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Evaluating the effect of transport infrastructure on the employment in Vietnam

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ABSTRACT

During the process of international economic integration, the labor issue plays a vital, urgent, and long-term role in the sustainable development of the economy. The impact of employment on a country's investment decisions is significant. The material underpinning of a nation's socio-economic growth is its transport infrastructure. The impact of infrastructure upgrades on employment in Vietnam's economic sectors is the focus of this article. Furthermore, the study investigates whether the Vietnamese government's annual investment in infrastructure development benefits employees as projected (using data from the Vietnam General Statistics Office (VNGSO) for 19 economic sectors from 2005 to 2019). The results of the System Generalized Method of Moments (System-GMM) show that improving the quality of transport infrastructure can significantly increase employment rates in different sectors. The data show that transport infrastructure plays a key role in ensuring smooth connectivity of the entire national, regional and local economies. It reduces transport costs and facilitates the mobility of workers.

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INTRODUCTION

The problem of unemployment is a global phenomenon in the context of a market economy. There are no exceptions, regardless of whether the country is developing or has developed industries. Therefore, many nations around the world have become more focused on reducing unemployment, creating secure jobs, and stabilizing workers' lives. This is also true in Vietnam. Despite its enormous population, Vietnam has a relatively young population pyramid and has begun to enter the golden age of population growth with the most abundant human resources in history. Although the country benefits from the golden population structure, the said structure also puts pressure on policymakers. Thus, one of the main factors driving government investment decisions is the employment effect. The creation of more employment opportunities is typically viewed as a social and political investment.

It is well known that transport plays a particularly important role in the socio-economic development of any country in the world (Maparu & Mazumder, 2021; Muvawala et al., 2021; The Council of Economic Advisers (CEA), 2018; Wang et al., 2020). By establishing a spatial bridge between regions, socio-economic activities can be carried out between the country and the world, as well as ensuring national security and defense. Among the most important elements in a complete transport infrastructure system are roadways, railways, inland waterways, and aviation. Investing in transport infrastructure can increase access to economic opportunities. As a policy tool, it can be used to drive growth in isolated regions. A contemporary and modern transport infrastructure system will create conditions for equal development among territories, reducing the disparity in living standards between residential areas. Simultaneously, spatial isolation from economic opportunity can have a negative impact on employment. Thus, employment and connectivity are intimately linked (Chakrabarti, 2018). The increase in employment opportunities brought about by infrastructure investment is sighted as the main political and social driving force (Glaeser & Ponzetto, 2018). With the current transport infrastructure, the economy will have conditions for rapid, stable, and sustainable growth. In contrast, underdeveloped infrastructure systems are the main obstacle to development. Because of this, infrastructure development has always been at the center of Vietnam's development policies and is always been a priority for government investment. Vietnam's socio-economic development strategy is geared towards 2020 and Resolution No. 13-NQ / TW dated January 16, 2012 of the eleventh Central Committee of the Central Committee on building synchronous infrastructure, which has the goal of making Vietnam a modern industrialized country by 2020. Transport infrastructure is one of the four focus areas with the requirement to ensure connectivity among major cities and economic centers. Road infrastructure is also commonly discussed in trade agreements. Transport infrastructure is often involved in trade facilitation. Indeed, many studies on trade facilitation in recent years have addressed the infrastructure factor (Jordaan, 2014; Sakyi et al., 2018; Yu & Luu, 2020). Once again, this underscores the importance of a country's transport infrastructure for economic development.

Recent studies on infrastructure are primarily economic in nature (Agbelie, 2014; Bilotkach, 2015; Breidenbach, 2020; Brugnoli et al., 2018; Chen & Haynes, 2015; Cigu et al., 2018; Elburz et al., 2017; Leduc & Wilson, 2017; Melo et al., 2013). These studies have important implications for policymakers and economic researchers. Infrastructure benefits are mainly categorized based on the type of transport used. This includes researches in examining the benefits of investing in highway infrastructure and showing that government investment in infrastructure has positive benefits for the economy (Agbelie, 2014; Chen & Haynes, 2015; Leduc & Wilson, 2017; Li et al., 2016). Aviation transport investments have also been studied in recent years (Bilotkach, 2015; Breidenbach, 2020; Brugnoli et al., 2018; Li & Loo, 2016; Rashid Khan et al., 2018; Van de Vijver et al., 2016). While the majority of studies demonstrate that investments in air transport are beneficial, others show that there is no clear benefit of investments and that the implications on different sectors of the economy vary. Bilotkach (2015) showed that air passenger traffic affects employment and average wages but there are different impacts on varying industries in an economy. Tveter (2017) considered the influence of air transport on regional development. The research shows a positive but insignificant impact on population and employment. According to this research, air transport does not have a significant impact on the region. Furthermore, researches have shown that the impacts of air transport infrastructure range from positive to negative to completely unaffected (Breidenbach, 2020; Brugnoli et al., 2018). Recent decades have seen an increase in investments in railway infrastructure as well. Railway infrastructure has a positive impact on production and labor (Carbo et al., 2019; Sobieralski, 2021; Zhang et al., 2019). As the availability of rail transport infrastructure increases, the unemployment rate will decrease when constant conditions prevail (Tyndall, 2017). Nelson et al. (2019) showed that in areas where railway infrastructure is located, economic resilience is better during recessions. Railway infrastructure investment is generally considered to have a positive effect on economic development. Recent years have seen extensive research into measuring transport infrastructure. Maparu & Mazumder (2021) through road, rail, air, and port infrastructure surveyed the causality between transport infrastructure and urbanization of India from 1991 to 2011. Wang et al. (2020) reviewed the impact of road and rail transport infrastructure on economic growth in countries participating in China's Belt and Road Initiative. Sobieralski (2021) used a dataset of highways, railways and aviation to examine the impact of different transport infrastructure investments on employment in the United States from 1990 to 2018. Ndubuisi et al. (2021) utilized panel data covering 45 sub-Saharan African countries from 1996 to 2017 to examine the impact of digital infrastructure on employment. The empirical measure of digital infrastructure that this article uses is an aggregate of four indexes: employing internet usage, fixed broadband subscription, fixed telephone endowment, and mobile cellular subscription. By using different means of transport such as ports, roads, railways, and aviation, Ahmed et al. (2021) studied transport infrastructure and industrial output in Pakistan from 1972 to 2017. Muvawala et al. (2021) explored the socio-economic impacts of transport infrastructure investment in Uganda by estimating the impact of road transport infrastructure investment on Uganda's economic performance. In continuation with previous studies, this paper examines rail, road, inland waterway, and aviation infrastructure, as well as the impact of infrastructure improvements on employment sizes in Vietnam's economic sectors.

When estimating latent endogeneity, System-GMM is frequently used. This includes using this method to measure the wage effect (Lemieux, 1998; Van Reenen, 1996), examining the relationship between educational openness and economic growth (Fukase, 2010), studying the relationship between income and democracy (Heid et al., 2012), and measuring the impact of trade facilitation on economic growth and social welfare in Africa (Sakyi et al., 2017, 2018). System Generalized Method of Moments (henceforth: System-GMM) can be seen to be an appropriate choice to solve the potential endogenous problems associated with estimation.

