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How does physical transport infrastructure impact on logistics transport development: Ho Chi Minh, Vietnam case

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Abstract: The objective of this paper is to assess how physical infrastructure impact on logistics transport development; the case of Ho Chi Minh-Vietnam (HCM). Author uses Multivariate regression (MR) to assess by separated MR models, respectively. The major findings are cargo productivity / total labour is are impacted by road length, road quality, length of the railway line, quality of the airway. Passenger productivity / total labour is impacted by road length, road quality, length of the railway line, airlines units which departing internationally, quality of the airway, connection between domestic and international airports. Cargoproductivity / total capital is impacted by road length, road quality, length of the railway line, airlines units which departing internationally, quality of the airway, connection between domestic and international airports. Passenger productivity / total capital is impacted road length, length of the railway line, railway quality, quality of the airway, connection between domestic and international airports.All of eight independent variables PI_1, PI_2, PI_3, PI_4, PI_5, PI_6, PI_7, PI_8impact onGDP of logistics transport in HCM.

Key words: physical transport infrastructure, logistics transport, development, HCM, Ho Chi Minh City, Vietnam

I. Introduction

Transport transportation sector affect the location and efficiency of production, the solution of socio-economic problems, the cost of production, as well as the formation of local and national. It is necessary to consider the existing transport structure in order to make effective using, which will allow assessment of changes in transport sector. Attention should also be considered to the assessment of the structure of enterprises participating in the implementation of projects such as Smart City (Vladislav Uskov, Oleg Kharchenko, 2021).Nikola Chovančíková, KatarínaHoterová stated that (2021) "Transport infrastructure is an extensive system consisting of several elements, which ensures national and international transport of people and goods. All types of transport are used within the transport infrastructure on the territory of Slovakia. The transport system of the Slovak Republic consists of road, rail, water, and air transport. Quality and functional transport infrastructure is a prerequisite for the rapid development of regions, which supports the development of the state. The importance of transport infrastructure is also pointed out by Act 45 (2011) on critical infrastructure. The Act identifies in its annex the transport sector, including the relevant subsectors, which are made up of individual types of transport. Not only in Slovakia, but also abroad, transport infrastructure is perceived as a very important component of a functioning state". Vakulenko, Kurenkov, Chebotareva et al., (2021) Suppose that the transport industry in the modern period faces the challenges of digitalization, infrastructure modernization, and intensification of the use of existing lines. To carry out the transportation process, the railways of Russia are equipped with various technical devices and means, which include various devices of railway automation. Simultaneously with the development of new control systems, the introduction of new technologies of operational work is taking place. The Russian Arctic region has significant multifactorial potential. This potential must be fully exploited which takes into account all the features of this region. The transport logistics infrastructure development in the region is an important factor. An integrated transport and logistics model should be developed that incorporates all types and sectors of used transport (Vitaly Sergeev, Igor Ilin, Alexey Fadeev, 2020). Joseph Muvawala, Hennery SebukeeravàKurayishSsebulime (2020) argue that the impact of road infrastructure investment on economic growth occurs more slowly than in the case of Uganda. The evidence also demonstrates the presence of significant economic benefits resulting from large investments in urban transport infrastructure networks through expressways and associated roads, especially in urban areas. Greater Kampala town. At the country level shows that transport infrastructure in China’s Belt and Road Initiative (BRI) countries plays an essential role in promoting economic growth. Furthermore, the spatially positive spread effects of economic growth in the categories of geographical distance, economic distance, cultural distance and spatial weighting matrix of economic growth. Institutional distance, shorter geographical distance. Anh the economic, cultural and institutional similarities between the BRIs lead to mutual economic growth. The regional level indicates that the spatial spread of transport infrastructure is significantly negative in East Asia-Central Asia and the Commonwealth of Independent States and in South Asia. In contrast, the positive spatial spread of transport infrastructure on economic growth is most evident in Central and Eastern Europe.

