

Information and Communication Technology, Transportation Infrastructure, and Their Effect on Inward Foreign Direct Investment in the ASEAN

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Abstract:

The purpose of this study is to investigate the roles of information and communication technology (ICT) and transportation infrastructure in influencing inward foreign direct investment (FDI) in the ASEAN for the period from 2000–2018 using panel analysis techniques involving pooled ordinary least squares (OLS), fixed and random effect. Specifically, ICT and transportation infrastructure together with other determinants of FDI such as economic growth, openness, tax barriers, and labor force capacity are applied to analyze their effects on inward FDI.

The results of this study are consistent with the literature, whereby macroeconomic factors such as economic growth, trade openness, and the labor force have a positive impact on inward FDI. The results also suggest that ICT has a significantly positive impact on inward FDI in the ASEAN. In terms of transportation infrastructure, road quality is the main factor attracting FDI into ASEAN countries. The results of this study can be used as guidance for policymakers on FDI, and encourage the government to pay greater attention to the development of both transportation infrastructure and ICT. The quality and availability of infrastructure in the host country definitely attracts FDI.

Keywords: foreign direct investment; information and communication technology; transportation infrastructure; ASEAN.

JEL Classification: F40; O16.

Introduction

The Association of Southeast Asian Nations (ASEAN) is one of the world's fastest-growing regions. Foreign direct investment (FDI) inflows have been one of the most important factors behind the strong economic growth achieved by Thailand, Malaysia, and Singapore (ASEAN Secretariat News 2019). These countries primarily provide tax incentives and cost advantages to foreign investors. The literature indicates that FDI inflows are determined by market size, degree of openness, and the role of institutions. Besides, other factors such as the labor force, tax rate, transportation infrastructure, and ICT are correlated with FDI inflows. Moreover, many studies discuss the macroeconomic factors influencing FDI inflows into ASEAN countries. However, none of the existing research articles determine the impact of transportation infrastructure and ICT on attracting FDI in ASEAN countries.

This paper aims to elaborate on the role of transport infrastructure and ICT for inward FDI into the ASEAN. The results of this study can be expected to provide a guideline for government agencies in host countries when designing policies to attract FDI into their countries. The remainder of the paper is organized as follows. Section 2 provides an overview of the transportation infrastructure and ICT situation in the ASEAN; section 3 presents an

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empirical literature review; section 4 outlines the methodology and data. The results and conclusions are provided in sections 5 and 6, respectively.

1. Literature Review

Most researchers believe that economic factors are important in attracting FDI, including market, resource, efficiency and strategic asset seeking, regulations, and business (Nunnenkamp 2001, USAID 2005, Okapanom and Sricharoen 2016). However, many previous articles highlight the importance of physical infrastructure as one of the determinants for attracting FDI inflow. Infrastructure covers many dimensions, ranging from roads, ports, railways, and telecommunications. Countries with good physical infrastructure such as highways, ports, and ICT are likely to increase their productivity and attract more FDI (Coughlin *et al.* 1991, Wheeler and Ody 1992, Khadaroo and Seetanah 2010, Abu Bakar *et al.* 2012, Pribadi *et al.* 2019). Moreover, infrastructure facilities, such as communications, transportation, and energy supply determine production and transaction costs, thus influencing incentives for the attraction of FDI into a country. In contrast, Gold *et al.* (2019) found that infrastructure had a significantly negative impact on FDI in Africa. Infrastructure factors are often mentioned in literature, although they refer to a variety of aspects.

ICT encourages FDI either by reducing the search time and related costs or through increases in efficiency and productivity. ICT can also increase productivity and FDI by cutting the cost of holding inventories through “just-in-time” inventory management by supporting closer integration between demand and production. Just-in-time management can lead to significant reductions in production costs by permitting a direct link between customers and producers. ICT also influences FDI indirectly through its effects on other related determinants. For example, a good ICT infrastructure also enhances the attractiveness of countries to export-oriented FDI. ICT provides the logistical support to facilitate exporting, contributing to a country’s attractiveness to foreign investors seeking to establish a presence to serve regional or global markets (Economou 2008).

