อิทธิพลส่งผ่านของการลงทุนโดยตรงจากต่างประเทศ ต่อโครงร่างพื้นฐานด้านการขนส่ง และ การเติบโตทางเศรษฐกิจ ของสาธารณรัฐประชาธิปไตยประชาชนลาว

THE MEDIATION EFFECTS OF FDI ON TRANSPORTATION INFRASTRUCTURE AND ECONOMIC GROWTH IN LAO PEOPLE'S DEMOCRATIC REPUBLIC

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บทคัดย่อ

งานวิจัยครั้งนี้มีวัตถุประสงค์เพื่อศึกษาผลกระทบตัวแปรส่งผ่านของการลงทุนโดยตรงจากต่างประเทศ (FDI) ต่อความสัมพันธ์ระหว่างโครงสร้างพื้นฐาน ด้านการขนส่งกับ การเติบโตทางเศรษฐกิจใน สาธารณรัฐประชาธิปไตย ประชาชนลาว (สปป.ลาว) โดยใช้การทดสอบของ Sobel การศึกษานี้เป็นการวิจัยเชิงปริมาณที่ใช้ข้อมูลพาแนล ตั้งแต่ปี 2556 ถึง 2565 ผลการทดสอบการถดถอยสรุปได้ว่า มีความสัมพันธ์เชิงบวกระหว่างโครงร่าง พื้นฐานด้านการขนส่ง และ การลงทุนโดยตรงจากต่างประเทศ โดยค่า p-value=0.01 นอกจากนี้ยังพบว่าความสัมพันธ์เชิงบวกระหว่างการลงทุนโดยตรงจากต่างประเทศ และการเติบโตทางเศรษฐกิจอย่างมีนัยสำคัญ ที่ 0.05 ผลการวิจัยพบว่า มีผลกระทบทั้งทางตรง และทางอ้อมระหว่างโครงร่างพื้นฐานด้าน การขนส่งกับการเติบโตทางเศรษฐกิจ และการทดสอบของ Sobel พบว่า การลงทุนโดยตรงจากต่างประเทศ เป็นตัวแปรคั่นกลางบางส่วนของความสัมพันธ์ระหว่างโครงสร้างพื้นฐานด้านการขนส่ง และ การเติบโตทาง เศรษฐกิจเช่นกัน โดยสรุป โครงสร้างพื้นฐานด้าน

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การขนส่งช่วยเพิ่มความน่าดึงดูดใจ และ ประสิทธิภาพของภูมิภาค โดยดึงดูดการลงทุนโดยตรงจากต่างประเทศ ผลจากการลงทุนโดยตรงจากต่างประเทศนำมาซึ่งเงินทุน เทคโนโลยี และ ความเชี่ยวชาญ กระตุ้นกิจกรรมทางเศรษฐกิจ และเอื้อต่อการเติบโตทางเศรษฐกิจโดยรวม บทบาทไกล่เกลี่ยของการลงทุนโดยตรงจากต่างประเทศนี้ เน้นย้ำถึงความเชื่อมโยงระหว่างกันของการพัฒนาโครงสร้างพื้นฐาน การดึงดูดการลงทุน และ การเติบโตทางเศรษฐกิจ

คำสำคัญ: โครงร่างพื้นฐานด้านการขนส่ง การลงทุนโดยตรงจากต่างประเทศ การเติบโตทางเศรษฐกิจ

Abstract

This paper aims to study the mediation effects of Foreign direct investment (FDI) on the relationship between transportation infrastructure and economic growth in Lao people's Democratic Republic (Lao PDR) by using Sobel test. This study is quantitative research using panel data from 2013 to 2022. The regression results conclude that there is a positive relationship between transportation infrastructure and FDI by p-value=0.01. In addition, there is a positive relationship between FDI and Economic growth by significance at 0.05. Result demonstrates that there is direct effect and indirect effect between transportation infrastructure and Economic growth and Sobel test found that FDI was a partial mediator of the relationship between transportation infrastructure and Economic growth as well. In summary, transportation infrastructure enhances the attractiveness and efficiency of a region, drawing in FDI. The resultant FDI brings in capital, technology, and expertise, stimulating economic activities and contributing to overall economic growth. This mediating role of FDI underscores the interconnectedness of transportation infrastructure development, investment attraction, and economic growth.