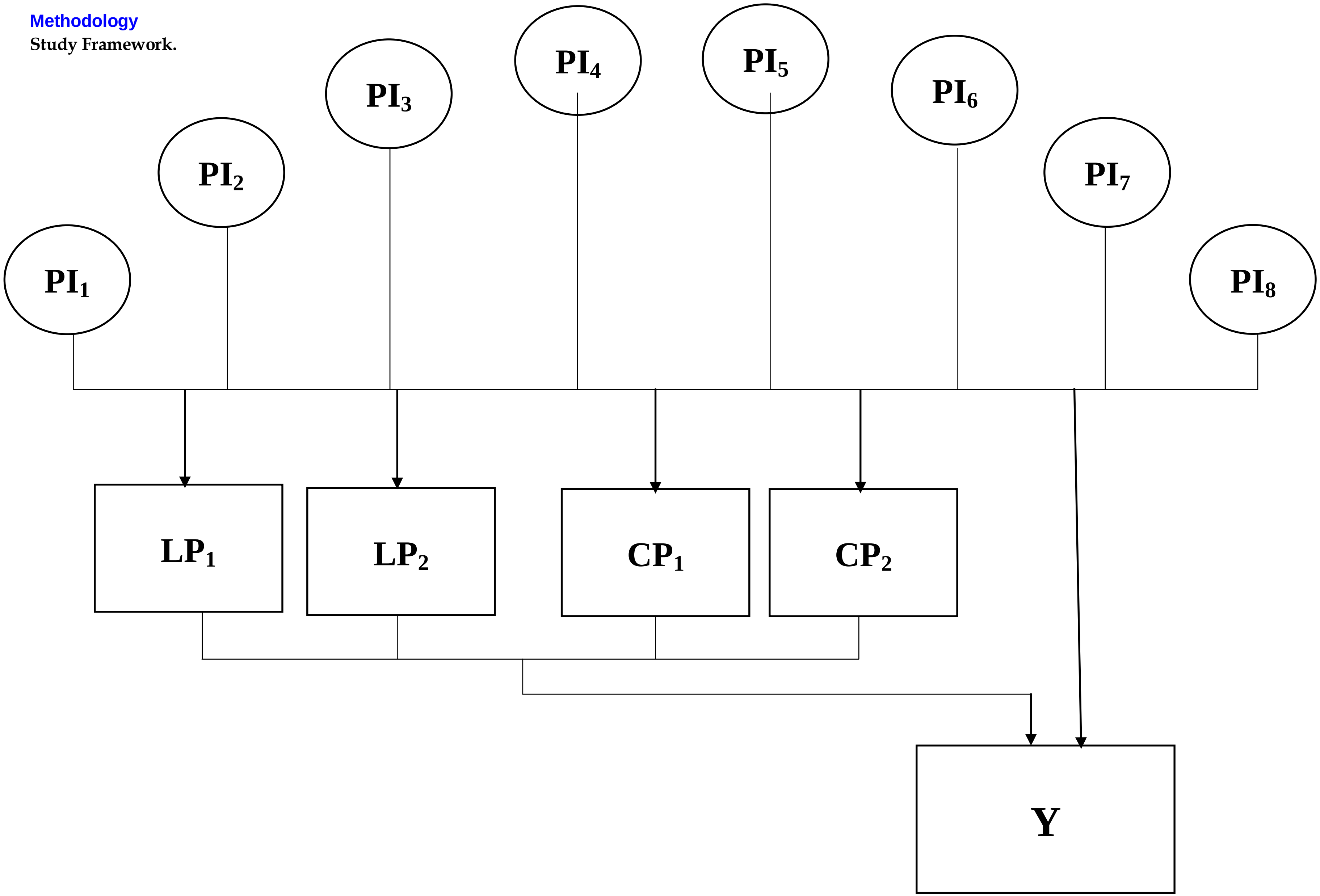
The objective of this paper is to assess how physical infrastructure impact on logistics transport development; the case of Ho Chi Minh-Vietnam. The content of paper has eight sections which are introduction is section 1, literature review is section 2, section 3 will be methodology, section 4 is theoretical basic, section 5 data source, section 6 will present study result, discussion will be in section 7, and finally section 8 is conclusion.

