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Develop the HCMVN transport logistics industry in the context of 4.0

Vu Thi Kim Hanh
University of Economics and Law, Vietnam National University Ho Chi Minh City, Quarter 3, Linh Xuan Ward, Thu Duc District, Ho Chi Minh city, Vietnam

Corresponding Author: **Vu Thi Kim Hanh**

Abstract
This paper aims to build the model which come from applying and developing Cobb-Douglas production function (Cobb-Douglas) to assess transport logistics industry development of Hochiminh City, Vietnam (HCMVN). The qualitative method is used to clarify the objectives of research through introduction, literature review, methodology, reasoning and approach in applying and developing Cobb-Douglas. By systematically collecting, reviewing and researching, capturing and synthesizing acknowledge documents from reputable scientific data sources, previous studies have been published by leading publishers. The result is the model is suggested which has total twenty-two independent observed variables, six independent latent variables, two intermediating observed variables and one dependent observed variable.

Keywords: transport logistics industry, development, Hochiminh, Vietnam, HCMVN, Cobb-Douglas production function

Introduction

Transport logistics is one of the nine key service industries of the economic structure of HCMVN. HCMVN transport logistics has a small number units of business compared to other industry groups, but it is the industry which has the second largest GDP after the trade sector contributes to GDP of HCMVN. The average percentage of GDP of transport logistics contributes to the GDP HCMVN between 2010 and 2020 is 15.67%. In which the highest is 80.12% in 2012, the lowest level in 2013 is 7.96%, the other years are from 9.05% to 10.09%. The highlight is although at the end of 2019 and during 2020 that all economies in the world were affected by Covid 19, most ot them have the negative GDP. However, GDP of HCMVN transport logistics still achieved 10.07% and 9.65% in 2019 and 2020, respectively. Although GDP was quite good, nevertheless productivity was low and fluctuated unusually over the period from 2010 to 2019. The number of businesses and enterprises in the transport logistics industry in HCMVN also increased steadily between 2010 and 2018 from 4,891 to 11,068 units and achieving an average growth rate at 10.92 percent. The highest was 16.66% in 2016 at 10,110 units, there was 8,666 units at 16.03% in 2015. There was 11,403 units in 2017 and 11,068 units in 2018 which shown that there was only 2018 had a negative growth rate at 2.94%.

Business performance of the HCMVN transport logistics industry is really inefficient. The rate of number of units doing business losses is higher than the rate of the one doing business has profits. While the rate of enterprises doing business with losses between 2011 and 2015 was 46.2%, the rate of the one doing business with profits in the same period accounted was only 39.8%. The percentage of enterprises making profits in 2016, 2017 and 2018 were 41.90%, 39.70%, and 38%, respectively. In the same time, the proportion of enterprises doing business losses were 54.3%, 54%, and 50.7%, respectively. The rate of enterprises suspending operations for a definite time, ceased operations indefinitely, dissolved or went bankrupt was 14% on average from 2011 to 2015. The years 2016, 2017, 2018 were 3.8%, 6.3 % and 11.3%, respectively.

Regarding the transport infrastructure of Vietnam (VN) 's transport logistics, according to the official report of the World Bank (WB), the transport infrastructure of the VN logistics industry includes the measurement criteria of road, railway, seaports, airports, general infrastructure for goods movement, and telecommunications infrastructure and information technology services. Accordingly, the WB surveyed through a questionnaire system including four levels of quality assessment are very low, low, high, and very high. In which, Vietnam reached low and very low levels in 2010, 2012, 2014, 2016, and 2018 with scores of 2.56, 2.68, 3.11, 2.70, and 3.01, respectively, with the ranking (Vietnam/countries) are 66/155, 72/155, 44/160, 70/160, and 47/160 in 2010, 2012, 2014, 2016, and 2018, respectively. In fact, the transport infrastructure of VN logistics industry. Although HCMVN has been promptly built, improved, restored and expanded, it has not solved the problem of congestion, delay, especially the seaports are losing its unique position, slow connection. The main roads connecting to bridges and ports slow down transportation time, leading to reduce transportation productivity and increased transportation costs.