The aim of this study is to examine the impact of infrastructure improvements on labor force size in Vietnam from 2005 to 2019. The influence of infrastructure upgrades on Vietnam's job sectors is the focus of this article. This research examines whether jobs are constantly created as a result of the continuous Vietnam government’s investment in infrastructure development. There have been very few studies on Vietnam's infrastructure in terms of industry labor size in recent years. Therefore, this research will contribute to the economic development of Vietnam. This method has been used in recent years to address endogeneity concerns in estimates (Chakrabarti, 2018; Grundke & Moser, 2019; Sakyi et al., 2017, 2018). The studies show that transport infrastructure has the potential to improve economic opportunities. The quality improvement of transport infrastructure has significant potential to increase employment rates in various sectors. In general, the improvement and upgrading of transport infrastructure are increasingly advanced. Apart from generating connectivity to meet the needs of freight and passenger transport, it also supports Vietnam's socio-economic sustainable development. This result is consistent with other previous studies showing that Vietnam's transport infrastructure has improved significantly over the years. This enhancement contributes to the development of the economy (Garcia-Puente, 2013; Phi et al., 2019).

RESEARCH METHOD

The research was conducted in Vietnam using quantitative approach. The VNGSO (Vietnam General Statistics Office) industrial classification was used to operate research objects into Vietnam's economic sectors.

Table 1. List of Economic Sectors in Vietnam

No.	Economic sector names
1	Agriculture, forestry and fishing
2	Mining and quarrying
3	Manufacturing
4	Electricity, gas, stream and air conditioning supply
5	Water supply, sewerage, waste management and remediation activities
6	Construction
7	Wholesale and retail trade; repair of motor vehicles and motorcycles
8	Transport and storage
9	Accommodation and food service activities
10	Information and communication
11	Financial, banking and insurance activities
12	Real estate activities
13	Professional, scientific and technical activities
14	Administrative and support service activities
15	Activities of Communist Party, socio-political organizations; public administration and defence; compulsory security
16	Education and training
17	Human health and social work activities
18	Arts, entertainment and recreation
19	Other service activities

Source: VNGSO

The research sample included 19 economic sectors of Vietnam from 2005 to 2019 (Table 1). The data taken from VNGSO's database included employment by economic sector, transport infrastructure, number of people graduating from high school in Vietnam, State budget expenditure, Gross Domestic Product (GDP), and the ratio between total import and export of goods to GDP. The main variable is the transport infrastructure variables, including data on passenger traffic and the volume of freight traffic transferred through four modes of transport, such as railways, roads, inland waterways, and aviation transport.

Table 2. Variables Description and Data Sources

Variable	Definition
Emp	Employment by economic sector
TINF	Transport infrastructure data includes data on the number of passenger traffic and the volume of freight traffic transfer through four modes of transport: Railways, road, inland waterways and aviation transport.
Edu	Number of people graduating from high school in Vietnam
TO	The ratio between total import and export of goods to GDP
Budget	State budget expenditure such as education, health, and public infrastructure construction
GDP	Gross domestic product

Source: VNGSO

All data on transport infrastructure were gathered through annual surveys conducted by Vietnamese government entities, covering enterprise surveys, investigations of individual production and commercial premises, and investigations of transport and warehousing activities. The number of passengers and the actual transit distance were used to calculate the number of passenger traffic data. A passenger-kilometer is the unit of measurement (Pers.km). The formula for the calculation is as follows.

The number of passenger traffic = number of carried passengers x the actual transport distance.

An actual number of passengers is the number of passengers transported during the period, regardless of the distance traveled. The actual transport distance is the government-specified fare distance. The number of people transferred under each contract for leased passenger vehicles is based on the number of seats in the vehicle, and each passenger is counted only once. The volume of freight traffic is determined by both the amount of freight carried and the actual distance traveled. Ton-Kilometer is the measurement unit (Tons.km). The following is the calculating formula.

The volume of freight traffic = volume of goods transported x the actual shipping distance.

The number of goods moved during a period, regardless of distance, was referred to as the volume of goods transported. The actual weight of the transported products was used to calculate the volume of the transported goods. If the weight of bulky products delivered by vehicles could not be determined directly, it was approximated to be 50% of the vehicle's tonnage. Alternatively, the actual volume of goods was computed based on an agreement between the vehicle owner and the owner of the commodities.

This paper used the System-GMM panel data of estimation technology to solve potential endogenous problems. In recent years, this method has been used to address endogeneity concerns in estimations (Chakrabarti, 2018; Grundke & Moser, 2019; Sakyi et al., 2017, 2018). The following equation was used to analyse the influence of transport networks on employment in the Vietnamese economy.

$$\mathrm{Emp}_{it} = \beta_0 + \gamma \mathrm{Emp}_{it-1} + \beta_1 \mathrm{TINF}_t + \beta_2 \mathrm{Edu}_t + \beta_3 \mathrm{TO}_{it} + \beta_4 \mathrm{Budget}_{it} + \beta_5 \mathrm{GDP}_{it} + \delta_i + \delta_t + \varepsilon_{it} \quad (1)$$

where t represents the time and i represents the economic sectors of Vietnam. Specifically, i indicates the economic sectors (1, .., 19), t is time (2005, …, 2019). Other variables are defined in Table 2. The results of each infrastructure option are presented in this study, along with several control variables that have been included to the estimate. The control variable is government's budget expenditure, that has goal of limiting the influence of government intervention on job creation across industries. In principle, government intervention may help the country's job situation. These selection control variables are widely used in recent studies such as Edu (Fageda & Gonzalez-Aregall, 2017; Ndubuisi et al., 2021; Sobieralski, 2021), GDP (Awaworyi Churchill et al., 2021; Brugnoli et al., 2018; Zhang et al., 2017) and TO (Ndubuisi et al., 2021; Wang et al., 2020). Because government expenditure on infrastructure can lower unemployment, the government budget variable is managed in this study (Chakrabarti, 2018; Leigh & Neill, 2011). δ_i and δ_t are economic sector-specific and time-specific fixed effects respectively.

The summary statistics of variables employed in the study are shown in Table 3. The table's values are logarithmic in nature. The number of observed variables, the mean, standard deviation, minimum, and maximum are all included. There were 285 variables to consider when estimating the impact of transport infrastructure from 2005 to 2019. The transport infrastructure variable was the focus of this estimate, and it was represented by four variables: rail transport, road transport, inland waterway, and aviation transport. Variables Edu, TO, Budget and GDP were the four control variables.

Table 3. Summary of Statistics of Variables, 2005-2019

Variable	Obs	Mean	Std. Dev.	Min	Max
Employment (person)	285	6.4908	1.6862	1.9444	10.8433
Rail transport (Pers.km and Tons.km)	285	8.3558	0.2884	8.1047	9.3886
Road transport (Pers.km and Tons.km)	285	11.0663	0.5632	10.2448	12.6288
Inland waterways transport (Pers.km and Tons.km)	285	9.9056	0.4755	9.2783	11.3215
Aviation transport (Pers.km and Tons.km)	285	9.6056	0.7459	8.645	11.5758
All transport (Pers.km and Tons.km)	285	9.7333	0.5095	9.0682	11.2287
Edu (person)	285	4.5597	0.1959	4.3873	5.5948
TO (%)	285	1.7358	0.5674	0.8109	2.5767
Budget (US$)	285	3.4112	0.7366	1.4715	5.3991
GDP (US$)	285	4.8695	0.2579	4.4468	5.3026

Source: Authors' calculation based on VNGSO data VNGSO

RESULT AND DISCUSSION

Infrastructure and Employment in Vietnam

In addition to being one of the fastest-growing economies in ASEAN, Vietnam places a high priority on the development of transport infrastructure. Vietnam's infrastructure has expanded significantly in recent years. Vietnam has reaped many economic and social benefits from this expansion of investment (Banomyong et al., 2015; Tran, 2018). Figure 1 presents the trend of transport infrastructure in Vietnam from 2005 to 2019. Road transport was the most popular mode of travel, but primarily used for short distances. Inland waterway transport, on the other hand, had a lower volume than road transport but became the primary mode of long-distance transporting goods. Railways were a very potential means of transport, but freight and passenger traffic volumes were still quite low. Although aviation transport had a modest volume of transport, it had the highest value-to-weight ratio of any method of transport. Road and aviation transport were two transport methods that people regularly employed in terms of passenger traffic. In this era, road transport was the most utilized means of transport.