Keywords: Transportation infrastructure, Foreign direct investment, Economic growth

Introduction

Presents, the development of human, social, and cultural capital is influenced by infrastructure, as are opportunities for the growth of economic initiatives and the attraction of outside capital, as well as chances for modernizing agricultural production, enhancing quality of life, and creating multipurpose and sustainable rural development (Kadyraliev et al., 2022). Improving infrastructure and increasing its services are important for a country's economic success since poor infrastructure deters international investors (Hasan et al., 2022). Rarely is it argued that in recent years, transportation infrastructure has been a key enabler of consistent economic growth. Transportation system is essential infrastructure for economic growth (Kadyraliev et al., 2022; Magazzino & Maltese, 2021; M. Zhang et al., 2021; Y. Zhang & Cheng, 2023).

Lao People's Democratic Republic (Lao PDR) is a landlock country , and its transportation infrastructure is underdeveloped and make Lao's economic slowly growth in the last five years (World Bank, 2021). The lack of direct access to the sea and insufficient facilities have limited the growth of this small domestic market, which as of 2022 had a population of only 7.2 million people with its ongoing negotiations to join the World Trade Organization (WTO), the country has increased its efforts to integrate on a global scale with the real GDP was 4.4% (Bank of the Lao PDR, 2022) and Lao PDR still faces numerous challenges on its path to graduating from Least Development Country status by 2026 (Wongpit, 2023). Due to Lao People's Democratic Republic (Lao PDR) has no border share with the sea so road transport is the dominant mode of transportation, and it is believed that in the foreseeable future, road transport will continue to dominate both freight and passenger traffic. Major transport routes follow the north-south pattern in accordance with the distribution of the population, and with major East-West links to neighboring countries such as Vietnam, Thailand and Myanmar. Road transport carries 96% of passenger traffic (passenger/kilometer) and 36% of freight traffic (ton/kilometer) (Ministry of Planning and Investment, 2021). However, the country's total road length is approximately 59.000 km, of which 1% is made of concrete, 2% is asphalt, 20% is paved, and 35% is earth road (Ministry of Planning and Investment, 2021). In addition, Road expansion improves the accessibility between different regions. This makes it easier for goods to be transported from one place to another, reducing the time and cost associated with transportation. With improved road networks, markets in different regions become more integrated. This means that goods can be sold in more markets, potentially leading to increased competition and lower prices (Wu et al., 2023). However, Lao People's Democratic Republic (Lao PDR) has poor road quality, lack of maintenance, limited connectivity, inefficient transportation system and high transportation costs. According to statistic show that global quality road ranking of Lao People's Democratic Republic (Lao PDR) was 86th of the world and the 6th of ASEAN country (Global economic.com, 2022) and also network density of Lao People's Democratic Republic (Lao PDR) was 24 Km of road per 100 square kilometers of land area (Ministry of Planning and Investment, 2021).

Furthermore, relative to FDI inflows in the manufacturing sector, the Lao PDR's economic growth over the past ten years has been significantly fueled by FDI inflows into the mining and hydropower sectors, which are both highly capital intensive. As of 2021, the FDI share of Laos' GDP was 5% (Ministry of Planning and Investment, 2021). In contrast, no notable technological advancements or innovations have taken place in other areas that would boost long-term economic productivity and performance. FDI, notably in the Lao PDR, is still significant and essential to the sustained economic progress of emerging country.

This in the background, the present study offers a valuable understanding of the effect of transportation infrastructure on economic growth through FDI as a mediator

because there is no research investigating this association in Lao People's Democratic Republic that has distinctive economic features. Specifically in the context of a landlocked and undeveloped country like Lao PDR. This contributes to the broader literature on economic development and infrastructure investment this study would fill the gap in the prior research by proving that FDI is the mediators on relationship between transportation infrastructure and economic growth over the period of 2013–2022. The Sobel model was developed by (Sobel, 1982) is used to examine the role of FDI as a mediator in the relationship between economic growth and transportation infrastructure.