Moreover, ICT can also improve transparency in host countries and reduce corruption, which acts as an impediment to FDI. Likewise, Latif *et al.* (2018) studied the dynamics of ICT, FDI, globalization, and economic growth in BRICS countries (Brazil, Russia, India, China, and South Africa), emerging economies with ICT infrastructure (consisting of five indicators: a landline telephone, mobile phones, Internet services, Internet users, and fixed broadband). These researchers found that FDI increases with the development of ICT; better ICT attracts more FDI in BRICS countries. This is consistent with the research conducted in Egypt by Fakher (2016), who found that a more developed ICT infrastructure attracts FDI, further strengthening economic growth. This is in the same direction as the research by Gholami *et al.* (2005), who studied the relationship between ICT and FDI in 23 major countries with heterogeneous economic development for the period 1976–99. They found a causal relationship between ICT and FDI in developed countries, meaning that a higher level of ICT investment leads to increased FDI inflow. Accordingly, ICT may contribute to economic growth indirectly by attracting more FDI. In addition, Kok and Ersoy (2009) discovered that telephone mainlines had a strong positive effect on FDI; this factor thus being the best FDI determinant in their analysis. Economou (2008) introduced that a 10% increase in the growth of Internet users or Internet hosts is correlated with a 2% increase in FDI flows.

In relation to inward FDI, the logistics sector, which includes transportation infrastructure, has been mentioned in various literature. Halaszovich and Kinra (2018) revealed that investments (FDI inflows and stocks) are more concerned with domestic transportation, especially by road, but less concerned with ports, which aligns with the sample case in this current study on Asia. Correspondingly, Bagchi (2014) investigated how supply competence attracts FDI by proposing three major factors, namely the supply environment, supply infrastructure, and absorptive capacity.

However, Luttermann *et al.* (2017) presented contrasting results, in that the logistics infrastructure has a positive influence on export and import volume, but not the factors attracting FDI. Khan *et al.* (2017) examined the long-run, causal relationship between environmental logistics performance indicators (ELPI) and growth-specific factors in a panel of 15 selected globally ranked logistics countries during the period from 2007–2015. The results indicate that logistics competence and infrastructure drive economic growth and add sectoral value, while energy demand and FDI inflows are both prerequisites for sustainable regional agriculture. Önsel Ekici *et al.* (2016) found that national inland transportation systems are important in the location choice for FDI and trade relations. Wang *et al.* (2016) evaluated the influencing criteria for attracting FDI by including legal and institutional factors, the market size of supporting industries, human resources, infrastructure facilities, technological development and innovation, domestic supply capacity, international cooperation and competition, and other criteria. While Çelebi *et al.* (2015) demonstrated the mediator effect on FDI in the relationship between LPI and GDP and found it to be statistically significant. Kampan (2017) recommended that to attract FDI in ASEAN countries, the efficiency of

customs and investment policies, security, safety as well as infrastructure development, especially road transportation systems, needs to be improved.

According to previous literature on ICT, the telecommunications sector has been identified as telephone and Internet networks. While transport infrastructure has been categorized according to modes of transport, namely ports, airports, roads, and railways, all of which are of major concern to investors.

2. Some Stylized Facts about Inward FDI, ICT, and the Transportation Infrastructure Situation in the ASEAN

FDI inflows into the ASEAN increased for the third consecutive year in 2018, reaching an all-time high of US\$ 155 billion (Table 1). The region's share of global FDI inflows also rose to 11.5% in 2018, with Singapore being the largest investor across the region, followed by Japan. Increased investment from China, the Netherlands, Germany, Switzerland, and Australia further contributed to higher inflows (UNCTAD 2019). This FDI trend is expected to continue, given the dynamic industrial developments and improvement of the investment and business environment in the region, especially concerning transportation infrastructure and ICT.