Road and inland waterway transport of goods always won out over other means of transport. Logistics in Vietnam can be seen to benefit from investments in infrastructure expansion. Vietnam shares borders with China, Laos, and Cambodia, and the country's coastline spans from north to south. As a result, Vietnam is a country with a strong maritime and road transport development with a coastline of 3,200 km, 19,000 km of inland waterways and 45 main routes used for goods transport. Vietnam is well exploiting the inland waterway network for transport activities. When it comes to highways, Vietnam's network is very evenly distributed across the country. Vietnam's road system has a total length of 570,448 km, in which 24,136 km are national, 816 km are highways, 25,741 km are provincial, 58,347 km are district, 26,953 km are urban, and 144,670 km are commune. Despite the fact that road transport is more expensive than inland waterway transport, it is the most prevalent mode of transport. The fundamental reason for this is the flexibility of time in the roadway transport operation. As a result, cargo transport by road is always the best option. The high transport costs show that, despite the Vietnamese government's ongoing expansion of transport systems, it has yet to bring significant efficiency. Therefore, transport costs are greater than in many ASEAN countries. (Nguyen, 2019; Pham et al., 2020).

In general, the quantity of passengers and freight traffic on roads, inland waterways, and aviation transport tended to rise with time. While other forms of transport have caught up to the world's latest technologies, Vietnam's rail transport remains uncompetitive. Throughout the period 2005 to 2019, railway transport saw a range of growth rates. Since 2015, the volume of freight transported by train had fluctuated, while the number of passengers using this mode of travel declined. This inconsistent growth is due to the underdeveloped infrastructure policies of the Vietnamese government (Banomyong et al., 2015) and the quality of the current transport network that is not synchronized (Nguyen, 2019).

The expansion of transport systems has increased workers' travel options and allowed Vietnam to reap the benefits of aggregation and specialization. Travel expenses are also reduced, and workers have easier access to better positions and pay. As a result, the unemployment rate fell.

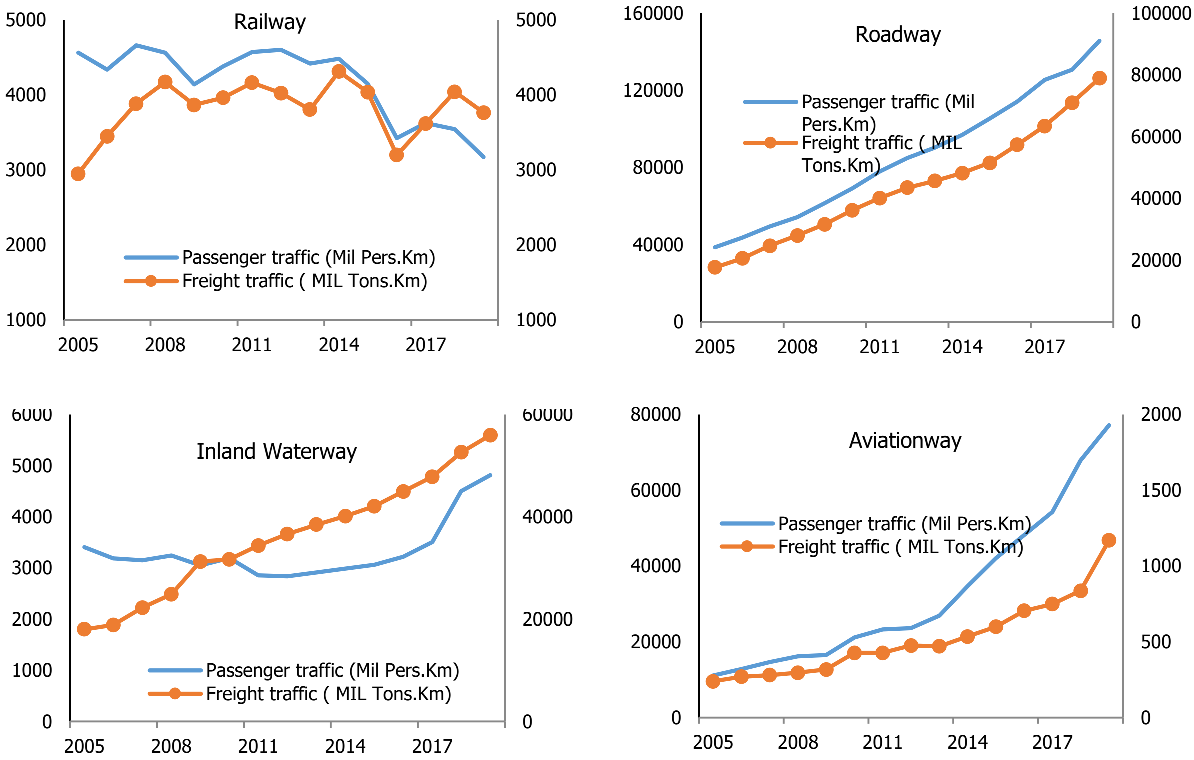

Figure 1. Transportation infrastructure in Vietnam, 2005-2019 (Source: VNGSO)

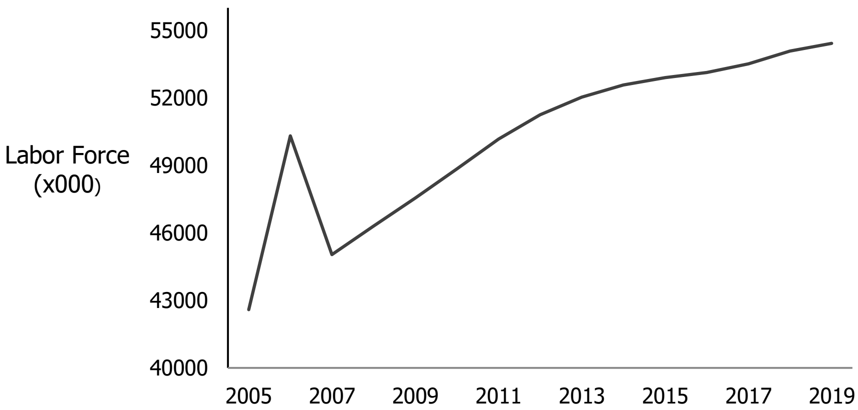

Figure 2. The labor force (15 years of age and above) in Vietnam, 2005-2019 (Source: VNGSO)

The labor market in Vietnam has always been a labor surplus (Tran, 2018) and employment growth has lagged GDP in recent years (Abbott et al., 2017). Figure 2 illustrates that since entering the World Trade Organization in 2007, Vietnam's employment has increased dramatically. Although there was a substantial variation from 2005 to 2007, the number of jobs in Vietnam has consistently climbed during the years since 2007. Vietnam's employment growth was modest, averaging 1.92% from 2005 to 2019. Vietnam's economic reform project is still incomplete (Jenkins, 2004) and the economy is primarily focused on agriculture (Jenkins, 2004; Tran, 2018), which explains its relatively modest growth. Despite the fact that Vietnam's economic structure has evolved, the process has been rather slow (Abbott et al., 2017; MOLISA & ILO, 2010).