Literature reviews

1. The relationship between transportation infrastructure and economic growth

Acheampong et al. (2022) uses data from 1995 to 2019 and the dynamic system-generalized method of moment to examine the effects of transportation infrastructure and technological advancement on GDP, energy consumption, and carbon emissions in the European Union (EU). The findings show that EC raises GDP in a single direction, but GDP and EC have opposite effects on CO2e. The findings show that innovation directly raises GDP and EC, whereas improvements in freight transportation infrastructure raise GDP and CO2e while lowering EC. Raimbekov and Syzdykbayeva (2021) study about assessing the impact of transport and logistics on economic growth in emerging economies of the republic of KAZAKHSTAN. The objective is to examines the link between logistics indicators and economic growth in Kazakhstan in the period 1995-2019. By using models of total output, demand, and vector error correction, factors and the causal relationship between the indicators of transport development and economic growth are explored. The investigation clarified the intricacies of the relationship between several transport indicator variables and economic growth, including the relationship's direction and nature.

Nguyen (2022) investigates the geographic spillover effects of transportation infrastructure in Vietnam. To calculate the geographical impact of transportation infrastructure on Vietnam's economic growth from 2000 to 2019, we use the spatial Durbin model. Due to the national transportation infrastructure's connected nature, the data demonstrate that there is good evidence for each time. Transportation infrastructure spillover effects at the regional level vary significantly over time among Vietnam's four macro regions: the southern region always has a positive spillover effect; the northern region had negative spillover effects from 2000 to 2009 and positive spillover effects from 2010 to 2019; the central region had negative spillover effects from both periods; and in the case of the Mekong Delta's economic region, negative spillovers can be seen starting in 2010. Pradhan and Bagchi (2013) examine the effect of transportation (road and rail) infrastructure on economic growth in India over the period 1970e 2010. The research discovers bidirectional causality between road traffic and economic growth using the Vector Error Correction Model (VECM).

Additionally, it discovers unidirectional causality from rail transportation to economic growth and unidirectional causality from rail transportation to gross capital formation, as well as bidirectional causality between road transportation and capital formation, gross domestic capital formation, and economic growth. According to the study, the Indian economy will grow significantly as a result of increased gross capital formation and improved transportation infrastructure (road and rail). Therefore, this study recommends that, within its specified parameters, a proper transportation strategy be maintained in order to improve India's transportation infrastructure and, in turn, promote sustainable economic growth.

Elburz and Cubukcu (2021) analyze the spatial impacts of road infrastructure on the regional economy in Turkish NUTS 2 areas between 2004 and 2014 aims to gauge the most recent advancements in transportation infrastructure. To evaluate geographic impacts, we use a spatial Durbin model and an enhanced Cobb-Douglas production function model. Unlike earlier research that used spatial econometric models. The findings show that investments in road infrastructure have considerable and advantageous geographical spillover effects on regional growth. The results essentially show the significance of indirect effects of road transportation infrastructure and diverge from earlier non-spatial and inflated effect conclusions in the literature. Based on the previous study was found the nexus between transportation infrastructure and economic growth (Elburz & Cubukcu, 2021; Nguyen, 2022; Saidi et al., 2018).