II. Literature review

Transport Infrastructure projects such as metro tracks are being built more and more. However, assessing the benefits to be gained from these projects is not easy. While some benefits from infrastructure projects can be measured using economic data, such data is not sufficient to measure social benefits (Sandeep Mathur, Johan Ninan, Lauri Vuorinen et al., 2021).In order to revive and promote the inland water transport system in Ghana and other countries with similar limitations, the researchers proposed a number of recommendations that are appropriate institutionalization and regulation of inland water transport, dredging or maintenance, improving navigational channels, improving logistics, developing infrastructure as well as promote integrated transport planning (Boadu Solomon, Ebenezer Otoo, Alex Boateng et al., 2020). Matteo Muratori, David Greene, EleftheriaKontou et al., (2020) provide information literacy and quantitative evidence in network-level sustainable infrastructure management, practical decision-making on traffic environment assessment, and road performance monitoring design and evaluation, road maintenance and management. In addition to traffic and road problems, the model-driven fuzzy multi-criteria decision method has broad and great potential in solving geospatial decision-making problems in other areas, such as the environment and public health. Yongze Song, Dominique Thatcher, Qindong Li et al., (2020) show that an index based on a model-driven fuzzy spatial multi-criteria decision (MFSD) can more comprehensively and accurately describe sustainable road infrastructure performance. The MFSD-based index is able to improve the correlation with road maintenance costs by 30.46% compared to roughness, which is the optimal sensor-monitored metric. In local government areas, the MFSD-based index could explain 45.8% of actual road maintenance costs. Sensitivity analysis from many aspects shows that MFSD is a reliable and accurate method in decision making. Andrey Nechaev, YuliaSkorobogatova, Maria Nechaeva (2020) suggest creating a mixed transport and logistics alliance and presents a macro-level diagram of the innovative infrastructure for this mixed transport and logistics alliance. The implementation of a strategy to reduce total logistics costs is complicated by the weak ability to formalize logistics service quality parameters and the subjective assessment of service quality by consumers. The desire to take into account most of the key factors in a logistics strategy clearly leads to the need to adopt a multi-criteria optimization approach.Jin Suk Park, Young-Joon Seo, Min-Ho Ha (2019) argue that government spending on transport infrastructure is often spread out across the country to maintain parity of standards across regions and that a larger population can benefit from it. Besides, another finding is that the negative impact of transport costs on transport infrastructure investment is widespread. In other words, this implies that lower transport costs are associated with more active investment in transport infrastructure. One potential related to this could be that cheap transport leads to greater use of transport infrastructure. Such frequent use may then require greater expenditure on maintenance or greater transportation needs to rebuild existing transport infrastructure.This shows a polarizing effect in the early stages of lagging transport infrastructure and spread effects after the transport infrastructure is completed (Chao Wang, Ming K. Lim, Xinyi Zhang et al, 2020). The impact of China-Pakistan economic corridor (CPEC)'s road and transport infrastructure is positively related to community support for tourism, and perceived tourism benefits and community satisfaction play a central role in this relationship. Researchers make clear the perceptions of Pakistani locals regarding tourism due to CPEC road and transport infrastructure development. The survey shows that the local community has a positive perception and readiness for tourism in Pakistan in the context of CPEC. In addition, it explains the mediating mechanisms in terms of community satisfaction and perceived tourism benefits in the relationship between CPEC road and transport infrastructure and community support for tourism development (Shamsa Kanwal, Muhammad Imran Rasheed, Abdul Hameed Pitafid et al,. 