Base Specification of the Estimate

The experimental results produced from the System-GMM estimations are reported and discussed in this section. The basic findings of the economic impacts of Vietnamese transport systems on employment were presented first. The research then used the System-GMM estimations to tackle the endogenous problem. Finally, it employed different measures to describe the infrastructure quality of Vietnam. The World Economic Forum Global Competitiveness Reports (WEFGC) collects these data through annual surveys that are widely used in scientific study (Cheewatrakoolpong & Rujanakanoknad, 2011; Jordaan, 2014; Sakyi et al., 2017, 2018).

The findings of the estimate's basic specification are shown in Table 4. Five models were used to report the effect outcomes of infrastructure factors. The results were rail transport (Model 1), road transport (Model 2), inland waterway transport (Model 3) aviation transport (Model 4), and all transport impacts (Model 5). The effect of transport networks on employment in Vietnam was estimated using System-GMM in Tables 5 to 9. Each table in this study contains five models. Control variables distinguished these models, which were then included to the estimate. Edu (Model 1), TO (Model 2), Budget (Model 3), GDP (Model 4) were all included as control variables in each model, with Edu, TO, and Budget being captured in the same model (Model 5). Table 10 shows the results of the robustness check. As previously stated, several measures representing the quality of Vietnam's infrastructure were used in this paper.

The base specification results are shown in Table 4. The findings of the random effects model are presented in this table, with Hauman's test p>0.05. The Hausman test determines if a fixed or random model is used. According to the estimated coefficients assessing the impact of transport infrastructure on employment across industries, improving the mode of transport system had a substantial potential to increase employment in Vietnam's economic sector.

Table 4. Base Specification of the Estimate

Variable	Model 1 (Rail)	Model 2 (Road)	Model 3 (Inland waterways)	Model 4 (Aviation)	Model 5 (Total)
Rail transport	1.216*** (0.233)				
Road transport		1.114*** (0.214)			
Inland waterways transport			1.478*** (0.284)		
Aviation transport				1.854*** (0.356)	
All					1.362*** (0.261)
Edu	0.257 (0.277)	0.257 (0.277)	0.257 (0.277)	0.257 (0.277)	0.257 (0.277)
TO	4.259*** (0.253)	3.638*** (0.304)	6.095*** (0.381)	8.770*** (0.842)	5.321*** (0.284)
Budget	-0.0361 (0.0356)	-0.0361 (0.0356)	-0.0361 (0.0356)	-0.0361 (0.0356)	-0.0361 (0.0356)
GDP	-6.676*** (0.570)	-6.671*** (0.570)	-12.17*** (1.042)	-20.51*** (2.548)	-10.48*** (0.785)
Constant	23.08*** (2.550)	22.01*** (2.665)	42.15*** (3.157)	74.76*** (8.828)	36.64*** (2.492)
Fixed industry effect	Yes	Yes	Yes	Yes	Yes
Fixed time effect	Yes	Yes	Yes	Yes	Yes
R-square	0.9317	0.9317	0.9317	0.9317	0.9317
Number of group	19	19	19	19	19

***, ** and * indicate significance at the 0.01, 0.05 and 0.10 level

Table 5. System-GMM Estimates of the Effect of Rail Transport on Employment

Variable	Model 1 (Edu)	Model 2 (TO)	Model 3 (Budget)	Model 4 (GDP)	Model 5 (Total)
Emp_{it-1}	0.897***	0.934***	0.895***	0.934***	0.923***
	(0.0291)	(0.0203)	(0.0258)	(0.0210)	(0.0206)
Rail transport	0.523***	1.078***	0.494***	1.165***	1.116***
	(0.199)	(0.122)	(0.111)	(0.126)	(0.243)
Edu	0.000850				0.0744
	(0.244)				(0.281)
TO		-0.539***			-0.0605
		(0.0320)			(0.0980)
Budget			0.0609		0.117***
			(0.0475)		(0.0426)
GDP				-1.244***	-1.202***
				(0.0728)	(0.253)
Constant	-3.473***	-7.383***	-3.427***	-2.990***	-3.356***
	(0.789)	(1.020)	(0.850)	(0.832)	(1.284)
No. of observations	285	285	285	285	285
No. of sectors	19	19	19	19	19
AR(2)	-0.36	-1.73	-0.58	-1.34	-1.68
AR(2) p-value	0.720	0.083	0.565	0.181	0.092
Hansen stat	18.89	18.96	18.87	18.94	18.91
Hansen p-value	0.529	0.460	0.925	0.461	0.757

***, ** and * indicate significance at the 0.01, 0.05 and 0.10 level

Table 6. System-GMM Estimates of the Effect of Road Transport on Employment

Variable	Model 1 (Edu)	Model 2 (TO)	Model 3 (Budget)	Model 4 (GDP)	Model 5 (Total)
Emp_{it-1}	0.912***	0.929***	0.863***	0.929***	0.903***
	(0.0236)	(0.0206)	(0.0370)	(0.0215)	(0.0274)
Road transport	-0.148	0.825***	0.166***	1.048***	0.882***
	(0.110)	(0.101)	(0.0589)	(0.123)	(0.257)
Edu	0.844***				0.263
	(0.218)				(0.332)
TO		-0.901***			-0.411***
		(0.0741)			(0.135)
Budget			0.0855		0.113***
			(0.0670)		(0.0400)
GDP				-2.449***	-1.398***
				(0.211)	(0.385)
Constant	-1.405***	-6.853***	-1.016*	1.043**	-2.940***
	(0.289)	(1.024)	(0.588)	(0.425)	(1.103)
No. of observations	285	285	285	285	285
No. of sectors	19	19	19	19	19
AR(2)	-0.76	-1.21	-0.78	-0.38	-1.61
AR(2) p-value	0.445	0.225	0.437	0.701	0.107
Hansen stat	18.95	18.97	18.76	18.96	18.39
Hansen p-value	0.800	0.459	0.174	0.648	0.496

***, ** and * indicate significance at the 0.01, 0.05 and 0.10 level

In Models 1 to 5, the majority of the mode of transport infrastructure coefficients were significant at the 1% level. These findings empirically confirm the study's hypothesis that transport infrastructure has a favorable impact on employment growth across economic sectors. As previously stated, transport infrastructure has the capacity to expand economic opportunity access. The results of the five models back the claim that transport infrastructure boosts labor productivity (Agbelie, 2014; Carbo et al., 2019; Chen & Haynes, 2015; Leduc & Wilson, 2017; Li et al., 2016; Sobieralski, 2021; Tveter, 2017; Zhang et al., 2019). It also backs up Chakrabarti's (2018) idea that being geographically isolated from economic opportunities can hurt employment.

Economic Impacts on the Employment

Tables 5 to 9 provide the estimated coefficients for quantifying the influence of transport infrastructure on employment, and each table has five models with different control variables. Tables 5 to 9 about the regression findings show that all of these coefficients are statistically significant at the 1% level. The results reveal that upgrading the quality of transport infrastructure had a significant impact on overall employment rates. The transit coefficient in Model 1 was not positive after adjusting the Edu variable, as shown in Tables 5 to 9. After adjusting for education, Ndubuisi et al. (2021) studies the digital infrastructure and employment in the services sector in African countries found comparable outcomes.