2. The relationship between transportation infrastructure and FDI

Basuki (2021) examines the availability of transportation infrastructure as a component of FDI inflow among Indonesia's 34 provinces during the years 2014 to 2018. Researchers and academics have been looking into how a country's infrastructure influences its acceptance of FDI, and part of their research has focused on how important good transportation infrastructure may be for FDI inflow. The study's findings demonstrate the enormous influence that transportation infrastructure has on FDI inflow. Indicators of the economy and society are included since FDI the inflow to Indonesia is also susceptible to other causes. Halaszovich and Kinra (2020) found that there are several factors, according to research in logistics and transportation, that explain why MNEs rely their site decisions on the logistical performance of the host country. By incorporating these factors into more conventional FDI and trade models, it will become clearer how important the various components of national transportation systems are to FDI and trade trends in the Asian area. In addition, they offer theoretical justifications and empirical data to support the notion that national transportation networks mitigate the negative impacts of various (between-country) distance dimensions on the performance of foreign direct investment and international trade. Shahbaz et al. (2020) examines the impact of infrastructure for education and transportation on FDI for the French economy from 1965 to 2017. Other factors that affect foreign direct investment include economic expansion, financial progress, and electricity use. In order to

analyze unit root properties of variables in the presence of both sharp and smooth structural breaks in the series, the SOR unit root test is used in this manner. The bootstrapping ARDL cointegration test is used to determine whether there is cointegration between the variables. The empirical findings demonstrate that the variables are cointegrated.

Wekesa et al. (2016) identified the impacts of infrastructure development in the areas of transportation, electricity, communication, water, and waste on FDI inflows in Kenya. The World Bank, the Central Bank of Kenya, and the United Nations Conference on Trade and Development (UNCTAD) provided the study with annual time series data. The improvement of the country's transportation, communication, water, and waste systems, as well as the exchange rate, economic expansion, and trade openness, were found to be significant drivers of FDI inflows into Kenya using multiple regression analysis. Therefore, ongoing infrastructure development is essential for Kenya to draw additional FDI since good infrastructure provides investors with a favorable business environment. (Azolibe et al., 2020) targeted at determining whether government spending on infrastructure like roads, transportation, defense, and health care has a meaningfully beneficial relationship with the amount of FDI and local investment in Nigeria. The results of the co-integration test showed that the variables in the models have long-term associations. The short-run coefficients of the error correction estimates revealed a favorable link between domestic investment and FDI and government spending on infrastructure for roads, transportation, defense, and health.

Atioğlu and Şahin (2022) explore the one of the key elements affecting a country's degree of development is foreign direct investment (FDI). Realizing the developments that the foreign capital wants and preparing the ground for investments are vital to entice foreign capital to the nation. The country's development is aided by its robust transportation system in many social and cultural as well as economic ways. With all these benefits, investments in transportation infrastructure make countries more appealing to foreign investors. The Arellano-Bond difference Generalized Method of Moments (GMM) was used in this study to analyze the connection between investments in transportation infrastructure and foreign direct investments (FDI). In addition, the dynamic panel model's explanatory variables were expanded to include the FDI determinants of inflation, trade openness, and economic growth. The analysis was done using data from 30 OECD nations, and the study's data set spans the years 2010 and 2017. The data show that total expenditures for transportation infrastructure investment have a beneficial impact on foreign direct investments.

3. The relationship between FDI and economic growth

Alam et al. (2022) investigate the unequal effects of foreign direct investment (FDI) on India's economic growth from 1991 to 2019. As control variables, trade openness, inflation, and financial development are also used. According to the findings, positive foreign direct investment inflow shocks have a beneficial impact on India's economic growth whereas

negative FDI inflow shocks have the opposite effect. Additionally, the Wald test confirms that FDI has an unbalanced impact on GDP growth over the long and short terms. Additionally, both in the long and short runs, financial development and inflation rate greatly slow down economic growth. (Ali & Hussain, 2017) asserted on the theory that FDI was considered as a key driver of global economic integration. Mustafa (2019) examined the contribution of foreign direct investment and tourism receipts to GDP of Sri Lanka for the period 1978- 2016. The results showed that export had a positive effect on GDP, while import had a negative influence on GDP. Phuyal and Sunuwar (2018) discovered that foreign direct investment has a positive and considerable impact on Nepal's economic growth in all sectors. Based on sector-specific data that was not aggregated, the study concluded that the government should give export-oriented FDI priority over domestic demand-oriented foreign direct investment in order to boost economic growth. Additionally, other studies concluded that there is insufficient proof that FDI significantly affects economic growth.