In terms of institution, based on data from the Provincial Governance and Public Administration Performance Index in Vietnam (PAPI). Institution is measured by six indicators which are (1) citizen participation at the grassroots level, (2) openness, transparency, (3) accountability to the people, (4) control of corruption in the public sector, (5) public administration procedures and (6) public service delivery. Each indicator is clearly explained by sub-criteria. Accordingly, calculating the period from 2010 to 2019 the criteria for HCMVN is (1) is 5.20 to 4.86, (2) is 6.40 to 5.49, (3) is 5.87 to 5.04, (4) is 6.54 to 6.37, (5) os 7.26 to 7.39 and (6) is 7.38 to 7.47. The figures show indicators (5) and (6) that the scores increased slightly between 2010 and 2019. However, indicators (1), (2), (3) and (4) the score decreased from 2010 to 2019. In general, the institutional situation is one of the three bottlenecks of the Vietnamese economy, the three bottlenecks are institutions, infrastructure and human resources. In other words, the institution is a barrier on the way to develop the logistics industry in HCMVN in particular and VN's economy oriented socialism in general.

Conclusion, the transport logistics industry in HCMVN is facing many difficulties and challenges. Specifically, institutions, infrastructure, size and intrinsic quality of units in the logistics industry which are capital, human resources, science and technology, vision, strategy and so on. These difficulties and challenges are the core and fundamental causes of the productivity and GDP of the industry in HCMVN are still low and weak.

2. Literature review.

Strong development of road traffic without applying advanced technology related to green productivity can lead to waste of resources and environmental and safety problems. Therefore, in order to improve productivity while reducing carbon emissions, traffic noise and accident rates should have priority to have advanced transport technology and equipment and also continuously expanding the scope of their application (Hongwei Liu, Ronglu Yang, Dongdong Wu et al., 2021). In China, the combined environmental performance of national and sub-systems of passenger transport outperforms freight when the system is limited to a number of hours. The passenger transport sub-system performs better than the Eastern region and the freight transport outperforms the Central region. Furthermore, the aggregate environmental effects in the Eastern and Western regions are not only converging at their own stable levels, but there are also differences in the overall environmental performance between the Eastern and Western regions (Hongwei Liu, Ronglu Yang, Dongdong Wu et al., 2020). Until now, many countries still depend on inland waterway transport (IWT) to transport bulk and general goods across rivers and lakes over long distances. Regardless of the long years of operational activities, the IWT system in Ghana is facing many limitations grouped under administrative, market, logistical and technical constraints that impede smooth operation and industry growth. In order to revive and promote the IWT system in Ghana and other countries with similar limitations, some of the recommendations are to institutionalize and regulate appropriately IWT that are dredging or maintaining navigational channels, improving logistics, developing infrastructure as well as promote integrated transport planning (Boadu Solomon, Ebenezer Otoo, Alex Boateng et al., 2020). Government institutions, policies and regulatory frameworks are considered to be of vital importance in moving towards sustainable transport. Coordinating