2020).Xun Zhang, Guanghua Wan, Xu Wang (2017) state that the city's road infrastructure is negatively correlated with the share of labour income. If the Hukou system impedes labour mobility and economic transformation is controlled, road infrastructure will help increase the share of labour. Policy choices can be suggested to lessen the negative impact of road infrastructure on employment rates in China. Public spending should be redirected to road construction and towards education and health development, which is expected to increase the share of employment. The development of state-owned enterprises can play a role in reducing the unequal impact of road infrastructure, improving operational efficiency. Air and rail transport have a positive and significant relationship with energy demand, while air and rail passenger transport have a positive influence on energy demand in middle income countries. low, and rail freight significantly increases energy demand in middle- and high-income countries. These findings will be greater benefit to policymakers to come up with a sustainable transport policy in which energy demand is balanced by alternative energy sources, electric wagons, Inefficient road infrastructure and modified train type engines to meet the challenges of global energy problems (Haroon Ur Rashid Khan, Muhammad Siddiquec, Khalid Zamand et al., 2018). Transport infrastructure contributed to the regional economic growth in China during 2007-2015. In particular, the improvement of road and railway quality and upgrading of transport infrastructure contributed significantly to economic growth. However, the expansion of the overall road network has not been examined to have a significant impact yet. And government development strategies that lack local comparative advantage is not only make slowly economic growth but are also likely to limit the contribution of transport infrastructure (Xiao Ke, Justin Yifu Lin, Caihui Fu et al., 2020). Wissam El Hamra, Youssef Attallah (2012) demonstrated that Vehicles Identification Techniques (VIT) systems can be used to collect trip matrices, and for traffic operational applications such as congestion pricing, road toll collection, and traffic violation detection. Congestion pricing, tolls, parking fees, and traffic violation detection are all potential areas of VIT adoption within the same required infrastructure. Such apps are already active in many developing countries. VIT is recommended to be deployed in countries with ITS. Dieudonn´e Tchuente, Dominik Senninger, Holger Pietsch et al, (2020) provide more frequent road signal infrastructure updates for connected driving. Consolidation of community-sourced sensor data to provide accurate location and regular updates of road signs. How to filter out noise caused by lots of inaccurate positioning data and noise caused by false positive and false negative detection, because they happen very often and are attributed to factors like weather, objects natural obstructions, traffic conditions or sensor failure. Clearly demonstrate the suitability of the proposed approach, which can significantly contribute to making connected driving easier and safer. The state of road infrastructure has a serious effect on road safety, driving comfort and rolling resistance. Road infrastructure must be taken care of comprehensively and regularly to identify damaged sections and road hazards. The authors propose a monitoring system based on vehicle sensor data and supervised learning algorithm, which can automatically learn from the crowd, especially from new vehicles with no available data. The effort of manually collecting training data can be greatly reduced (Johannes Masino, Jakob Thumm, Michael Frey et al., 2017).Elements for the safe use of unmanned aerial vehicles in established transport infrastructures. Taking these factors into account, a method of protecting an allocated air corridor has been developed (Svetlana Shvetsova, Alexey Shvetsov, 2021). Complextechnologies such as additive manufacturing or commonly accepted as 3D printing have received widespread attention, creating challenges and opportunities in terms of transport infrastructure, logistics and transportation services. Providing timely and valuable new insights into this phenomenon, as a potential mechanical tool to support the transportation revolution to improve congestion and traffic pollution (Mohammadreza Akbari, Nghiep Ha, 2020).Ranking of logistics infrastructure and connectivity between departments is the important factor to improve Vietnam's logistics system. The Vietnamese government should pay attention in implementing ideal investment priorities and appropriate regulations to improve the logistics system such as transport infrastructure (Viet Linh DANG, Gi Tae YEO, 2018). In Hai Phong City, Vietnam, the development of road network infrastructure should be continued and completed according to the Government's schedule and changes in legal regime, infrastructure and timeliness (Thao Phuong Vu, David B. Grant, David A. Menachof, 2020). The public sector plays an important role in land resource management, policy formulation, economic strengthening and strategic transport infrastructure development, including logistics hubs in Vietnam (Thi Yen Pham, Hye Min Ma, Gi Tae Yeo, 2017). It has been proven that internal factors have a more significant impact than external factors both in the formulation and implementation of marketing strategies of logistics enterprises in Vietnam such as business networks, human resources and existing marketing strategy. Meanwhile, external factors such as logistics transport infrastructure have the biggest impact on a company's marketing strategy (Vinh TươngPhia, Thai BinhĐang, 2020).