When compared to other means of transport, railway transport had a number of advantages, including a big transport volume, high productivity, and the competitive value of a large economy. The railway traffic coefficients were statistically significant and positive. At a 1% level, a 1.116% growth in rail transport would result in a 0.923% rise in employment opportunities across all industries. This indicates that investing in railway infrastructure has a favorable impact on job creation. This finding is in line with earlier research on railway transport systems (Carbo et al., 2019; Sobieralski, 2021; Zhang et al., 2019). The availability of railway infrastructure and employment are linked in that as railway investment grows, and so does the rate of employment (Tyndall, 2017). Rail transport is critical for emerging countries to grow their own economies, as well as to integrate and expand commerce with other countries in the region. Table 6 shows the impact of road transport infrastructure on employment. The road transport coefficients were positive and statistically significant, according to the findings. A 0.882% improvement in the road transport element would result in a 0.903% increase in job possibilities across sectors at a 1% level. This demonstrates that road transport has strong economic benefits, and transport upgrading is usually promoted as a growth strategy. Vietnam is one of the world's 20 largest and most densely populated countries (O'Connor et al., 2020). Transport infrastructure is critical for ensuring the smooth connectivity of the national, regional, and local economies. Improved transport lowers transport expenses and makes it easier for workers to get to work (Gibbons et al., 2019). As a result, strengthening infrastructure is one of the most important prerequisites for ensuring economic development and raising local people's living standards.

Table 7. System-GMM Estimates of the Effect of Inland Waterways Transport on Employment

Variable	Model 1 (Edu)	Model 2 (TO)	Model 3 (Budget)	Model 4 (GDP)	Model 5 (Total)
Emp_{it-1}	0.910***	0.927***	0.861***	0.932***	0.907***
	(0.0242)	(0.0204)	(0.0375)	(0.0175)	(0.0241)
Inland waterways transport	-0.131	0.764***	0.237***	0.940***	0.735***
	(0.139)	(0.0977)	(0.0747)	(0.110)	(0.251)
Edu	0.790***				0.396
	(0.244)				(0.325)
TO		-0.712***			-0.395***
		(0.0535)			(0.133)
Budget			0.0684		0.131***
			(0.0570)		(0.0432)
GDP				-1.881***	-0.922**
				(0.137)	(0.378)
Constant	-1.480***	-5.597***	-1.458**	0.545	-3.506***
	(0.324)	(0.900)	(0.650)	(0.482)	(1.271)
No. of observations	285	285	285	285	285
No. of sectors	19	19	19	19	19
AR(2)	-0.57	-1.36	-0.97	-1.73	-2.10
AR(2) p-value	0.565	0.173	0.331	0.084	0.036
Hansen stat	18.93	18.96	18.76	18.96	18.16
Hansen p-value	0.839	0.838	0.538	0.704	0.696

***, ** and * indicate significance at the 0.01, 0.05 and 0.10 level

Table 8. System-GMM Estimates of the Effect of Aviation Transport on Employment

Variable	Model 1 (Edu)	Model 2 (TO)	Model 3 (Budget)	Model 4 (GDP)	Model 5 (Total)
$\mathrm{Emp}_{\mathrm{it}-1}$	0.910***	0.929***	0.890***	0.947***	0.935***
	(0.0237)	(0.0180)	(0.0279)	(0.0146)	(0.0183)
Aviation transport	-0.0803	0.852***	0.0649*	1.220***	1.251***
	(0.0693)	(0.0838)	(0.0393)	(0.106)	(0.181)
Edu	0.766***				-0.0834
	(0.186)				(0.217)
TO		-1.203***			0.130
		(0.0887)			(0.109)
Budget			0.0789*		0.113***
			(0.0475)		(0.0389)
GDP				-3.808***	-4.232***
				(0.258)	(0.388)
Constant	-1.899***	-5.377***	0.0543	7.440***	9.048***
	(0.322)	(0.687)	(0.335)	(0.255)	(1.144)
No. of observations	285	285	285	285	285
No. of sectors	19	19	19	19	19
AR(2)	-0.84	-1.59	-0.75	0.08	0.21
AR(2) p-value	0.398	0.112	0.451	0.940	0.836
Hansen stat	18.95	18.99	18.78	18.98	18.85
Hansen p-value	0.800	0.457	0.969	0.837	0.843

***, ** and * indicate significance at the 0.01, 0.05 and 0.10 level

Table 9. System-GMM Estimates of the Effect of all Transport on Employment

Variable	Model 1 (Edu)	Model 2 (TO)	Model 3 (Budget)	Model 4 (GDP)	Model 5 (Total)
$\mathrm{Emp}_{\mathrm{it}-1}$	0.908***	0.933***	0.882***	0.933***	0.920***
	(0.0245)	(0.0196)	(0.0311)	(0.0218)	(0.0228)
All transport	-0.0816	0.911***	0.175***	1.140***	1.103***
	(0.121)	(0.106)	(0.0622)	(0.123)	(0.246)
Edu	0.720***				0.0812
	(0.229)				(0.328)
TO		-0.895***			0.0396
		(0.0691)			(0.0974)
Budget			0.0727*		0.133***
			(0.0429)		(0.0408)
GDP				-2.411***	-2.567***
				(0.187)	(0.341)
Constant	-1.653***	-6.621***	-0.954*	1.336***	1.645*
	(0.262)	(0.950)	(0.541)	(0.379)	(0.958)
No. of observations	285	285	285	285	285
No. of sectors	19	19	19	19	19
AR(2)	-0.69	-1.54	-0.70	-0.93	-1.28
AR(2) p-value	0.489	0.123	0.481	0.352	0.202
Hansen stat	18.93	18.99	18.82	18.94	18.88
Hansen p-value	0.839	0.797	0.534	0.755	0.841

***, ** and * indicate significance at the 0.01, 0.05 and 0.10 level

In regard to inland waterways transport, Table 7 shows the economic potential of inland waterways transport on employment. Inland waterways transport coefficients were positive and statistically significant. A 0.735% rise in inland waterways transport would result in a 0.907% increase in employment possibilities across all sectors at a 1% level. Inland waterways in Vietnam total more than 19,000 kilometers, with 45 main channels used to move products. The inland waterway transport business is in a good place right now. Indeed, the existence of an inland waterway network certainly provides numerous economic benefits, assisting businesses in lowering costs, expanding their scale, and providing more job possibilities for workers. Similarly, the regression findings in Table 8 demonstrate the economic potential of aviation transport in terms of job creation. Aviation transport coefficients were positive and statistically significant. A 1.251% improvement in features of air transport would result in a 0.935% rise in employment possibilities across sectors at a 1% level. People find it more convenient to travel by using air transport because it saves them time. The regression results suggest that aviation, along with other modes of transport infrastructure, plays a critical role in the promotion and development of the economy. In terms of the overall impact of transport infrastructure on employment, Table 9 shows that a 1.103% upgrade in all transport infrastructure would enhance employment opportunities by 0.935% across sectors at a 1% level.

The System-GMM method's regression results reveal that transport infrastructure had an impact on economic sector job opportunities. The transport infrastructure coefficient in Model 1 of Tables 6 to 9 was not positive after controlling for the Edu variable. Overall, the majority of the employment effects of transport infrastructure were positive and statistically significant at the 1% level. These findings empirically confirm the study's hypothesis that transport infrastructure has a favorable impact on employment growth across economic sectors. The transport infrastructure serves as a vital link between various economies. The regression results also demonstrate that transport plays a critical role in the economy, particularly in emerging countries.