national transport activities with clear responsibilities, incentives, disseminating good practices and establishing partnerships with key stakeholders. It should be emphasized that taxes, customs and duties in the transport sector, including fuel taxes, contribute a significant portion of the revenue generated to the government, so it will be a challenge to reduce income by providing tax incentives related to new technologies and alternative fuels. In addition, people lack awareness about efficient vehicle use and fuel consumption reduction practices (Sameer Abu-Eisheh, Wilhelm Kuckshinrichs, Abdelnaser Dwaikat, 2020). Logistics technology is to significantly reduce transportation costs, improve the quality of services providing to senders and recipients of goods, and speeding up capital turnover (Andrey Nechaev, Yulia Skorobogatova, Maria Nechaeva, 2020). The large scale of transport vehicles such as container ships and cargo planes may not be necessary for the competitiveness of the logistics industry. Expansion is a double - edged sword. Economies of scale can have negative aspects that come with it (Hyuksoo Cho, Jungsun Lee, 2020). A geographically dispersed transport company uses virtual computing infrastructure and maximizes process which has the means to ensure efficient operation of the remote controller including operation through low broadband Internet channels and ensure the integrity and confidentiality of business related information (Aleksey Dorofeev, Valery Kurganov, Nadejda Fillipova et al., 2020). It can be said that today's transport chain is fully integrated in the production system, as far as international trade is concerned. In the transaction model itself, this is a concept by which the activities of transportation, distribution are considered as a sub-system of the entire production system. The role of logistics in intermediating globalization demonstrates that international logistics is a fundamental element of the global economy with its importance driven by the growth of the volume of goods traded as well as the numerous origin and destination (Yücel Candemira, Dilay Çelebib, 2017). Real transport cost reduction can be achieved. This is achieved through a reduction in the number of transport trips between regions. Furthermore, since the cost metric is a function of time and distance traveled, the saving of cost is achieved are related to reduced fuel consumption as well as less time than the circulate result, total distances is shorter and congestion is less (Stephanus Daniel Handoko, Hoong Chuin Lau, 2016). Distributing urban goods through environmentally friendly methods is one of the sustainable strategies advocated worldwide. The great potential to reduce congestion and pollution levels caused by transportation methods which caused by existing goods distributed. Urban railways can be considered as an alternative method for the distribution of goods within the city. Adoption of the EU rail for urban distribution of goods, specifically from 1995 to 2008 (Monika Singha, Sanjay Gupta, 2020). The importance of transportation in economic growth. Air and road transport maybe do not often be associated with or negatively affect economic growth, mainly in developing countries. Sometimes, in developing countries, the increase in air and road transport can hinder economic development. Physical capital plays an important role in the economic growth of developed countries. While labor concentration negatively affects economic growth of developing countries, the demand for transportation is driven by social and economic factors other than the private sector. The larger geographical size of

