following steps in turn:

Step 1: Descriptive statistics

Step 2: Unit root testing

Apply the Phillips–Perron Test (PP) to determine the order of integration for each time series.

Step 3: Cointegration Test

Use the Johansen trace and maximum eigenvalue tests to verify the existence of long-run equilibrium relationships among variables.

Step 4: Selection of Optimal Lag Length

Determine the optimal lag length for the VECM model using Akaike Information Criterion (AIC) and other selection metrics

Step 5: Estimation of the VECM Model

The VECM model is used to examine the short run impact of independent variables on dependence. The VECM model is set up as follows:

$$\Delta X_t = \Pi X_{t-1} + \Gamma_1 \Delta X_{t-1} + \cdots + \Gamma_{p-1} \Delta X_{t-p+1} + U_t$$

In which: ΔX_t is a vector consisting of n different variables.

Step 6: Diagnostic Testing

The study carried out a number of diagnostic tests such as testing the stability of the model and autocorrelation, heteroskedasticity in the regression model

Step 7: Impulse Response Functions and Variance Decomposition Analysis

Pulse reaction functions are used to determine the contribution of FDI, LF and innovation to Vietnam's EG

3.2. Research model

The proposed research model is as follows:

$$LGDP_t = \alpha + \sum_{i=1}^k \beta LFDI_{t-i} + \sum_{i=1}^k \beta LLB_{t-i} + \sum_{i=1}^k \beta LINN_{t-i} + \varepsilon_t$$

In which: ε_t denotes the stochastic error term.

t is the study period, from 1996 to 2024

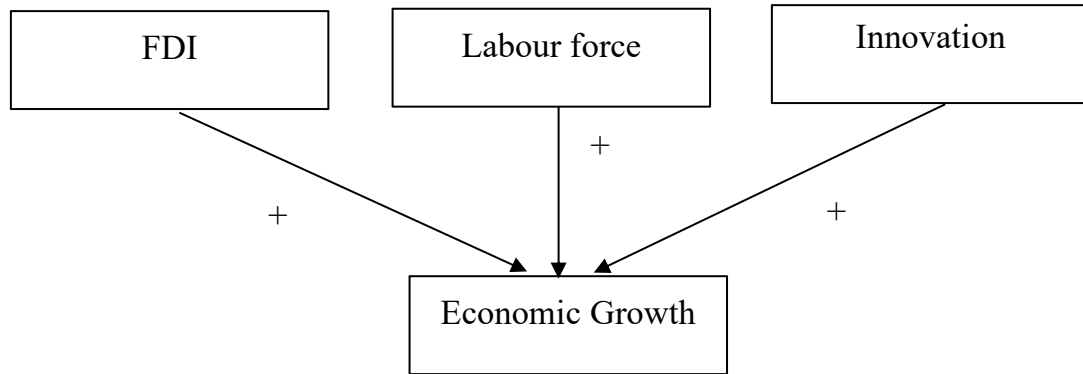


Figure 1. The research model

Source: Author (2026)

3.3. Research data

The data was presented in Table 1

Table 1. Research variables

Variable Name	Description	Source
LGDP	Logarithm of GDP per capita, PPP (constant 2021 international \$)	The World Bank Development Indicators Database
LFDI	Logarithm of FDI, net inflows (BoP, current US\$)	The World Bank Development Indicators Database
LLB	Logarithm of Employment to population ratio, 15+, total (%) (national estimate)	The World Bank Development Indicators Database
LINN	Logarithm of Total patent applications (number of new patent applications filed worldwide through national or regional patent offices, including those filed via the Patent Cooperation Treaty (PCT) procedure)	WIPO IP Statistics Data Center

4. Results and discussion

4.1. Descriptive statistics

Table 2. Descriptive statistics of the variables used

	LGDP	LFDI	LLB	LINN
Mean	3.859673	9.749882	1.864101	2.394718
Median	3.861817	9.903090	1.862376	2.511883
Maximum	4.158821	10.30471	1.881248	3.143639
Minimum	3.554372	9.113275	1.844353	1.397940
Std. Dev.	0.183028	0.437023	0.011593	0.557656
Skewness	-0.043590	-0.324775	-0.020496	-0.431152
Kurtosis	1.800705	1.454255	1.574252	1.859870
Jarque-Bera	1.747141	3.396918	2.458279	2.469187
Probability	0.417458	0.182965	0.292544	0.290953
Sum	111.9305	282.7466	54.05894	69.44683
Sum Sq. Dev.	0.937983	5.347686	0.003763	8.707442
Observations	29	29	29	29

Source: Research results from Eview 10

Descriptive statistics of the variables are presented in Table 2. The Skewness result of the variables is negative indicating that the variables are distributed left. At the same time, Jarque-Bera test indicates that the variables are accepted as normal distributions