III. Methodology

3.1. Study Framework.



3.2. Factors, variables of study model and Multivariate regression model.

Factors, variables of study model.

PI_1 is road length, the unit is km.
PI_2 is road quality. the unit is score.
PI_3 is the length of the railway line, the unit is km.
PI_4 is railway quality, the unit is in score.
PI_5 is length of inland waterways, the unit is km.
PI_6 is airlines units which departing internationally, the unit is the airline.
PI_7 is quality of the airway, the unit is in score.
PI_8 is connection between domestic and international airports, the unit is the airline.
LP_1 iscargo productivity which calculated on the total labour of logistics transport sector in HCM.
LP_2 is passenger productivity which calculated on the total labour of logistics transport sector in HCM.
CP_1 is cargo productivity which calculated on the total capital of logistics transport sector in HCM.
CP_2 is passenger productivity which calculated on the total capital of logistics transport sector in HCM.
Y is gross domestic products of logistics transport sector in HCM.

Multivariate regression model.

The relation between PI_1, PI_2, PI_3, PI_4, PI_5, PI_6, PI_7, PI_8 and LP_1 is assessed by MR model 1 below:
$LP_1 = pi_0 + pi_1PI_1 + pi_2PI_2 + pi_3PI_3 + pi_4PI_4 + pi_5PI_5 + pi_6PI_6 + pi_7PI_7 + pi_8PI_8 + w$
The relation between PI_1, PI_2, PI_3, PI_4, PI_5, PI_6, PI_7, PI_8 and LP_2 is assessed by MR model 2 below:
$LP_2 = pi_0 + pi_1PI_1 + pi_2PI_2 + pi_3PI_3 + pi_4PI_4 + pi_5PI_5 + pi_6PI_6 + pi_7PI_7 + pi_8PI_8 + w$
The relation between PI_1, PI_2, PI_3, PI_4, PI_5, PI_6, PI_7, PI_8 and CP_1 is assessed by MR model 3 below:
$CP_1 = pi_0 + pi_1PI_1 + pi_2PI_2 + pi_3PI_3 + pi_4PI_4 + pi_5PI_5 + pi_6PI_6 + pi_7PI_7 + pi_8PI_8 + w$
The relation between PI_1, PI_2, PI_3, PI_4, PI_5, PI_6, PI_7, PI_8 and CP_2 is assessed by MR model 4 below.
$CP_2 = pi_0 + pi_1PI_1 + pi_2PI_2 + pi_3PI_3 + pi_4PI_4 + pi_5PI_5 + pi_6PI_6 + pi_7PI_7 + pi_8PI_8 + w$
The relation between PI_1, PI_2, PI_3, PI_4, PI_5, PI_6, PI_7, PI_8 and Y is assessed by MR model 5 below.
$Y = pi_0 + pi_1PI_1 + pi_2PI_2 + pi_3PI_3 + pi_4PI_4 + pi_5PI_5 + pi_6PI_6 + pi_7PI_7 + pi_8PI_8 + w$
Where
w is the factors beyond the $PI_1 + PI_2 + PI_3 + PI_4 + PI_5 + PI_6 + PI_7 + PI_8$that this paper ignores.
$pi_0 + pi_1 + pi_2 + pi_3 + pi_4 + pi_5 + pi_6 + pi_7 + pi_8 = 0$: MR model has no statistical significance and do not besuitable to input data.
$pi_0 + pi_1 + pi_2 + pi_3 + pi_4 + pi_5 + pi_6 + pi_7 + pi_8 \neq 0$: MR model has statistical significance and be suitable to input data.
$pi_0 + pi_1 + pi_2 + pi_3 + pi_4 + pi_5 + pi_6 + pi_7 + pi_8 > 0$means the PI_1, PI_2, PI_3, PI_4, PI_5, PI_6, PI_7, PI_8impact on CP_1, CP_2,LP_1,LP_2, Y, separately and respectively.
$pi_0 + pi_1 + pi_2 + pi_3 + pi_4 + pi_5 + pi_6 + pi_7 + pi_8 =< 0$ means the PI_1, PI_2, PI_3, PI_4, PI_5, PI_6, PI_7, PI_8 do not impact on CP_1, CP_2,LP_1,LP_2, Y, separately and respectively.

IV. Theoretical basis and calculation formula of variables of study model

3.3. Infrastructure:

Ann Mills, Sarah Hesketh (2013, p. 814) says that most activities which be performed outdoors can be identified as community transportation infrastructure. According to Bogdan I, Vamanu Adrian V, Gheorghe Polinpapilinho F. et al., (2016, p. 2, p. 4) that there is still a lack of a widely have been accepted worldview on how transport infrastructure systems should be defined. Activities in other critical infrastructures may affect the ability of this infrastructure to function. Rahul Kala (016, p. 443) commented that "Road infrastructure consists of many short roads, alternative roads, intersections in city traffic, routes, routing is computationally expensive, unlike highway traffic, there are fewer roads and longer roads".

3.4. Cargolabour productivity.

Cargo labour productivity $= \frac{Total\ volume\ of\ cargo\ have\ been\ transported}{Total\ number\ of\ lalour}$

3.5. Passenger labour productivity.

Passenger labour productivity $= \frac{Total\ volume\ of\ passenger\ have\ been\ transported}{Total\ number\ of\ lalour}$

3.6. Cargo capital productivity.

$$\text{Cargo capital productivity} = \frac{Total\ volume\ of\ cargo\ have\ been\ transported}{Total\ capital}$$

3.7. Passenger capital productivity.

$$\text{Passenger capital productivity} = \frac{Total\ volume\ of\ passenger\ have\ been\ transported}{Total\ capital}$$

3.8. Gross domestic product

According to definition of World Bank that "Gross domestic product (GDP) represents the sum of value added by all its producers. Value added is the value of the gross output of producers less the value of intermediate goods and services consumed in production, before accounting for consumption of fixed capital in production. The United Nations System of National Accounts calls for value added to be valued at either basic prices (excluding net taxes on products) or producer prices (including net taxes on products paid by producers but excluding sales or value added taxes). Both valuations exclude transport charges that are invoiced separately by producers. Total GDP is measured at purchaser prices. Value added by industry is normally measured at basic prices".