Table 1. FDI inflow into the ASEAN, 2015–2018 - unit: billions of dollars

Country	2015	2016	2017	2018
Brunei Darussalam	0.20	- 0.20	0.50	0.50
Cambodia	1.70	2.30	2.70	3.10
Indonesia	16.10	3.90	20.60	22.00
Lao PDR	1.10	1.10	1.70	1.30
Malaysia	10.20	11.30	9.30	8.10
Myanmar	2.80	3.00	4.00	3.60
The Philippines	5.60	8.30	10.30	9.80
Singapore	59.70	73.90	75.70	77.60
Thailand	8.90	2.80	8.00	13.20
Vietnam	11.80	12.60	14.10	15.50
Total	118.10	119.00	146.90	154.70

Source: ASEAN Secretariat, ASEAN FDI database (2019).

Table 2 reveals the investment in ICT in various sectors such as hardware, software, and IT services. Singapore has the highest IT spending per person and the biggest proportion of its investment comes from the government, especially for private and public clouds. The governments of Malaysia and Indonesia emphasize cloud computing, especially for supporting SME. While the Philippines also invest in cloud computing, supported by private companies such as Microsoft and Datacraft. However, government ICT investment projects mainly focus on the education sector, public health, and customs. The Vietnamese government is more concerned with ICT solutions for enterprise resource planning (ERP). Lastly, the growth in the hardware market of Thailand is driven by the demand for mobile technology, and it is government policy to give tablets to primary school students to adopt technology to enhance the efficiency of the education sector.

Table 2. ICT investment in the ASEAN

Country	Unit: dollars					
	Hardware	Software	IT Services	Total	IT Spending 2016	Average Spending/Person
Indonesia	4.2 bn	687 mn	989 mn	5.9 bn	11.5 bn	24
The Philippines	2.2 bn	4.1 mn	996 mn	3.6 bn	4.9 bn	35
Thailand	4.2 bn	893 mn	1.8 bn	6.9 bn	9.3 bn	103
Malaysia	2.7 bn	873 mn	1.6 bn	5.2 bn	N/A	179
Singapore	2.9 bn	944 mn	2.6 bn	6.4 bn	9.6 bn	1,207
Vietnam	1.8 bn	222 mn	474 mn	2.53 bn	4.9 bn	28

Source: IMC Institute (2012).

According to the master plan for ASEAN Connectivity 2025, there has been considerable investment in infrastructure projects to strengthen and enhance the capability of the economic and transport corridor. However, ASEAN member countries still face budgetary constraints and inadequate resources in their implementation. Nevertheless, technical support from the World Bank and funding support from the ASEAN-Australia Development Cooperation Program Phase II have helped to identify and prioritize potential infrastructure projects at the regional

level. Hence, 19 potential projects have been selected by seven countries as shown in Table 3 (ASEAN Secretariat News 2019).

In terms of transport, ASEAN connectivity and economies have been driven by domestic transport, cross-border trade, and labor movement within the region. The AEC Blueprint 2025 has resulted in the launch of the ASEAN Transport Plan, with an emphasis on air, land, and maritime transport as well as the relevant support facilities.

For air transportation, the strategic plan aims to strengthen and enhance the ASEAN to create a single aviation market, focusing on infrastructure improvement and air traffic management efficiency. For land transportation especially, road and rail infrastructures have enhanced the efficiency of intermodal and multimodal transport, for example with the ASEAN Highway Network and Singapore-Kunming Rail Link (SKRL). However, more than 80% of global trade is driven by maritime transport. The establishment of the ASEAN Single Shipping Market (ASSM) is designed to focus on enhancing efficiency and align with International Maritime Organization (IMO) conventions.

Table 3. ASEAN transportation infrastructure projects by country

Country	Road	Railway	Airport	Port
Indonesia			1	2
Myanmar	4			
Brunei Darussalam	1			
Cambodia	1			
Lao PDR	2			
Thailand	1	1		
Vietnam	2			

Source: ASEAN Secretariat (2019).