4.2. Test statistic

Table 3. Results of PP unit root test

Lag length	Lag length 0		Lag length 1		Result
	t-statistics	p – value	t-statistics	p – value	
LGDP	-2.549431	0.3041	-4.726562	0.0008	I(1)
LFDI	-2.382916	0.3797	-3.393425	0.0202	I(1)
LLB	-1.662213	0.4387	-5.592218	0.0001	I(1)
LINN	-1.717052	0.7167	-5.121447	0.0003	I(1)

Source: Research results from Eview 10

To ensure that variables are accepted in the VECM model, it is necessary to test the stops of the variables. The study performed a stop test using Phillips-Perron (PP). The test results show that the variables all stop at level 1. That said, the variables that ensure the VECM analysis is performed

4.3. Cointegration test

To examine the long-term relationship between independent and dependent variables, the study applied the Johansen co-integrated method.

Table 4. Results of unrestricted cointegration rank test

Unrestricted Cointegration Rank Test (Trace)

Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**

None *	0.763309	72.50358	55.24578	0.0008
At most 1	0.490035	33.59653	35.01090	0.0704
At most 2	0.397719	15.41436	18.39771	0.1246
At most 3	0.061874	1.724532	3.841466	0.1891

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.763309	38.90705	30.81507	0.0042
At most 1	0.490035	18.18217	24.25202	0.2586
At most 2	0.397719	13.68983	17.14769	0.1488
At most 3	0.061874	1.724532	3.841466	0.1891

Source: Research results from Eview 10

The results of Johansen's integrated copper analysis in Table 4 show that there exists at least one long-term integrated copper equation between the independent and dependent variables. Table 5 shows the long-term relationship between independent and dependent variables

Table 5. Relationship results in long run

LGDP	LFDI***	LLB***	LINN
1.000000	-0.105669	0.811797	-0.019933
	(0.01334)	(0.20172)	(0.01593)
	[7.9212]	[4.0243]	[1.2513]

Source: Research results from Eview 10

In the long term, the relationship between the variables is expressed in the following equation:

$$\text{LGDP} = -0.105669 \cdot \text{LFDI} + 0.811797 \cdot \text{LLB} - 0.019933 \cdot \text{LINN} + \epsilon$$

With the long-run adjustment coefficient: $D(\text{LGDP}) = 0.028971$

The results show that in the long term, FDI and LF are statistically significant for EG. Specifically, in the long term, FDI will have a negative impact on EG in Vietnam. This conclusion is consistent with the research of Ang, J. B. (2009), Bouchoucha, N., Ali, W. (2019). Estimates from the VECM show that in the long term, FDI (FDI) has a negative impact on Vietnam's EG. In fact, the process of attracting FDI into Vietnam shows that, although the total registered FDI tends to increase, the contribution of FDI to Vietnam's GDP is very low. Data from Vietnam's 2024 Statistical Yearbook shows that the FDI sector contributes about 20% of GDP and only creates 10% of domestic jobs while accounting for over 71% of export turnover. That shows that the value that Vietnam "retains" is very small. In addition, the structure of FDI in recent years shows that it is mainly focusing on processing and manufacturing industries. These are labor-intensive and low-value-added industries, with a high potential risk of environmental pollution. In addition, increasing

FDI attraction into Vietnam in recent years has also been associated with transfer pricing and limitations in technology transfer.

Meanwhile, in the long run, LF will have a positive impact on EG in Vietnam. This finding is shown in the study of Chirwa, T.G., & Odhiambo, N.M. (2017), Dong, P. T., & Binh, D.H. (2019), Nguyen, H. C., & Do, H. H. (2020), Han, X (2023). The period 1996-2024 shows that Vietnam is in the golden age. This gives Vietnam the advantage of young, abundant and cheap labor. These are the conditions for the development of labor-intensive economic sectors.

In the above research results, innovation is not statistically significant in the long term. This result is consistent with the research of Law, S. H. et al. (2020), Pham, T.C (2025). This implies that, although innovation is expected to be an important driver of growth, during the research period, innovation has not shown a clear role in boosting GDP. The reason is that over the years, Vietnam has had a very low success rate for both intellectual property commercialization and research and development (R&D) commercialization

The results also show that, in the long term, EG will need to be adjusted upwards by about 0.028971% to return to the equilibrium position.