a country will increase the supply of transport (Jin Suk Park, Young-Joon Seo, Min-Ho Ha, 2019). In the long run, investment in road transport infrastructure has a positive and significant impact on economic growth. But in the short term, the real impact is negative. The impact of road transport infrastructure investment on economic growth occurred more slowly than in the case of Uganda. The presence of significant economic benefits resulting from large investments in urban transport infrastructure networks through highways and associated roads, especially in the Greater Kampala metropolitan. The city authorities and the transportation planning for new cities in future . With the current traffic flow, the country loses about 6.7% of GDP every year due to traffic congestion (Joseph Muvawala, Hennery Sebukeera và Kurayish Ssebulime, 2020). At the national level, transport infrastructure in China's Belt and Road Initiative (BRI) plays an essential role in promoting economic growth. The spatially positive spillover effects of economic growth in the categories of geographic distance, economic distance, cultural distance, and the spatial weighting matrix of institutional distance. Shorter geographical distances and economic, cultural and institutional similarities between the BRIs lead to mutual economic growth. At the regional level, the spatial spillover 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 spillover of transport infrastructure on economic growth is most evident in Central and Eastern Europe. This shows a polarizing effect in the early stages of lagging transport infrastructure and spillover effects after transport infrastructure be completed (Chao Wang, Ming K. Lim, Xinyi Zhang et al., 2020). Policy choices can be suggested to lessen the negative impact of road infrastructure on employment rates in China. The development of state-owned enterprises can play a role in reducing the unequal impact of road infrastructure, improving operational efficiency (Xun Zhang, Guanghua Wan, Xu Wang, 2017). An increasse air transport capacity, in terms of passengers and cargo by air have a significant effect on the economy. This implies that there are incentives for policymakers around the world to invest in the aviation sector because the economic returns of these policies will be greater. Encouraging more efficient and financially responsible airports, allowing regional governments to invest in infrastructure such as airport expansion, streamlining airline access, and create open sky agreements (Jose M. Carbo, Daniel J. Graham, 2020). 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 and low income countries, rail freight significantly increases energy demand in middle and high income countries. Air transport and passenger rail increase aggregate customs duties. While rail passenger transport positively affects customs tax increases in low and middle income countries, road passenger transport negatively affects customs duties in middle and high income countries. Container port traffic greatly affects per capita income between countries (Haroon Ur Rashid Khan, Muhammad Siddiquec, Khalid Zamand et al., 2018). Transport infrastructure contributes to regional economic growth in China between 2007 and 2015 as the country approached idle income status. In particular, the improvement of road and railway quality and the upgrading of transport infrastructure contributes significantly to the growth. Government development strategies is less advantage than local areas that is not only makes growth slow, but also potentially limits the contribution of transport infrastructure (Xiao Ke, Justin Yifu Lin, Caihui Fu et al., 2020). Vehicles Identification Techniques (VIT) systems can be used for trip matrix acquisition, and for traffic operational applications such as congestion pricing, toll collection, and traffic violation detection. However, the VIT system has not been fully adopted for transportation purposes because of limitations in developed countries and low-tech conditions in developing countries (Wissam El Hamra, Youssef Attallah, 2012). The rapid expansion of the transport network greatly facilitates the travel and transmission of information between cities which is very important in facilitating the development of activities. economics and reshaping the spatial model of economic geography. However, the role of transport accessibility in increasing capital moving which is less attention (Liaoliao Duan, Weizenng Sun, Siqi Zheng, 2020). The state of road infrastructure has a serious effect on road safety, driving comform and rolling resistance. Therefore, road infrastructure must be taken care of comprehensively and regularly to identify damaged sections and road danger (Johannes Masino, Jakob Thumm, Michael Frey et al., 2017). The influence of land prices on the distribution of logistics facilities. Public policies related to logistics facilities such as land use regulations, development rights in controlled areas, and public support for urban distribution center development, can be important factors impact on the distribution of logistics facilities. In addition, an understanding about the impact of public policies is necessary to manage the urban logistics systems (Takanori Sakai, Kazuya Kawamura, Tetsuro Hyodo, 2016). In the Mekong Delta, Vietnam, in order to promote into full play the advantages of inland water transport and reduce the pressure on road transport, local and regional competent authorities need to review their reasonable investment policies between modes of transport (Vĩnh Tường Phia, Thái Bình Đăng, 2020). The customer's expected value is significantly different from the perceived value which proves that the customers are not satisfied with the service quality of the logistics service providers (LSP). Logistics service quality (LSQ) is a process where a customer's perception begins to form and develop from the time of the order placed to the completion of the service, and they can place a distinct focus on the LSQ. Therefore, LSPs should pay more attention to weaknesses such as shipping links, claims and freight charges. Furthermore, Research and Development and development of customer care programs need to be improved. In addition, the government also needs to have many positive policies to create favorable conditions for logistics services (Sabine Limbourg, Ho Thi Quynh Giang, Mario Cools, 2016). 3D printing was identified as the least efficient technology in the transportation industry (Mohammadreza Akbari, Nghiep Ha, 2020). Logistics costs are considered to be the most important factor to improve Vietnam's logistics system, because Vietnam's logistics costs are higher than that of other countries in the same region and the income from these activities is insignificant. Therefore, it is necessary to reduce costs to achieve the optimal balance between costs and revenue. Ranking logistics infrastructure and connectivity between departments is the next important factor to improve Vietnam's logistics system. Other elements of supply chain logistics, such as railways and networks for ICD and logistics need to have further attention. Finally, the institutional framework and technology are considered as the