Robustness Checks

The robustness checks results (Table 10) shows five models, each of which is distinguished by form of transport infrastructure. The impact of transport infrastructure on employment was positive according to regression studies. WEFGC collected these indicators, which also had positive results. Models 1 and 4's regression results suggest that rail and aviation transport have beneficial effects on employment. A 4.631% upgrade in rail transport infrastructure would result in a 0.922% increase in job opportunities across industries at a 1% level. A 1.925% enhancement in air transport infrastructure would increase job opportunities by 0.895% across industries at a 10% level.

Table 10. The Economic Impacts of Transport Infrastructure on Employment

Variable	Model 1 (Rail)	Model 2 (Road)	Model 3 (Inland waterways)	Model 4 (Aviation)	Model 5 (Total)
Emp_{it-1}	0.922***	0.915***	0.917***	0.895***	0.910***
	(0.0220)	(0.0271)	(0.0254)	(0.0413)	(0.0263)
Rail transport	4.631***				
	(0.654)				
Road transport		-1.296***			
		(0.428)			
Inland waterways transport			-4.036***		
			(0.433)		
Aviation transport				1.925*	
				(1.099)	
All transport					0.146
					(1.504)
Edu	0.663***	1.106***	1.166***	0.669	-0.452***
	(0.145)	(0.0897)	(0.196)	(0.449)	(0.149)
TO	-0.0481	-0.969***	-1.398***	-0.533	0.127***
	(0.126)	(0.198)	(0.178)	(0.325)	(0.0418)
Budget	0.115**	0.0817**	0.0631*	0.351***	0.0756
	(0.0485)	(0.0392)	(0.0381)	(0.122)	(0.427)
GDP	-1.360***	1.490***	3.846***	-0.635	0.999***
	(0.298)	(0.497)	(0.478)	(0.566)	(0.181)
Constant	-3.222**	-5.310*	-13.58***	-5.930*	-4.131*
	(1.493)	(2.930)	(1.851)	(3.376)	(2.393)
No. of observations	285	285	285	285	285
No. of sectors	19	19	19	19	19
AR(2)	-1.71	-2.09	-2.07	-1.55	-0.83
AR(2) p-value	0.088	0.037	0.039	0.122	0.408
Hansen stat	18.81	18.73	18.26	18.56	17.11
Hansen p-value	0.534	0.474	0.691	0.613	0.646

***, ** and * indicate significance at the 0.01, 0.05 and 0.10 level

In general, improved transport infrastructure boosts the economy and improves employees' access to jobs. Transport infrastructure, in general, plays a critical role in the creation of jobs for employees. The development and upgrading of transport infrastructure is progressing at a rapid pace, not only to fulfill the needs of freight and passenger transport, but also to aid Vietnam's socio-economic sustainability. Simultaneously, the findings reveal that the Vietnamese government's recent investment in infrastructure development has resulted in the creation of new jobs for employees.

Research Implication

The issue of labor plays a key role in the development of sustainable economies on a long-term basis during times of international economic integration. The biggest advantage Vietnam has is its abundant labor force and young labor structure. Vietnam is in the period of the golden population structure when it has a large population in the working age group. This is considered a favorable opportunity to improve labor efficiency and contribute to the economic growth of the country. However, Vietnam's workers still face a lot of pressure from the under-employed. Thus, one of the main drivers of government investment decisions is the employment effect. The cost of investment in infrastructure development tends to increase over the years. It can show that infrastructure development is an important prerequisite to promoting socio-economic development, which can reduce underemployment.

Infrastructure plays a particularly important role in Vietnam's social and economic development. A well-developed infrastructure system will promote economic growth and increase economic productivity and efficiency, which will contribute to solving social problems. The primary barriers to development, on the other side, are underdeveloped infrastructure systems. In many developing countries today, the lack and weakness of infrastructure have led to the stagnation of resource flows and difficulties in absorbing investment funds, which have a negative impact on economic growth.

The rapid development of Vietnam's economy necessitates the development of advanced transport infrastructure. Besides improving traffic and goods transport, it also helps Vietnamese workers find jobs. This study demonstrates the significance of transport infrastructure for overall employment in Vietnam across all economic sectors. The following are some of the consequences of this research.

Transport infrastructure has a huge impact on overall employment across all industries. The construction of transport infrastructure will aid in the economy's resource optimization. At the same time, comparative advantages between areas in Vietnam's economic sectors can be exploited (Chakrabarti, 2018; Glaeser & Ponzetto, 2018; Nguyen, 2020). Furthermore, improved transport infrastructure aids the development of logistics. This is one of the most crucial aspects of boosting competitiveness (Mangla et al., 2016; Montoya-Torres et al., 2016; Nguyen, 2020). As a result, it is critical to focus on refining and improving Vietnam's transport infrastructure in order to promote the country's economic and social development.

The improvement of transport infrastructure is one of Vietnam's core objectives in its socio-economic development strategy. Government expenditures on infrastructure expansion and construction create a large quantity of social benefits. The growth in freight traffic and passenger traffic proves that the Vietnamese government's improvement and extension of transport infrastructure is working. Despite the fact that estimates show that railway infrastructure has a positive impact on overall employment across industries from 2005 to 2019, the volume of freight traffic and the number of persons using railway infrastructure are falling, according to VNGSO data. As a result, it is clear that Vietnam's railway infrastructure is still in need of modernization. This is also the general conclusion of recent research (Le & Tran, 2021; Nguyen, 2020).

Lastly, implementing trade facilitation measures can generate significant economic benefits from transport infrastructure (Jordaan, 2014; Sakyi et al., 2017, 2018; Yu & Luu, 2020). Although the majority of trade facilitation agreements deal with procedures in the realm of products import and export, they also deal with improving domestic infrastructure. Construction of innovative transport infrastructure is critical to enhancing Vietnam's investment climate. The importance of developing transport infrastructure is demonstrated in the study. At the same time, it emphasizes the significance of adhering to trade facilitation measures that are enforced.

CONCLUSION AND SUGGESTION

Investments aimed at increasing employment levels are considered incentivized and preferred investments. Transport infrastructure projects such as railways, aviation and roadways are considered the focus of many public infrastructure investments. This study also shows government investment in infrastructure development every year has the expected result of creating jobs for workers. The findings of the System-GMM regression suggest that enhancing transport infrastructure has a large potential to enhance employment rates across industries. A 1.116% increase in rail transport would result in a 0.923% increase in employment possibilities. A 0.882% rise in the road transport component would also result in a 0.903% increase in job opportunities across sectors. When it comes to the effects of inland waterway and aviation transport, the results are also favourable. Improved transport lowers transport expenses and makes it easier for workers to get to work. Although the government is always concerned about job creation for workers, Vietnam still has many reform restrictions, putting a lot of pressure on the issue of job creation for employees.

Vietnam needs to push up its development and enhancement of transport infrastructure in order to provide links between regions and create ideal conditions for employees to access jobs. Simultaneously, it is vital to focus on adopting a regional and municipal transport infrastructure plans. The true role of the plan must be determined, allowing for the elimination of ineffective plans that do not follow the sector's development, both locally and regionally. The plans must be extremely synchronized throughout the many sectors involved in socio-economic growth. It is vital to rebalance investment ratios and procedures in the development strategy, as well as to ensure the efficient use of investment capital sources for roads, trains, aviation, and waterways. The growth rate must be forecasted in the work plans, and this projection must be made at a strategic level. At the same time, it is vital to emphasize the investment's practical benefits, i.e., the benefits that people, communities, and regions obtain when transport infrastructure projects are implemented.