3. Methodology

3.1. Data

This study uses panel data from certain ASEAN countries, namely Cambodia, Indonesia, Lao PDR, Malaysia, the Philippines, Singapore, Thailand, and Vietnam from 2000–2018. The data for dependent variables, inward FDI, and the variables for identifying the ICT and transportation infrastructure (or explanatory variables), namely broadband Internet subscribers, mobile phone subscribers, quality of railroad infrastructure, quality of port infrastructure, quality of air transport infrastructure, and quality of roads were obtained from various sources, including the World Development Indicators from the World Bank, Asian Development Bank (ADB), and ASEAN Secretariat.

3.2. Model Specification

The following equations (1) and (2) analyze the effect of ICT and transportation infrastructure on FDI inward using market size, openness, tax barriers, and labor force capacity.

$$FDI = b_0 + b_1GDPG + b_2OPEN + b_3TAX + b_4LF + b_5BROADBAND + b_6MOBLIE + e_1 \quad (1)$$

$$FDI = b_0 + b_1GDPG + b_2OPEN + b_3TAX + b_4LF + b_7AIR + b_8PORT + b_9RAIL + b_{10}ROAD + e_2 \quad (2)$$

where FDI: Foreign direct investment inward, billion USD; GDPG: Economic growth: the rate of change in real GDP; OPEN: Trade openness: exports plus imports as a percentage of GDP; TAX: Taxes on international trade, as a percentage of total revenue; LF: Labor force, million people BROADBAND: Fixed broadband Internet subs; cribers per 100 people; MOBILE: Mobile phone subscribers, per 100 people; AIR: Quality of air transport infrastructure, 1(low)–7(high); PORT: Quality of port infrastructure, 1(low)–7(high); RAIL: Quality of railroad infrastructure, 1(low)–7(high); ROAD: Quality of roads, 1(low)–7(high); e: Error term; b_0, b_1, \dots, b_{10} : Coefficient

The empirical method adopted for estimation is the panel data approach. Panel data analysis has several benefits such as increasing reliability, regardless of the given sample size, boosting the degree of freedom, coping with multicollinearity among independent variables, reducing the effects of variable bias even with unbalanced panel data, and providing more complex analysis in comparison to stand-alone time-series or cross-sectional data analysis (Hsiao 2000). Panel data analysis not only captures the behavior of variables but also provides greater estimation efficiency and more information on the variables (Greene 2008). Furthermore, it allows greater flexibility when modeling differences in behavior across individuals within a group compared to ordinary least squares (OLS)

regression analysis. However, heterogeneity and selection bias may occur if the panel data analysis model is not chosen correctly (Gujarati and Porter 2009). There are three important models for panel data analysis:

- pooled OLS regression;
- the fixed effects model;
- the random effects model.

4. Results and Discussion

The descriptive statistics for the main variables prior to empirical analysis are presented in Table 4. The table shows the mean and standard deviations, as well as the maximum and minimum levels of the variables and number of observations. The Hausman test is a common approach in choosing a fixed effect or random effect model (Green 2008). The null hypothesis of the test indicates that the preferred model is the random effect. A fixed effect model is appropriate for estimating the effect of transportation infrastructure on inward FDI stock (Table 6). While the random effect model is the better choice for estimating the effect of ICT and transportation infrastructure on FDI inflow (Tables 5–6). The random effect model is also used to estimate the impact of ICT on inward FDI stock.