Nketiah-Amponsah and Sarpong (2019a) investigates the effect of infrastructure and foreign direct investment (FDI) on economic growth in Sub-Saharan Africa (SSA) using panel data on 46 countries covering the period 2003– 2017. The system GMM estimates that the growth rates for infrastructure related to energy and transportation are 0.09 percent and 0.06 percent, respectively, for every 1 percent upgrade. Furthermore, FDI only promoted growth when it interacted with infrastructure. Infrastructure and FDI together increase economic growth by 0.016 percent. Base on the previous reviews found a strong positive relationship between foreign direct investment and economic growth (Nketiah-Amponsah & Sarpong, 2019b; Danky et al., 2022; Phuyal & Sunuwar, 2018).

A review of the related literature provides a clear consideration of the association between transportation infrastructure and economic growth. The variables such as transportation infrastructure, foreign direct investment and economic growth. To estimate the role of FDI as a mediator in the relationship between transportation infrastructure and economic growth in Laos, a model and variables are developed and explained in the methodology part. The empirical results will express the role of FDI as a mediator through Sobel’s model.

Data and Methodology

This study is quantitative research that using secondary data which population in this study are 18 provinces in Lao PDR and using a sampling criterion, the researcher used purposing sampling by selecting sample groups from provinces with annual foreign direct investment from other countries as well as annual imports and exports. Therefore, we can choose 10 of the 18 provinces. including from the northern part 3 provinces, middle part 5 provinces and 2 provinces from the southern part which these provinces have complete data for analysis. For dependent variable the GDP per capita is used to represent economic

growth (Y), which is divided by the provincial population (GDP per capita) and independent variable is transportation infrastructure that measuring by using length of road in kilometers as a proxy, and mediators were foreign direct investment (FDI) by using value of inflow investment from foreign investors. This study is to find the role of FDI as a mediator on the relationship between transportation infrastructure and economic growth by using Sobel (1982) because of the Sobel test is relatively straightforward to compute and interpret and the standard errors of the regression coefficients (a and b) are likely to be more stable and less biased, leading to more accurate estimates of the indirect effect. In addition, limited data with a small sample size where the assumptions of OLS regression are more likely to be violated. Therefore, Robust regression was used for solving these assumptions in this study.

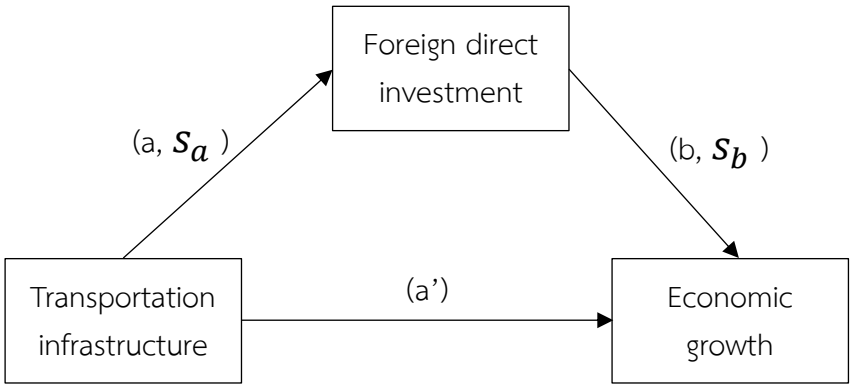

Figure 1 Mediation model

The Sobel test is simple to utilize. It requires three steps:

Model1: $lnFDI = \beta_0 + alnTRA + \varepsilon_1$ (1)

Model2: $lnGDP = \beta_1 + a'lnTRA + blnFDI + \varepsilon_2$ (2)

Model3: $Z = \frac{a*b}{\sqrt{b^2*s_a{}^2+a^2*s_b{}^2}}$ (3)

Where:

lnGDP = Economic growth

lnFDI = foreign direct investment

lnTRA = Transportation infrastructure

$\beta_0, a, \varepsilon_1$ were intercept, coefficient, and error term of model1 respectively