Vietnam's rapid economic expansion needs the building of advanced transport infrastructure. Infrastructure development can help with underemployment. The development of improved transport infrastructure aids in the efficient use of the economy's resources. At the same time, it aids in the greater utilization of comparative advantages between regions in economic sectors. Furthermore, effective transport infrastructure aids logistics development. Although it is estimated that rail transport infrastructure has a positive impact on overall employment across industries, according to VNGSO data, the volume of freight traffic and the number of people using railway infrastructure are declining. As a result, Vietnam's railway infrastructure still needs to be upgraded. In order to execute trade facilitation, it is also necessary to improve transport infrastructure. The development of cutting-edge transport infrastructure is crucial to improving Vietnam's business climate.

REFERENCES

Abbott, P., Tarp, F., & Wu, C. (2017). Structural transformation, biased technological change and employment in Vietnam. European Journal of Development Research, 29(1), 54–72. https://doi.org/10.1057/ejdr.2015.64

Agbelie, B. R. D. K. (2014). An empirical analysis of three econometric frameworks for evaluating economic impacts of transportation infrastructure expenditures across countries. Transport Policy, 35, 304–310. https://doi.org/10.1016/j.tranpol.2014.06.009

Ahmed, K., Bhattacharya, M., Qazi, A. Q., & Ghumro, N. A. (2021). Transport infrastructure and industrial output in Pakistan: An empirical investigation. Research in Transportation Economics, 90, 101040. https://doi.org/10.1016/j.retrec.2021.101040

Awaworyi Churchill, S., Inekwe, J., Ivanovski, K., & Smyth, R. (2021). Transport infrastructure and CO2 emissions in the OECD over the long run. Transportation Research Part D: Transport and Environment, 95, 102857. https://doi.org/10.1016/j.trd.2021.102857

Banomyong, R., Thai, V. V., & Yuen, K. F. (2015). Assessing the national logistics system of Vietnam. Asian Journal of Shipping and Logistics, 31(1), 21–58. https://doi.org/10.1016/j.ajsl.2015.03.002.

Bilotkach, V. (2015). Are airports engines of economic development? A dynamic panel data approach. Urban Studies, 52(9), 1577–1593. https://doi.org/10.1177/0042098015576869

Breidenbach, P. (2020). Ready for take-off? The economic effects of regional airport expansions in

Germany. Regional Studies, 54(8), 1084–1097. https://doi.org/10.1080/00343404.2019.1659948

Brugnoli, A., Dal Bianco, A., Martini, G., & Scotti, D. (2018). The impact of air transportation on trade flows: A natural experiment on causality applied to Italy. Transportation Research Part A: Policy and Practice, 112, 95–107. https://doi.org/10.1016/j.tra.2018.01.010

Carbo, J. M., Graham, D. J., Anupriya, Casas, D., & Melo, P. C. (2019). Evaluating the causal economic impacts of transport investments: evidence from the Madrid–Barcelona high speed rail corridor. Journal of Applied Statistics, 46(9), 1714–1723. https://doi.org/10.1080/02664763.2018.1558188

Chakrabarti, S. (2018). Can highway development promote employment growth in India? Transport Policy, 69, 1–9. https://doi.org/10.1016/j.tranpol.2018.05.009

Cheewatrakoolpong, K., & Rujanakanoknad, J. (2011). The impact of AEC trade facilitation improvement on Thailand's goods in transit and inter-state trade. Chulalongkorn Journal of Economics, 23, 19–37. Retrieved from https://so05.tci-thaijo.org/index.php/saje/article/view/99836

Chen, Z., & Haynes, K. E. (2015). Spatial Impact of Transportation Infrastructure: A Spatial Econometric CGE Approach.In: Nijkamp P., Rose A., Kourtit K. (eds) Regional Science Matters (P. Nijkamp, A. Rose, & K. Kourtit (eds.)). Springer International Publishing. https://doi.org/10.1007/978-3-319-07305-7

Cigu, E., Agheorghiesei, D. T., Gavriluță (Vatamanu), A. F. G., & Toader, E. (2018). Transport infrastructure development, public performance and long-run economic growth: A Case Study for the Eu-28 Countries. Sustainability, 11(1), 67. https://doi.org/10.3390/su11010067

Elburz, Z., Nijkamp, P., & Pels, E. (2017). Public infrastructure and regional growth: Lessons from meta-analysis. Journal of Transport Geography, 58, 1–8. https://doi.org/10.1016/j.jtrangeo.2016.10.013

Fageda, X., & Gonzalez-Aregall, M. (2017). Do all transport modes impact on industrial employment? Empirical evidence from the Spanish regions. Transport Policy, 55, 70–78. https://doi.org/10.1016/j.tranpol.2016.12.008

Fukase, E. (2010). Revisiting linkages between openness, education and economic growth: system gmm approach. Journal of Economic Integration, 25(1), 194–223. https://doi.org/10.11130/jei.2010.25.1.194

Garcia-Puente, M. P. A. (2013). Infrastructure Policy Unit 2012 East Asia and the Pacific PPI Data Update (Issue October). http://ppi.worldbank.org/

Gibbons, S., Lyytikäinen, T., Overman, H. G., & Sanchis-Guarner, R. (2019). New road infrastructure: The effects on firms. Journal of Urban Economics, 110, 35–50. https://doi.org/10.1016/j.jue.2019.01.002

Glaeser, E. L., & Ponzetto, G. A. M. (2018). The political economy of transportation investment. Economics of Transportation, 13, 4–26. https://doi.org/10.1016/j.ecotra.2017.08.001

Grundke, R., & Moser, C. (2019). Hidden protectionism? Evidence from non-tariff barriers to trade in the United States. Journal of International Economics, 117, 143–157. https://doi.org/10.1016/j.jinteco.2018.12.007

Heid, B., Langer, J., & Larch, M. (2012). Income and democracy: Evidence from system GMM estimates. Economics Letters, 116(2), 166–169. https://doi.org/10.1016/j.econlet.2012.02.009

Jenkins, R. (2004). Why has employment not grown more quickly in Vietnam? Journal of the Asia Pacific Economy, 9(2), 191–208. https://doi.org/10.1080/1354786042000207335

Jordaan, A. C. (2014). The impact of trade facilitation factors on South Africa's exports to a selection of African countries. Development Southern Africa, 31(4), 591–605. https://doi.org/10.1080/0376835X.2014.907535

Le, K. G., & Tran, Q. H. (2021). The sustainable development of railway system in Vietnam by GIS-based Technologies. E3S Web of Conferences, 310, 03003. https://doi.org/10.1051/e3sconf/202131003003

Leduc, S., & Wilson, D. (2017). Are state governments roadblocks to federal stimulus? Evidence on the flypaper effect of highway grants in the 2009 Recovery Act. American Economic Journal: Economic Policy, 9(2), 253–292. https://doi.org/10.1257/pol.20140371

Leigh, A., & Neill, C. (2011). Can national infrastructure spending reduce local unemployment? Evidence from an Australian roads program. Economics Letters, 113(2), 150–153. https://doi.org/10.1016/j.econlet.2011.05.037

Lemieux, T. (1998). Estimating the effects of unions on wage inequality in a panel data model with comparative advantage and nonrandom selection. Journal of Labor Economics, 16(2), 261–291. https://doi.org/10.1086/209889

Li, L., & Loo, B. P. Y. (2016). Impact analysis of airport infrastructure within a sustainability framework: Case studies on Hong Kong International Airport. International Journal of Sustainable Transportation, 10(9), 781–793. https://doi.org/10.1080/15568318.2016.1149647