Table 4. Summary of descriptive statistics

Variables	Mean	Median	Maximum	Minimum	Std. Dev.	Observations
FDI_INFLOW	9,524.802	4,535.395	77,646.130	-4,550.370	15,577.820	152
FDI_STOCKIN	133,046.500	49,353.150	1,481,033.000	588.348	248,905.500	152
GDPG	5.807	6.050	14.530	-1.510	2.381	152
OPEN	144.893	124.330	437.330	37.420	95.297	151
LF	33.048	22.735	131.960	2.120	35.104	152
TAX	9.216	5.315	25.500	0.050	7.631	96
BROADBAND	4.968	1.360	27.380	0.000	7.431	139
MOBILE	53.991	19.460	435.190	0.010	80.408	151
AIR	4.830	4.360	6.910	2.800	1.126	97
PORT	4.243	3.900	6.830	2.000	1.327	97
RAIL	3.335	2.985	5.900	1.600	1.381	70
ROAD	4.192	3.740	6.660	2.090	1.304	97

Table 5 presents the analysis results on the role of information communication technology (ICT) and transportation infrastructure in influencing FDI inflows based on panel data from 2000–2018. The regression result shows that macroeconomic factors such as economic growth, trade openness, and labor force have a positive impact on FDI inflow and FDI inward stock. Economic growth, which refers to the market size of a host country, has a major and statistically significant positive impact on FDI inflow into the ASEAN. The results seem to support the argument that foreign investors tend to be more attracted to the country with a higher growth rate of GDP because it indicates a larger potential demand for their products. In addition, the results also demonstrate that the openness level of the country has a positive and statistically significant effect on FDI inflow and FDI stock inward, which supports the hypothesis that a country with more liberalized economic reforms attracts FDI. The results also show that the labor force has a significant positive effect on FDI inflow. Therefore, the labor force and the skill level of the labor force in the host country are still in need of improvement.

The empirical analysis shows a positive effect on the key variables of ICT on inward FDI in the ASEAN. The estimated coefficient for fixed broadband Internet subscribers (BROADBAND) and mobile phone subscribers (MOBILE) are at the positive and significant level of 1%. ICT is a fundamental infrastructure and a necessary factor for development of a country's productivity, to attract FDI and ensure competitiveness. From the investor perspective, the readiness of ICT infrastructure has an influence on FDI decision-making because projects are easy to implement and can start immediately without spending time and budget initiating an ICT system. Therefore, the quality of ICT infrastructure plays an important role in attracting FDI into the ASEAN. Similarly, the Thailand Board of Investment (2017) found that good communication was to be the main factor for investors deciding to expand or maintain investment levels. While Tantivisetthak and Na Ubon (2018) suggest that Cambodia's telecommunication infrastructure development, measured by the increase in the number of Internet users, can increase FDI from China. Currently, ASEAN member countries have been actively promoting an enabling environment for investment in the digital economy. Moreover, the ASEAN has also been developing national digital plans, as well as adopting policies and measures to facilitate and encourage both domestic and foreign investment (Hwee *et al.* 2018). ICT has been utilized to promote the transformation of the ASEAN into a single market, leading

to cost reduction for conducting business, achieving economies of scale and scope, and enabling synergies toward sustainable business models within the ASEAN.

In terms of transportation infrastructure, roads can be considered as the main factor for attracting FDI in the ASEAN. The quality of roads (ROAD) has a significant positive effect on inward FDI stock and inflow in ASEAN countries. While the quality of ports and air infrastructure has a significant negative effect on inward FDI stock. These results correspond with those of Halaszovich and Kinra (2018) and Önsel Ekici *et al.* (2016), in that national transport, especially roads, is key to the decision-making of foreign investors, since the quality of roads and geographical distance are their main focus. Gopalan *et al.* (2019) suggested that quality of roads was the most essential determinant of Greenfield FDI inflows to ASEAN. Moreover, transportation is obviously one of the biggest logistics costs and has a direct effect on overall business costs. According to the important characteristics of the AEC Blueprint (2008), establishment of the AEC was aimed at encouraging the ASEAN to become a highly competitive economic single market as well as a production base. Many infrastructure development projects have been proposed to facilitate the free flow of goods, services, investment, and capital among the ASEAN. The current transportation infrastructure development situation in the ASEAN means that road infrastructure projects are the main focus of ASEAN connectivity planning to attract inward FDI to support and facilitate investors. However, although the port infrastructure in each country has received substantial investment to expand container capacity, it has also had a positive influence on international trade, encouraging foreign investors to trade in exports and imports instead of making direct investment.