$\beta_1, a', b, \varepsilon_2$ were intercept, coefficient, and error term of model2 respectively

s_a = standard error of coefficient (a) in Model1

s_b= standard error of coefficient (b) in model2

Which in model3 is utilized to compute the Sobel test statistic, use a "Z Scores" table to determine if the computed Z value falls outside the critical values (Abu-Bader & Jones, 2021). For example, the computed Z score will be statistically significant if it falls outside ±1.96 given a two-tailed alpha of .05 and outside ±2.58 given a two-tailed alpha of .01. The Sobel test, however, has been criticized by various researchers in that it is based on the standard normal distribution (z scores), which requires a large sample size to conduct mediation analysis (Kenny et al., 1998; MacKinnon et al., 2002; Sobel, 1982).

Results

The stationarity test (unit root test) is performed on all variables using the Levin–Lin–Chu (LLC) unit root test. The variables are used to calculate such as GDP growth per capita, foreign direct investment and transportation infrastructure. The unit root test results are applied to confirm that the variables in this study are stationary at level (0) and at the statistical significance level of 0.10 and 0.05. The results are presented in Table 1.

Table 1 Stationary test (unit root test)

Variable	Method	Statistic	p-value	Remark
Lngdp	Levin, Lin & Chu	-3.6607	0.0833*	Stationary
LnTra	Levin, Lin & Chu	-2.7334	0.0772*	Stationary
LnFDI	Levin, Lin & Chu	-5.6501	0.0003**	Stationary

Source: Author's calculation

Note: ***statistically significant at 1 percent, ** statistically significant at 5 percent, *statistically significant at 10 percent.

To examine the relationship between transportation infrastructure and FDI panel regression was use and also Hasman test was implied to choose the suitable method between fixed effect or random effect where the result was showing in the table 2 bellowed.

Table 2 Hausman test for model 1

	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	fe	re	Difference	S.E.
lnTra	1.461749	1.394544	.067205	.1277963

Source: Author's calculation

Test: Ho: difference in coefficients not systematic. chi2(1) = (b-B)'[(V_b-V_B) ^ (-1)] (b-B) = 0.28

Prob>chi2 = 0.5990. b = consistent under Ho and Ha; obtained from xtreg; B = inconsistent under Ha, efficient under Ho; obtained from xtreg.

As a result, in table3 found a positive relationship between transportation infrastructure and FDI (Basuki, 2021; Mefteh, 2020; Nguea, 2020). where the coefficient (a)=1.3945, standard error (S_a)=0.370, z=3.77 and p-value=0.000***. The result indicates that 8% transportation infrastructure can predict FDI.

Table 3 Regression results model1

Interpret variable	Coef.	Std. Err.	z	P>|z|
lnTra	1.394544	.3701965	3.77	0.000***
_cons	6.101029	2.877162	2.12	0.034

Source: Author's calculation

R-sq = 0.08, Obs = 100, Prob > chi2 = 0.0002, Chi2(1) = 14.19. Note: The test statistics are in parentheses, ***, ** and * represent the 1%; 5% and 10% significance levels, respectively.

Table 4 below shows the results of the panel regression analysis that was conducted to investigate the relationship between transportation infrastructure, foreign direct investment (FDI), and economic growth. The Hasman test was also used to determine which method—fixed or random—was most appropriate.

Table 4 Hausman test for model2

	(b) fe	(B) re	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
lntra |	.0931053	.0788235	.0142817	.010543
LnFDI |	.0224983	.0296405	-.0071422	.0023313

Source: Author's calculation

Test: Ho: difference in coefficients not systematic chi2(2) = (b-B)'[(V_b-V_B)^(-1)](b-B) = 9.42
Prob>chi2 = 0.0090. b = consistent under Ho and Ha; obtained from xtreg; B = inconsistent under Ha, efficient under Ho; obtained from xtreg.