least important factors for improving the logistics system of Vietnam (Viet Linh Dang, Gi Tae Yeo, 2018). Cargo transporting demand, proximity to markets, production areas, customers and transportation costs are considered the most important factors to determine the location of logistics centers in VN (Thi Yen Pham, Hye Min Ma, Gi Tae Yeo, 2017).

3. Methodology

3.1. Study framework

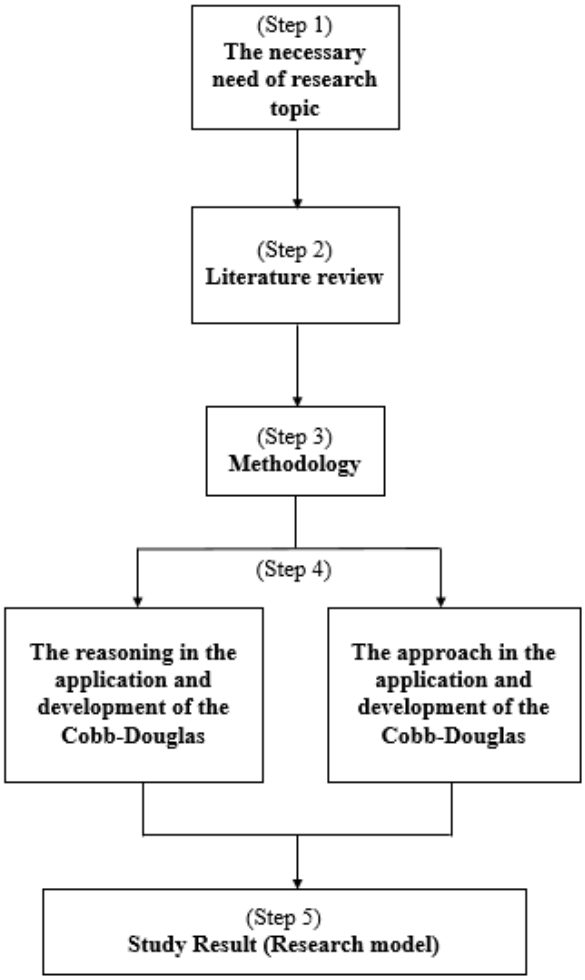

Fig 1

3.2 Study model explanation.

Step 1: Author presents the necessary need of research topic by explanation the situation brief of transportation logistics industry in HCMVN consists of GDP, business performance, transport infrastructure and institution between 2010 and 2020.

Step 2: Authors analyzes literature review by summarizing and have analysis twenty-three papers which have been published indexed scopus. All papers are relevant to the topic of this paper that are transportation logistics industry. The purpose of doing literature review is to find out and determine the research gap.

Step 3: Methodology including 3.1 and 3.2.

Step 4: The reasoning in the application and development of the Cobb-Douglas. The approach in the application and development of the Cobb-Douglas.

Step 5: Research model is built, this is study result that author presents the suggesting research model of the study topic of this paper.

4. Applying and developing Cobb-Douglas.

4.1 The reasoning in the application and development of the Cobb-Douglas.

The first: The Cobb – Douglas is a specific form of function in economics and econometrics, is a classic function, has scientific value, practical value represents the objective regularity, the function has been established and tested and proven for 40 years. Over half a century from 1927 to 1976, nearly 5,000 empirical studies were carried out in many different industries and in many different countries. A large number of researchers were involved in the research along with pioneering monetary inventor and economic investigator Paul H. Douglas and mathematician Charles WV.Cobb are the two authors named the function. During a 40-year period with the help of seven authors whom Paul H. Douglas acknowledged as worthy co-authors, and others were Grace Gunn, Mary Hook, Stanley Horowitz, Christopher Jehn, Marjorie Handsake, Martin Bronfen-Brenner and Patricia Daly. In addition, there are contributions from Handsaker in 1937 and 1938, Gunn in 1941 and 1942, Olson in 1943 and Williams in 1945. With a large number of applied empirical research works in various fields such as manufacturing, industry, service, outsourcing. In which, manufacturing has more than 257 industries in countries including United States, Australia, Canada, New Zealand, South Africa and United Kingdom. It can be assumed that the Cobb–Douglas production function has enough accumulated evidence to show that most of the large deviations between the actual and the theoretical values of P can be explained by the difference of dynamic departures from "normal". For better or worse, yield is markedly different from the formula as a description of normal conditions. Therefore, the value of using the function is further strengthened. In addition, due to the effects of imperfect competition, expanding demand, excess supply of labor and contractual demand cause a lot of large errors, and it seems that many smaller deviations are also caused by other similarly factors caused.