V. Data source

Data of HCM logistics transport productivity and GDP are from HCM Statistics Office and HCM Statistical Yearbook.

Data of physical infrastructure are from World Bank.

VI. Study results

Table 1: The result of MR model 1 for correlation between PI_1, PI_2, PI_3, PI_4, PI_5, PI_6, PI_7, PI_8 and LP_1

R square (RS)		0.995036932 (99.5%)	
Adjusted R Square (ARS)		0.97518466 (98%)	
Significance F (SF)		0.01970497	
Independent variables	Coefficients	Value of Coefficients (VC)	P-Value (PV)
	pi_0	-0.6437902	0.46895816
PI_1	pi_1	2.0571E-06	0.54640958
PI_2	pi_2	0.03548686	0.64165414
PI_3	pi_3	6.236E-06	0.29791569
PI_4	pi_4	-8.278E-07	0.48377233
PI_5	pi_5	-0.3613745	0.14016025
PI_6	pi_6	-7.57E-07	0.40052545
PI_7	pi_7	0.7891239	0.03487437
PI_8	pi_8	-6.867E-05	0.24951832

RS = 0.995036932 (99.5%), ARS = 0.97518466 (98%), FS = 0.01970497 is to mean that the model was built to be suitable to the input data and it has statistical significance at the FS level 0.01970497.

The independent variables impact on LP_1 have their coefficients> 0 which are pi_1= 2.0571E-06, pi_2 = 0.03548686, pi_3 = 6.236E-06, pi_7 = 0.7891239

The independent variables have their coefficients<= 0 which do not impact on LP_1 are pi_4= -8.278E-07, pi_5 = -0.3613745, pi_6 = -7.57E-07, pi_8 = -6.867E-05

PV:pi_1, pi_2, pi_3, pi_4, pi_5, pi_6, pi_7, pi_8 are 0.46895816, 0.54640958, 0.64165414, 0.29791569, 0.48377233, 0.14016025, 0.40052545, 0.03487437, 0.24951832, respectively, which all are small is to mean that the output figures has statistical significance.

Table 2: The result of MR model 2 for correlation between PI_1, PI_2, PI_3, PI_4, PI_5, PI_6, PI_7, PI_8 and LP_2

R square (RS)		0.97881677 (98%)	
Adjusted R Square (ARS)		0.89408384 (89%)	
Significance F (SF)		0.08207837	
Independent variables	Coefficients	Value of Coefficients (VC)	P-Value (PV)
	pi_0	-0.124793	0.5590993
PI_1	pi_1	1.1327E-06	0.25020717
PI_2	pi_2	0.03725941	0.14768184
PI_3	pi_3	1.8084E-06	0.24366312
PI_4	pi_4	-5.045E-07	0.17049131
PI_5	pi_5	-0.0470998	0.33619476
PI_6	pi_6	1.1251E-07	0.58957823
PI_7	pi_7	0.01108487	0.79504089
PI_8	pi_8	7.0194E-07	0.95311395

RS = 0.97881677 (98%), ARS = 0.89408384 (89%), FS = 0.08207837 which means that the model was built to be suitable to the input data and it has statistical significance at the FS level = 0.08207837.
The independent variables impact on LP_2 have their coefficients> 0 which arepi_1 = 1.1327E-06, pi_2 = 0.03725941, pi_3 = 1.8084E-06, pi_6 = 1.1251E-07, pi_7 = 0.01108487, pi_8 = 7.0194E-07
The independent variables have their coefficients<= 0 which do not impact on LP_2 are pi_4 = -5.045E-07, pi_5= -0.0470998
PV: pi_1 = 0.25020717, pi_2= 0.14768184, pi_3= 0.24366312, pi_4= 0.17049131, pi_5= 0.33619476, pi_6= 0.58957823, pi_7 = 0.79504089, pi_8 = 0.95311395. All of them are small, that is to mean the output figures have statistical significance.