Table 5 demonstrates the positive relationship between transportation infrastructure and economic growth (Kadyraliev et al., 2022; Nguyen, 2022; Y. Zhang & Cheng, 2023) additionally, FDI has a positive relationship to economic growth (Asafo-Agyei & Kodongo, 2022; Brahimi, 2022; Poudel, 2022).

Table 5 Regression results for model2

Lngdp	Coef.	St.Err.	t-value	p-value
lnTra	0.09	0.04	2.12	.03**
LnFDI	0.02	0.01	2.04	.04**
Constant	6.46	0.31	20.29	0.00***

Source: Author's calculation

R-sq = 0.17, Obs = 100, Prob > chi2 = 0.058, Chi2(1) = 3.97. Note: The test statistic is in parentheses, ***, ** and * represent the 1% ;5% and 10% significance levels, respectively.

To utilize the Sobel test, follow these steps: Determine both "a" and "b" unstandardized regression coefficients and their standard errors (S_a and S_b, respectively). These values are found in both tables 3 and 5, respectively, and are summarized in figure2.

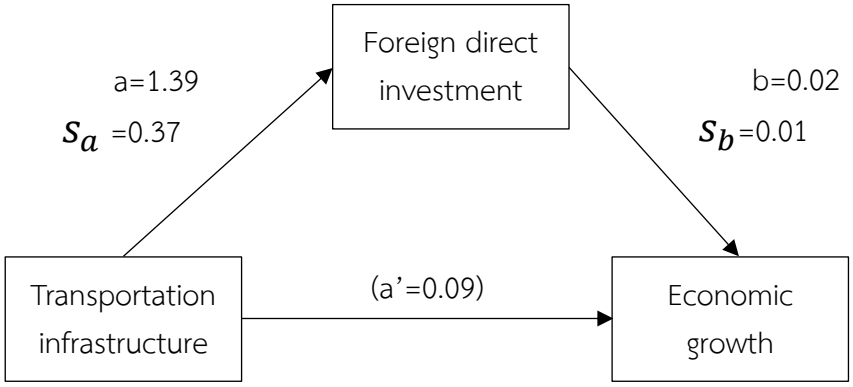

Figure 2 Unstandardized Regression Coefficients and Standard Errors

According to the result from the figure2, we use the Sobel test to compute the Z score (MacKinnon et al., 2002). using equation3 as follows:

$$Z = \frac{1.3945 * 0.022}{\sqrt{(0.022)^2 * (0.3701)^2 + (1.3945)^2 * (0.010)^2}} = 1.899$$

Because the computed z score =1.899, p-value=0.05, it indicates a statistically significant result at alpha 5%. First, results of simple linear regression in table 3 show that transportation infrastructure was a statistically significant predictor of FDI (a = 1.39, S_a=0.37, z = 3.77, p < .01***). Next, when the mediator, FDI was entered in the regression analysis, transportation infrastructure was still longer a significant predictor of economic growth in table 5 (beta = 0.07, SE = 0.036, t = 2.14, p >.032**). On the other hand, the mediator, FDI, emerged as a significant predictor of economic growth (b =0.02, S_b= 0.01, t = 2.03, p < .042**. To further investigate the mediator, the Sobel test was utilized to examine if FDI significantly mediated the relationship between transportation infrastructure and economic growth. The results confirmed that FDI significantly mediates the relationship between transportation infrastructure and economic growth (Z = 1.899, p < 0.05**). The results above suggest that FDI and economic growth are positively impacted by transportation infrastructure. Additionally, FDI has a positive impact on economic growth, suggesting that it might be considered a mediator. Using the Sobel test, the hypothesis that

foreign direct investment (FDI) acted as a mediator between transportation infrastructure and economic growth was confirmed.

Discussion

Transport infrastructure has a direct positive influence on foreign direct investment with a significance at 0.001 demonstrate improvements in transportation infrastructure attract more foreign direct investment which the government should improve transportation infrastructure by expanding roads from large city to small city or from urban to rural areas and also improve the quality of roads. The results of this study are related to the research of (Basuki, 2021) demonstrate the enormous influence that transportation infrastructure has on FDI inflow it means that a good transportation infrastructure more attract to FDI and accordingly to (Azolibe et al., 2020) targeted at determining whether government spending on infrastructure like roads, transportation has a meaningfully beneficial relationship with the amount of FDI and local investment.