The second: The Cobb – Douglas does not limit the research field as well as the research scope in both space and time.

The third: Empirical studies of the function were carried out for a wide range of industries in imperfect competition, namely 61 manufacturing industries in New Zealand, 17 industries in South Africa, 160 industry in Great Britain and the United States, and 19 others including woodcarving, gold and silver work, mechanical engineering, music publishing, glucose, starch, linseed oil, patent medicine, tin plates , brass and lead.

The fourth: Studies in South Africa found that the k-index when blacks and whites are combined in 17 industries is 0.66 but when separated the value of k is 0.65. Accordingly, we see that human resource issues such as ethnicity and skin color also affect the research results.

The fifth: Up to now, there are still many research students, economists, researchers and scientists who are still working day and night in researching, applying and developing functions in many different fields in different countries. On the one hand, inheriting the scientific and practical value of the function. On the other hand, in order to explore new points, promote creativity in order to contribute more to the world's scientific treasure as well as practical application in the context of experimental research in the country, including the author.

From the above arguments, the author decides to choose the

Cobb - Douglasto apply and develop for the author's research model, in order to measure the relationship between six input factors namely labor, capital, transport infrastructure, institutions, business environment and emission factor with productivity and GDP of HCMVN transport logistics industry. In which, the author develops factor L into four variables including total number of employees, total number of female employees, percentage of employees who have received vocational training and percentage of employees who have graduated from high school. TFP is developed by the author into four factors which are transport infrastructure, institutions, business environment and emission factor.

4.2. The approach in the application and development of the Cobb-Douglas.

Theoretically, the author applies and develops the Cobb - Douglasin building research models. However, the author's approach is innovative to suit the nature of the research field and the actual situation in the current global industry 4.0 context in general and the economic context of Vietnam in particular. Especially, the three factors that are human resources, infrastructure and institutions are the three biggest bottlenecks (obstacles) for the Vietnamese economy, in which the transport logistics industry is one of nine important service industries in the economic structure. Accordingly, these three knots need to be removed to bring Vietnam's economy step by step development, including the transport logistics industry that the author chooses as a research topic. The author's research model includes six independent observed factors, two intermediate factors and one dependent factor. Six independent factors are human resources, capital, transport infrastructure, institutions, business environment and emission factor, the six factors are named A, B, C, D, E, respectively. Two intermediate factors are labor productivity and capital productivity are named X and Y, respectively. And A dependent factor is GDP of HCMVN transport logistics industry which names Z.

5. Data source: All data are from HCMVN Statistics Department and Statistical Yearbook, Public Administration Performance Index of VN (PAPI) and WB.

6. Study result: the suggesting study model to assess the transport logistics industry development in HCMVN in the context of 4.0.