Table 3: The result of MR model 3 for correlation between PI_1, PI_2, PI_3, PI_4, PI_5, PI_6, PI_7, PI_8 and CP_1

R square (RS)		0.91351531 (91%)	
Adjusted R Square (ARS)		0.56757656 (57%)	
Significance F (SF)		0.30359268	
Independent variables	Coefficients	Value of Coefficients (VC)	P-Value (PV)
	pi_0	1.53892181	0.58907502
PI_1	pi_1	-8.284E-08	0.99383369
PI_2	pi_2	-0.3434094	0.25478039
PI_3	pi_3	1.529E-05	0.41179253
PI_4	pi_4	3.4188E-06	0.40052426
PI_5	pi_5	-0.8747393	0.22495569
PI_6	pi_6	-5.238E-06	0.15823128
PI_7	pi_7	1.08572407	0.16356761
PI_8	pi_8	-5.79E-06	0.97120195

RS = 0.91351531 (91%), ARS = 0.56757656 (57%), SF = 0.30359268 to indicate that the model was built to be suitable to the input data and it has statistical significance at the FS level = 0.30359268.
The independent variables impact on CP_1 have their coefficients> 0 which are pi_1 = 1.1327E-06, pi_2 = 0.03725941, pi_3 = 1.8084E-06, pi_6 = 1.1251E-07, pi_7 = 0.01108487, pi_8 = 7.0194E-07
Impact: pi_3 = 1.529E-05, pi_4 = 3.4188E-06, pi_7 = 1.08572407
The independent variables have their coefficients<= 0 which do not impact on CP_1 are pi_1 = -8.284E-08, pi_2 = -0.3434094, pi_5 = -0.8747393, pi_6 = -5.238E-06, pi_8 = -5.79E-06
PV: pi_1 = 0.99383369, pi_2= 0.25478039, pi_3 = 0.41179253, pi_4 = 0.40052426, pi_5 = 0.22495569, pi_6 = 0.15823128, pi_7 = 0.16356761, pi_8= 0.97120195, all are under 1, so the output result has statistical significance.

Table 4: The result of MR model 4 for correlation between PI_1, PI_2, PI_3, PI_4, PI_5, PI_6, PI_7, PI_8 and CP_2

R square (RS)		0.92526172 (93%)	
Adjusted R Square (ARS)		0.62630858 (63%)	
Significance F (SF)		0.26707696	
Independent variables	Coefficients	Value of Coefficients (VC)	P-Value (PV)
	pi_0	0.26406318	0.37187215
PI_1	pi_1	5.8551E-07	0.58591479
PI_2	pi_2	-0.0296067	0.2909062
PI_3	pi_3	2.6863E-06	0.19991384
PI_4	pi_4	2.9571E-07	0.4398584
PI_5	pi_5	-0.1201966	0.13065839
PI_6	pi_6	-6.078E-07	0.11625861
PI_7	pi_7	0.05586355	0.3661122
PI_8	pi_8	1.1044E-05	0.50247524

RS = 0.92526172 (93%), ARS = 0.62630858 (63%), Sf = 0.26707696 which means that the model was built to be suitable to the input data and it has statistical significance at the FS level = 0.26707696.
The independent variables impact on CP_2 have their coefficients> 0 which are pi_1 = 5.8551E-07, pi_3= 2.6863E-06, pi_4= 2.9571E-07, pi_7= 0.05586355, pi_8= 1.1044E-05
The independent variables have their coefficients<= 0 which do not impact on $CP_2$are pi_2 = -0.0296067, pi_5 = -0.1201966, pi_6 = -6.078E-07
PV: pi_1, pi_2, pi_3, pi_4, pi_5, pi_6, pi_7, pi_8 are 0.58591479, 0.2909062, 0.19991384, 0.4398584, 0.13065839, 0.11625861, 0.3661122, 0.50247524, respectively. All of them are small, that is to mean the output figures have statistical significance.