4.4. VECM model estimation results

- Determine the optimal lag:

Table 6. VAR Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	255.2365	NA	4.75e-14	-19.32588	-19.13233*	-19.27015*
1	273.3184	29.20933*	4.13e-14*	-19.48603	-18.51827	-19.20735
2	289.6184	21.31536	4.46e-14	-19.50911*	-17.76713	-19.00748

Source: Research results from Eview 10

This study uses the AIC criterion to determine the latency of the VECM model. The results in table 6 show that the optimal latency of the model is 2

- VECM results:

Table 7. VECM Error Correction Estimates results

D(LGDP(-1))	D(LFDI(-1))***	D(LLB(-1))**	D(LINN(-1))	C
1.000000	-0.131336	0.935433	0.020601	-0.016915
	-0.02023	-0.3743	-0.02429	
	[-6.49096]	[2.49918]	[0.84798]	

Source: Research results from Eview 10

From the VECM estimation results in Table 7, the short-term relationship between the variables is shown in the following equation:

$$\text{LGDP} = -0.016915 - 0.131336 * \text{LFDI} + 0.935433 * \text{LLB} + 0.020601 * \text{LINN} + \epsilon$$

In the short-term, two variables LFDI, LLB are statistically significant. FDI has a negative impact on EG in Vietnam. This is also the opinion of Ang, J. B. (2009), Bouchoucha, N., Ali, W. (2019) and Muhammad Shahid (2014). Meanwhile, LF has a positive impact on GDP EG in Vietnam. This research result is consistent with the research of Chirwa, T.G., & Odhiambo, N.M. (2017), Dong, P. T., & Binh, D.H. (2019), Nguyen, H. C., & Do, H. H. (2020), Han, X (2023). Besides, innovation is not statistically significant. This

result is consistent with the research of Law, S. H. et al. (2020), Pham, T.C (2025). In the short term, the interaction between FDI and GDP is inverse because from investment to the production of goods and services, there are always certain delays. Meanwhile, innovation is not statistically significant due to delays in the research, application and commercialization of creative results. Overall, these results show that in the short term, Vietnam's EG is mainly influenced by traditional factors such as labor, while the role of FDI and innovation needs time to become more pronounced.

4.5. Diagnostic testing

- Testing the stability of model:

The results of testing the stability of the model show that the values are all in a circle. This shows that the short-term impact analysis model is stable and reliable.

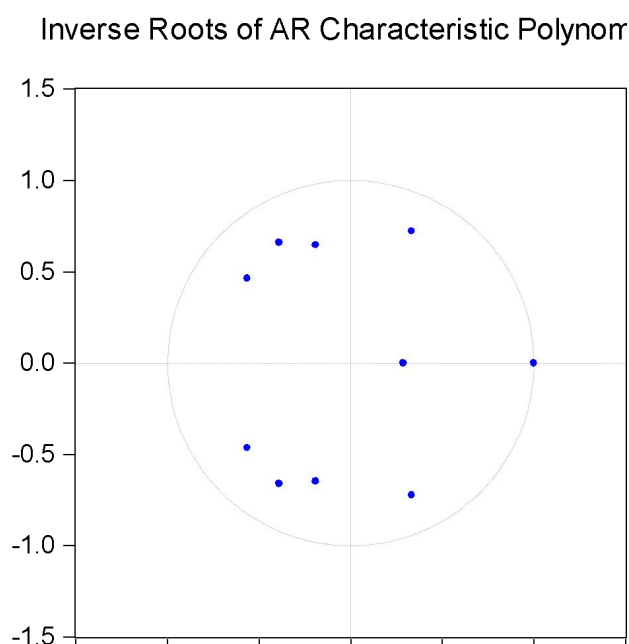


Figure 2. Inverse Roots of AR Characteristic Polynomial

Source: Research results from Eview 10

- Autocorrelations testing

Table 8. Portmanteau Tests

Lags	Q-Stat	Prob.*	Adj Q-Stat	Prob.*	df
1	8.723958	---	9.087457	---	---
2	19.43673	---	20.73177	---	---
3	32.35905	0.2601	35.41623	0.1581	28

Source: Results extracted from Eviews software

The Portmanteau Tests results had no autocorrelation in the model with a statistically significant level of 1%.

- Residual Tests:

Table 9. VEC Residual Heteroskedasticity Tests

Joint test:

Chi-sq	df	Prob.
165.7897	180	0.7686

Source: Research results from Eview 10

The test results in Table 9 show that there is no evidence of Heteroskedasticity in the model

- *Shock transmission and variance decomposition mechanisms:*

Table 10. Variance Decomposition using Cholesky (d.f.adjusted) Factors

Variance Decomposition of D(LGDP):