Foreign investment has a direct positive influence on economic growth with a significance at 0.05 demonstrate attracted more FDI would increase economic growth because of FDI helps integrate local economies into the global market, leading to increased trade, higher export volumes, and improved balance of payments. These factors collectively contribute to economic growth where related to (Alam et al., 2022) found a positive foreign direct investment inflow have a beneficial impact on India's economic growth whereas negative FDI inflow have the opposite effect and according to (Dankyi et al., 2022) explored the nexus of human capital development, foreign direct investment, and economic growth the result represented that there is an effect of FDI on economic growth.

Transportation infrastructure has a positive relationship on economic growth with a significance at 0.05 it means that contributed to improve transportation infrastructure would increases economic growth where related to (Okechukwu et al., 2021) study on the effect of transportation infrastructure on economic Development found that the significance of transport as a driver for socio-economic growth has increased in conjunction with the encouragement of society and the growth of foreign relations due to the globalization processes. In addition, according to (Y. Zhang & Cheng, 2023) studied the role of transport infrastructure in economic growth. The empirical study found the effects of transport infrastructure construction on economic growth are heterogeneous in the long and short run. In the long run, the transport infrastructure has a significant and positive effect on economic growth. However, in the short run, the paper finds that transport infrastructure construction harms economic growth.

As a result, according to data analysis represented that there is a direct effect of relationship between transportation infrastructure and foreign direct investment (FDI) and indirect effect of relationship between transportation infrastructure and economic growth

through foreign direct investment. It concluded that FDI plays a mediating role on transportation infrastructure and economic growth. Therefore, it implies that as transportation infrastructure improved, investors would be attracted to undertake investments, which would lead to economic growth.

Research implications

Academic Implications: the findings demonstrate that this analysis can explain how foreign direct investment (FDI) may indirectly impact the model and, in consequently, the economic growth of the Lao People's Democratic Republic (Lao PDR). Researchers and academics can use this result as a reference source to create other models. This enables the creation of new models to further enhance comprehension of the dynamic capability theory concept.

Practical Implications: transportation infrastructure has been a key enabler of consistent economic growth and there is a direct influence on foreign direct investment. Thus, it is essential that the Lao government prioritize the construction of transportation infrastructure by optimizing network connectivity, increasing the quantity and density of network nodes, and expanding and deepening network coverage. A nation's ability to attract more investors is enhanced by its transportation infrastructure.

Future research and suggestions

In this study used only road length as a proxy of transportation infrastructure. There may be limitations to the results and data analysis. Therefore, in the future research should include air transportation for identifying transportation infrastructure.

In this study focus on foreign direct investment as a mediator variable. Therefore, future research may find other mediators in the relationship between transportation infrastructure and economic growth.

Conclusion

This study examines the mediating impacts of foreign direct investment (FDI) on transportation infrastructure and economic growth in the Lao People’s Democratic Republic, adopting the approach of Sobel (1982) and Soper (2024). Panel data from 2013 through 2022 is used in this study. The direct and indirect effects of transportation infrastructure on economic growth were examined in this paper. The study's findings demonstrate a positive relationship between FDI and transportation infrastructure with a significant level of 0.01. Specifically, an increase of one unit in transportation infrastructure would result in a corresponding rise of 1.3 units in FDI. Furthermore, FDI and economic growth have a positive association significance at 0.05 shows that a unit increase in FDI would result in a 0.022 Unit encouragement in growth.

The role of FDI as a mediator in the relationship between transportation infrastructure and economic growth by using Sobel model was conducted in this study. The result saddest that FDI plays an important role as mediator in the association between transportation and economic growth. Hence, the Lao government should improve transportation infrastructure by expanding roads network from rural to urban and from region to region because of have a good infrastructure would attract more investors and enhance the economic growth in Lao People's Democratic Republic.

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