Table 5. Results of factors determining FDI inflow in the ASEAN from 2000–2018, using pooled OLS, fixed effect, and random effect

Independent variables	Dependent variable: FDI Inflow					
	(1)	(2)	(3)	(4)	(5)	(6)
	Pooled OLS Coefficient	Fixed Effect Coefficient	Random Effect Coefficient	Pooled OLS Coefficient	Fixed Effect Coefficient	Random Effect Coefficient
Constant	-9740.29 (-4.0450)***	-55936.67 (-4.0160)***	-9726.74 (-3.9364)***	-17322.74 (-1.4729)	-11925.99 (-0.7042)	-15779.00 (-1.1931)
GDP Growth	516.66 (2.7256)***	353.39 (1.6637)*	519.67 (2.6278)**	603.33 (2.2092)**	635.68 (2.1941)**	594.17 (1.8149)*
OPENNESS	52.37 (6.0573)***	79.78 (2.8365)***	52.42 (5.8665)***	61.94 (0.9627)	21.30 (0.2754)	53.59 (0.7656)
Labor Force	63.90 (2.3895)***	1448.79 (3.8665)***	63.83 (2.3213)**	155.44 (2.7649)***	114.26 (0.3076)	146.25 (2.3646)**
TAX	-15.97 (-0.1655)	-27.61 (-0.1427)	-17.63 (-0.1790)	81.20 (0.3239)	511.17 (1.0363)	52.74 (0.1898)
BROADBAND	673.81 (4.7030)***	761.43 (4.7818)***	669.65 (4.5746)***			
MOBILE	34.54 (3.9277)***	65.17 (2.3352)**	34.55 (3.8117)***			
AIR				-912.56 (-0.3708)	-2326.15 (-0.6590)	-652.76 (-0.2325)
PORT				-2900.62 (-0.6748)	-2035.08 (-0.3583)	-2828.97 (-0.5904)
RAIL				1458.608 (1.0033)	2205.86 (0.5920)	1428.13 (0.8876)
ROAD				4824.5660 (1.6600)*	4201.08 (0.9488)	4483.89 (1.6959)*
R-squared	0.7411	0.7826	0.7426	0.6963	0.7056	0.6949
Adjusted R-squared	0.7224	0.7519	0.7240	0.6356	0.6074	0.6339
F-statistic	39.6001	25.5193	39.9083	11.4641	7.1889	11.3906
Prob (F-statistic)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hausman Test			0.9343			0.9883

Notes: *t*-statistics are reported in parentheses. ***, **, * indicates significance at 0.01, 0.05, and 0.10.

Table 6. Results of factors determining inward FDI stock in the ASEAN from 2000–2018, using pooled OLS, fixed effect, and random effect