Table 5: The result of MR model 5 for correlation between PI_1, PI_2, PI_3, PI_4, PI_5, PI_6, PI_7, PI_8 and Y

R square (RS)		0.99680136 (99.6%)	
Adjusted R Square (ARS)		0.98400679 (98%)	
Significance F (SF)		0.01273331	
Independent variables	Coefficients	Value of Coefficients (VC)	P-Value (PV)
	pi_0	-201513.13	0.26362941
PI_1	pi_1	0.75589651	0.27996102
PI_2	pi_2	8784.34261	0.5336713
PI_3	pi_3	0.13369191	0.88352411
PI_4	pi_4	0.08651909	0.67005087
PI_5	pi_5	1069.8606	0.97234828
PI_6	pi_6	0.07163157	0.63407894
PI_7	pi_7	10568.7269	0.73578919
PI_8	pi_8	5.02112112	0.58157653

RS = 0.99680136 (99.6%), ARS = 0.98400679 (98%), SF = 0.01273331, that is to tell the model was built to be suitable to the input data and it has statistical significance at the FS level = 0.01273331.
The independent variables impact onY have their coefficients> 0 which are: pi_1, pi_2, pi_3, pi_4, pi_5, pi_6, pi_7, pi_8 are 0.75589651, 8784.34261, 0.13369191, 0.08651909, 1069.8606,0.07163157, 10568.7269,5.02112112, respectively.
PV: pi_1= 0.27996102, pi_2= 0.5336713, pi_3= 0.88352411, pi_4= 0.67005087, pi_5= 0.97234828, pi_6= 0.63407894, pi_7= 0.73578919, pi_8= 0.58157653. They are all small value which is to mean the output figures have statistical significance.

VII. Discussion

Based on the results which presented on table 1, table 2, table 3, table 4 and table 5 are to show that the independent variables of physical infrastructure impact on LP_1 are PI_1(pi_1= 2.0571E-06), PI_2(pi_2 = 0.03548686), PI_3 (pi_3 = 6.236E-06), PI_7 (pi_7 = 0.7891239).The independent variables impact on LP_2 have their coefficients> 0 which are PI_1 (pi_1 = 1.1327E-06), PI_2 (pi_2 = 0.03725941), PI_3 (pi_3 = 1.8084E-06), PI_6 (pi_6 = 1.1251E-07), PI_7 (pi_7 = 0.01108487), PI_8 (pi_8 = 7.0194E-07).The independent variables impact on CP_1 have their coefficients> 0 which are PI_1 (pi_1 = 1.1327E-06), PI_2 (pi_2 =

0.03725941), PI_3 (pi_3 = 1.8084E-06), PI_6 (pi_6 = 1.1251E-07), PI_7 (pi_7 = 0.01108487), PI_8 (pi_8 = 7.0194E-07).The independent variables impact on CP_2 have their coefficients> 0 which are PI_1 (pi_1 = 5.8551E-07), PI_3 (pi_3= 2.6863E-06), PI_4 (pi_4= 2.9571E-07), PI_7 (pi_7= 0.05586355), PI_8 (pi_8= 1.1044E-05).All of eight independent variables impact onY which are PI_1, PI_2, PI_3, PI_4, PI_5, PI_6, PI_7, PI_8 have their coefficients> 0, that are pi_1, pi_2, pi_3, pi_4, pi_5, pi_6, pi_7, pi_8 are 0.75589651, 8784.34261, 0.13369191, 0.08651909, 1069.8606, 0.07163157, 10568.7269, 5.02112112, respectively.

VIII. Conclusion

According to study results that presented in section 6 and discussion about study result in section 7 we can have conclusion are:

(LP_1) is cargo productivity which calculated on the total labour of logistics transport sector in HCMis impacted by PI_1(road length), PI_2(road quality), PI_3 (length of the railway line) and PI_7 (quality of the airway).

LP_2 (passenger productivity which calculated on the total labour of logistics transport sector in HCM) is impacted by PI_1(road length), PI_2(road quality), PI_3 (length of the railway line), PI_6 (airlines units which departing internationally), PI_7 (quality of the airway), PI_8 (connection between domestic and international airports).

CP_1 (cargoe productivity which calculated on the total capital of logistics transport sector in HCM)is impacted by PI_1(road length), PI_2(road quality), PI_3 (length of the railway line), PI_6 (airlines units which departing internationally), PI_7 (quality of the airway), PI_8 (connection between domestic and international airports).

CP_2 (passenger productivity which calculated on the total capital of logistics transport sector in HCM)is impacted by PI_1 (road length), PI_3 (length of the railway line), PI_4 (railway quality), PI_7 (quality of the airway), PI_8 (connection between domestic and international airports).

All of eight independent variables impact onY which are PI_1 is road length, PI_2 is road quality, PI_3 is the length of the railway line, PI_4 is railway quality, PI_5 is length of inland waterways, PI_6 is airlines units which departing internationally, PI_7 is quality of the airway, PI_8 is connection between domestic and international airports.

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