Li, X., Huang, B., Li, R., & Zhang, Y. (2016). Exploring the impact of high speed railways on the spatial redistribution of economic activities - Yangtze River Delta urban agglomeration as a case study. Journal of Transport Geography, 57, 194–206. https://doi.org/10.1016/j.jtrangeo.2016.10.011

Mangla, S. K., Govindan, K., & Luthra, S. (2016). Critical success factors for reverse logistics in Indian industries: A structural model. Journal of Cleaner Production, 129, 608–621. https://doi.org/10.1016/j.jclepro.2016.03.124

Maparu, T. S., & Mazumder, T. N. (2021). Investigating causality between transport infrastructure and urbanization: A state-level study of India (1991–2011). Transport Policy, 113, 46–55. https://doi.org/10.1016/j.tranpol.2020.03.008

Melo, P. C., Graham, D. J., & Brage-Ardao, R. (2013). The productivity of transport infrastructure investment: A meta-analysis of empirical evidence. Regional Science and Urban Economics, 43(5), 695–706. https://doi.org/10.1016/j.regsciurbeco.2013.05.002

Ministry of Labour and Social Affairs (MOLISA), & International Labour Organization (ILO). (2010). Labour and social trends in Viet Nam 2009/10. ILO. Retrieved from https://www.ilo.org/wcmsp5/groups/public/---asia/---ro-bangkok/documents/publication/wcms_142174.pdf

Montoya-Torres, J. R., Muñoz-Villamizar, A., & Vega-Mejía, C. A. (2016). On the impact of collaborative strategies for goods delivery in city logistics. Production Planning and Control, 27(6), 443–455. https://doi.org/10.1080/09537287.2016.1147092

Muvawala, J., Sebukeera, H., & Ssebulime, K. (2021). Socio-economic impacts of transport infrastructure investment in Uganda: Insight from frontloading expenditure on Uganda's urban roads and highways. Research in Transportation Economics, 88, 100971. https://doi.org/10.1016/j.retrec.2020.100971

Ndubuisi, G., Otioma, C., & Tetteh, G. K. (2021). Digital infrastructure and employment in services: Evidence from Sub-Saharan African countries. Telecommunications Policy, 45(8), 102153. https://doi.org/10.1016/j.telpol.2021.102153

Nelson, A. C., Stoker, P., & Hibberd, R. (2019). Light rail transit and economic recovery: A case of resilience or transformation? Research in Transportation Economics, 74, 2–9. https://doi.org/10.1016/j.retrec.2018.11.003

Nguyen, H. P. (2019). Current status and solutions to reduce logistics costs in vietnam. Malaysian E Commerce Journal, 3(3), 01–04. https://doi.org/10.26480/mecj.03.2019.01.04

Nguyen, H. P. (2020). Sustainable development of logistics in Vietnam in the period 2020-2025. International Journal of Innovation, Creativity and Change, 11(3), 665–682. Retrieved from https://www.ijicc.net/images/vol11iss3/11344_Nguyen_2020_E_R.pdf

O'Connor, K., Fuellhart, K., & Kim, H. M. (2020). Economic influences on air transport in Vietnam 2006–2019. Journal of Transport Geography, 86, 102764. https://doi.org/10.1016/j.jtrangeo.2020.102764

Pham, V. K., Do, T. T. H., & Ngo, A. T. (2020). Evaluation of the Costs through the Logistics Value Chain (LVC) in Vietnam: An AHP Approach. International Journal of Innovation, Creativity and Change, 14(2), 868–889. Retrieved from https://ijicc.net/index.php/volume-14-2020/199-vol-14-iss-2

Phi, V. T., Dang, T. B., & Nguyen, D. H. (2019). Impact of transport infrastructure on firm performance: case study of Cuu long delta area, Vietnam. Problems and Perspectives in Management, 17(2), 51–62. https://doi.org/10.21511/ppm.17(2).2019.04

Rashid Khan, H. U., Siddique, M., Zaman, K., Yousaf, S. U., Shoukry, A. M., Gani, S., Sasmoko, Khan, A., Hishan, S. S., & Saleem, H. (2018). The impact of air transportation, railways transportation, and port container traffic on energy demand, customs duty, and economic growth: Evidence from a panel of low-, middle-, and high -income countries. Journal of Air Transport Management, 70, 18–35. https://doi.org/10.1016/j.jairtraman.2018.04.013

Sakyi, D., Bonuedi, I., & Opoku, E. E. O. (2018). Trade facilitation and social welfare in Africa☆. Journal of African Trade, 5(1–2), 35. https://doi.org/10.1016/j.joat.2018.08.001

Sakyi, D., Villaverde, J., Maza, A., & Bonuedi, I. (2017). The effects of trade and trade facilitation on economic growth in Africa. African

Development Review, 29(2), 350–361. https://doi.org/10.1111/1467-8268.12261

Sobieralski, J. B. (2021). Transportation infrastructure and employment: Are all investments created equal? Research in Transportation Economics, 88, 100927. https://doi.org/10.1016/j.retrec.2020.100927

The Council of Economic Advisers (CEA) (2018). The economic benefits and impacts of expanded infrastructure investment the council of economic advisers (Issue March). Retrieved from https://trumpwhitehouse.archives.gov/wp-content/uploads/2018/03/The-Economic-Benefits-and-Impacts-of-Expanded-Infrastructure-Investment.pdf

Tran, T. T. (2018). Youth transition to employment in Vietnam: a vulnerable path. Journal of Education and Work, 31(1), 59–71. https://doi.org/10.1080/13639080.2017.1404011

Tveter, E. (2017). The effect of airports on regional development: Evidence from the construction of regional airports in Norway. Research in Transportation Economics, 63, 50–58. https://doi.org/10.1016/j.retrec.2017.07.001

Tyndall, J. (2017). Waiting for the R train: Public transportation and employment. Urban Studies, 54(2), 520–537. https://doi.org/10.1177/0042098015594079

Van de Vijver, E., Derudder, B., & Witlox, F. (2016). Air passenger transport and regional development: cause and effect in Europe. PROMET - Traffic&Transportation, 28(2), 143–154. https://doi.org/10.7307/ptt.v28i2.1756

Van Reenen, J. (1996). The creation and capture of rents: wages and innovation in a panel of U. K. companies. The Quarterly Journal of Economics, 111(1), 195–226. https://doi.org/10.2307/2946662

Wang, C., Lim, M. K., Zhang, X., Zhao, L., & Lee, P. T. W. (2020). Railway and road infrastructure in the Belt and Road Initiative countries: Estimating the impact of transport infrastructure on economic growth. Transportation Research Part A: Policy and Practice, 134, 288–307. https://doi.org/10.1016/j.tra.2020.02.009

Yu, Z., & Luu, B. (2020). The impact of trade facilitation on Vietnam's trade flows. ASEAN Journal of Management & Innovation, 7(1), 133–153. https://doi.org/10.14456/ajmi.2020.10

Zhang, A., Wan, Y., & Yang, H. (2019). Impacts of high-speed rail on airlines, airports and regional economies: A survey of recent research. Transport Policy, 81, A1–A19. https://doi.org/10.1016/j.tranpol.2019.06.010

Zhang, X., Wan, G., & Wang, X. (2017). Road infrastructure and the share of labor income: Evidence from China's manufacturing sector. Economic Systems, 41(4), 513–523. https://doi.org/10.1016/j.ecosys.2017.08.001