Independent Variables	Dependent Variable: Inward FDI Stock					
	(7)	(8)	(9)	(10)	(11)	(12)
	Pooled OLS Coefficient	Fixed Effect Coefficient	Random Effect Coefficient	Pooled OLS Coefficient	Fixed Effect Coefficient	Random Effect Coefficient
Constant	-40144.82 (-3.2205)***	-174679.40 (-1.9865)*	-40144.82 (-3.0647)***	44555.68 (0.4279)	-87928.05 (-1.0851)	44555.68 (0.6875)
GDP Growth	56.71 (0.0578)	-1211.68 (-0.6973)	56.71 (0.0550)	46.05 (0.0190)	2550.12 (1.8397)*	46.05 (0.0306)
OPENNESS	359.23 (8.0256)***	424.55 (2.3090)**	359.23 (7.6374)***	285.65 (0.5014)	-309.85 (-0.8374)	285.65 (0.8057)
Labor Force	406.35 (2.9351)***	4340.75 (1.7673)*	406.35 (2.7931)***	1333.31 (2.6785)**	9344.17 (5.2587)***	1333.31 (4.3036)***
TAX	-780.22 (-1.5621)	-858.64 (-0.5798)	-780.22 (-1.4865)	-5636.47 (-2.5392)**	588.92 (0.2495)	-5636.47 (-4.0799)***
BROADBAND	11105.14 (14.9731)***	12670.35 (9.3336)***	11105.14 (14.2488)***			
MOBILE	522.61 (11.4786)***	316.33 (1.9444)*	522.61 (10.9233)***			
AIR				-2648.46 (-0.1215)	-28728.27 (-1.7011)*	-2648.46 (-0.1953)
PORT				-73725.28 (-1.9370)*	33847.64 (1.2454)	-73725.28 (-3.1123)***
RAIL				-11106.84 (-0.8629)	-16776.84 (-0.9411)	-11106.84 (-1.3864)
ROAD				91667.89 (3.5622)***	36065.28 (1.7024)*	91667.89 (5.7235)***
R-squared	0.9435	0.9681	0.9435	0.8570	0.9595	0.8570
Adjusted R-squared	0.9394	0.9527	0.9394	0.8284	0.9460	0.8284
F-statistic	230.8681	62.8539	230.8681	29.9630	71.1047	29.9630
Prob (F-statistic)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hausman Test			0.7622			0.0000

Notes: *t*-statistics are reported in parentheses. ***, **, * indicates significance at 0.01, 0.05, and 0.10.

Conclusion

Empirically, the aim of this study was to investigate the effect of ICT and transportation infrastructure on inward FDI using panel data from 8 ASEAN member countries during the period from 2000–2018. The empirical results suggest that macroeconomic indicators such as economic growth, trade openness, and the labor force have a positive impact on inward FDI, while tax has no significant impact on FDI attraction. According to the study results, ICT infrastructure is a key factor in encouraging FDI because of its positive effect on production and cost-effectiveness. Investors are concerned about the quality of the ICT infrastructure since it plays an important role in attracting FDI into the ASEAN. The results also suggest that transportation infrastructure is associated with inward FDI because transport cost is seen as one of the biggest logistics costs and has a direct impact on business competitiveness. Road quality has a significant positive effect on inward FDI. While the quality of port and air infrastructure has a significant negative effect on inward FDI stock. Since overland transportation is the main means of transport, the ASEAN have developed more interconnected transportation routes.

In fact, the ASEAN remains focused on infrastructure development projects to facilitate the free flow of goods, services, investment, and capital among ASEAN member countries. ICT infrastructure is strongly supported because it facilitates investment in the digital economy. Moreover, the ASEAN has also been developing national digital plans and adopting policies and measures to facilitate and encourage both domestic and foreign investment. Road infrastructure projects have become the main focus of ASEAN connectivity planning to attract inward FDI to support and facilitate investors. However, although port infrastructure development in each country has received substantial investment to expand container capacity, it has also had a positive influence on international trade, encouraging foreign investors to trade in exports and imports instead of making direct investment.

However, there remains a large infrastructure readiness gap in each ASEAN member country. There are many routes linking the ASEAN together but the liberalization of trade and movement have still not been completely

implemented due to the difference in regulations and vehicle standards of each country, meaning that transporters need to stop for inspection and change trucks at the border. Moreover, the lack of road quality is a big issue, resulting in ASEAN connectivity not being as successful as it should be. Likewise, there are also differences in the readiness and stability of ICT infrastructure among the ASEAN. Furthermore, each country focuses on a different aspect of the ICT sector. Hence, governments should harmonize their policies and support each other. Finally, policymakers should prioritize essential ICT infrastructure (including fiber connections and mobile networks) to provide universal and low-cost Internet access. However, private players are unlikely to take full responsibility for such development, and the public sector should drive this effort forward.

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