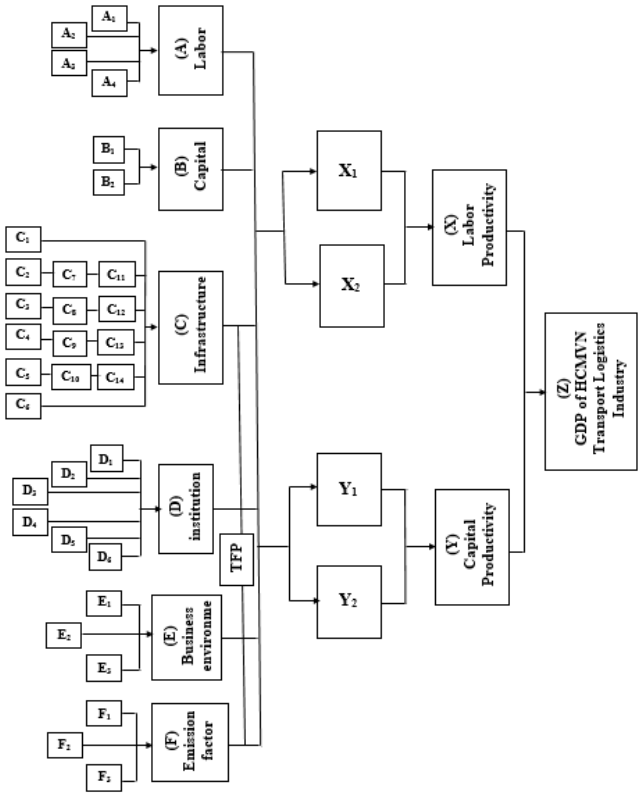

Fig 2

7. Discussion and conclusion

The description of factors and variables of suggesting model in section 6 – study result:

The human resource factor is A consists of four independently observed quantitative variables are A1, A2, A3, A4. The capital factor is B includes two independent observed quantitative variables are B1 and B2. Factors C, D, E and F belong to TFP, in which C and D, although are not quantifiable but they have a great impact and influence on the development of the economy including the subject of research. The transport infrastructure factor is C includes fourteen independent observed variables namely C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13, C14. The institutional factor D consists of six independent observed qualitative variables are D1, D2, D3, D4, D5, D6. The business environment factor E includes three independently observed quantitative variables are E1, E2, E3. The transport

emission factor F includes three independently observed quantitative variables are F1, F2, F3. The two intermediate factors are X and Y. In which, X is labor productivity of the HCMVN transport logistics industry, X consists of two variables are X1, X2. In which X1 is the cargo productivity calculated by the total number of human resources, X2 is the passenger productivity calculated by the total number of human resources. Y is the capital productivity of the HCMVN transport logistics industry. Y consists of two variables are Y1, Y2. In which, Y1 is the cargo productivity in terms of total capital, and Y2 is the passenger productivity in terms of total capital. A dependent variable calls Z which is the GDP of HCMVN transport logistics industry. Z is directly depended by two intermediate factors X and Y, and Z is indirectly depended by six independent factors A, B, C, D, E and F.

Explanation in detail of factors annd variables of suggesting model in section 6 – study result:

A is latent variable, A1 is total employees, A2 is total female employees, A3 is total employees who have been trained career, A4 is total employees who have been graduated high school.

B is capital, B1 is business capitsla, B2 is capital of fixed assets and long-term investment.

C is infrastructure, C1 is road length, C2 is road quality, C3 is rail length, C4 rail quality, C5 is inland water wayd length, C6 is number of registered airlines departing to overseas, C7 is airlines quality, C8 is connection between VN airports and international airports, C9 is safety internet connection, C10 is number of internet subscribers, C11 is number of broadband subscriptions, C12 is international internet connection, C13 is fixed internet registration, C14 is mobile subscription.

D is institution, D1 is citizen participation in HCMVN, D2 is openness and transparency, D3 is effectively interacting with all competent authorities in HCMVN, D4 is control corruption in HCMVN, D5 is public administrative procedures, D6 is public service supply.

E is business environment in HCMVN, E1 is Invest from state budget, E2 is investment from abroad to HCMVN, E3 is openness of the economy in HCMVN.

F is transport emission factor, F1 is CO2 emission factor, F2 is Methane emission factor, F3 is air pollution emission factor.

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