Period	S.E.	D(LGDP)	D(LFDI)	D(LLB)	D(LINN)
1	0.007897	100.0000	0.000000	0.000000	0.000000
2	0.008837	98.34979	0.080220	0.841705	0.728282
3	0.009196	97.59909	0.873645	0.790689	0.736573
4	0.010313	96.93140	0.853265	1.430623	0.784714
5	0.011054	96.82685	0.888097	1.262374	1.022684
6	0.011440	96.12920	1.018176	1.354961	1.497665
7	0.011900	96.31398	0.963527	1.253849	1.468642
8	0.012558	96.62635	0.916209	1.128177	1.329267
9	0.013114	96.87940	0.845801	1.037263	1.237538
10	0.013541	96.99368	0.793849	0.995185	1.217286

Source: Research results from Eview 10

The results of the variance decay of D(LGDP) show that over the entire forecast period, much of the fluctuation of GDP growth is explained by itself, with rates ranging from about 96% to 100%. Meanwhile, the variables D(LFDI), D(LLB) and D(LINN) contribute only a small percentage to the volatility of D(LGDP). Notably, the D variable (LINN) represents innovation that only explains about 0.7% to 1.5% of the fluctuations in GDP growth. This result shows that the role of innovation in the model is quite limited. Furthermore, since the LINN variable is not statistically significant in the VECM model, there is insufficient evidence to confirm that innovation has a significant impact on EG during the study period.

5. Conclusion

In the context of increasing global economic volatility, intensifying strategic competition among major economies, and the deep restructuring of global supply chains, Vietnam faces an urgent need to transform its growth model. The traditional development model, which has largely relied on natural resource exploitation, low-cost labour, and capital expansion, has revealed significant limitations in terms of productivity, quality, and long-term sustainability. At the same time, the rapid advancement of artificial intelligence (AI), big data, and digital technologies is fundamentally reshaping production systems and market structures, generating new competitive pressures while also creating opportunities for upgrading Vietnam's position in global value chains. Through the

National Digital Transformation Program, Vietnam has oriented its development strategy toward promoting the digital economy, green economy, and innovation-driven growth as key pillars for long-term development. In this context, transitioning toward a growth model based on productivity, technological advancement, and high-quality human capital has become imperative. Such a transformation is essential to enhance the economy's capacity to absorb FDI spillovers, stimulate innovation, and ensure sustainable EG in the new development era.

In this context, this study proposes some recommendations as follows:

First, selective attraction of FDI. In the context of digital economy development, Vietnam's FDI attraction policy needs to shift from a focus on the scale of capital inflows to a more selective approach based on quality, technological content, and knowledge spillovers. The government should prioritize FDI projects in digital technologies, innovation, research and development (R&D), data centers, and smart manufacturing. In addition, it is necessary to improve digital infrastructure and the legal framework for data governance, cybersecurity, and intellectual property protection in order to create a transparent and stable investment environment for high-tech investors. FDI incentive policies should be tied to commitments on technology transfer, workforce training, and linkages with domestic firms, thereby enhancing the economy's absorptive capacity. At the same time, comprehensive digitalization of administrative procedures will help reduce transaction costs and strengthen Vietnam's competitiveness in attracting high-quality FDI in the long run. Moreover, FDI attraction policies should closely integrate environmental criteria, prioritizing projects that adopt clean technologies, energy efficiency, and low emissions in line with green growth and sustainable development goals. The application of stringent environmental standards combined with investment incentives will help Vietnam attract green FDI while avoiding the risk of becoming a destination for polluting projects during its transition to the digital economy.

Second, improving labour quality. In the new context, enhancing labour quality is a key prerequisite for transforming Vietnam's growth model toward productivity-driven development. Policies should shift from expanding labour quantity to developing skills, particularly digital skills and technological adaptability. The government should establish a national digital skills framework aligned with sector-specific needs, serving as a foundation for vocational training, reskilling, and lifelong learning. In parallel, stronger linkages between training institutions and enterprises are needed through demand-driven training models and practice-oriented apprenticeships. Policies should also prioritize reskilling workers in low-productivity sectors, enabling them to participate more effectively in the digital economy. Furthermore, incentive mechanisms and co-financing schemes for training should be implemented to encourage firms to invest in workforce upskilling, thereby improving productivity and fostering sustainable growth.

Third, promoting innovation. To enable innovation to contribute more effectively to EG, policies should focus on improving the quality and commercial viability of inventions rather than merely increasing their quantity. The government should prioritize support for R&D activities aligned with market demand, especially in digital technologies and automation. At the same time, stronger linkages among research institutes, universities, and enterprises should be promoted through the development of technology transfer mechanisms and benefit-sharing arrangements for inventions. In addition, the state can play a demand-creating role for innovation through public procurement and commissioning of technological solutions to support digital transformation. Finally,

strengthening linkages between the FDI sector and domestic firms will facilitate knowledge spillovers, enhance domestic innovative capacity, and gradually position innovation as a key driver of long-term EG.

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