

VIETNAM'S HIGH-SPEED RAILWAY AND THE PROFITABILITY OF “SHINKANSEN”

Policy Report

September 2020

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Table of Contents

Executive Summary	4
Introduction	5
Long-distance Transportation in Vietnam	7
The Relationship Between Population Density and Profit Margin	8
Urbanisation in Vietnam	10
Railway Network in Southeast Asia	11
Connecting Ho Chi Minh City to Phnom Penh and Bangkok, and Hanoi to Kunming and Nanning	12
The South Section of Vietnam High-speed Railway and the Southern Economic Corridor	14
Conclusion	15
About the Authors	16
About the Centre for Multilateralism Studies	16
About the S. Rajaratnam School of International Studies	17

Executive Summary

The first plan to construct a High-Speed Railway (HSR) in Vietnam was rejected by the national assembly in 2010 due to its high cost. The government prepared an amended plan for the national assembly's approval again in May 2020. This paper analyses the profitability of the HSR project in Vietnam. Based on the estimated relationship between the population density of regions along the railways and the profit margin of railway companies in Japan, we find that passenger service alone would not make Vietnam's HSR profitable. The project should consider connectivity to suburban areas around highly populated cities and have a diversified business plan with 32 to 54 per cent of profits coming from non-transport sectors such as hotel, real estate, and retail. Moreover, we find that the HSR could be more profitable when it is extended to Phnom Penh and Bangkok as a part of the Southern Economic Corridor connecting Vietnam, Cambodia, and Thailand in the future.

Introduction

The first High-Speed Railway (HSR) known as the “Shinkansen” was introduced in Japan in 1964. The International Union of Railways defines an HSR as a system designed for speed above 250km/h.¹ The Taiwan HSR was Japan’s first project of the Shinkansen system exported overseas. Other HSRs in Asia include the China Railway High-speed (CRH) and Korea Train Express (KTX), but there are still no HSRs in operation in Southeast Asia, although some are in construction or planning. For example, the HSR which connects Kunming in China and Vientiane in Laos is under construction and is scheduled to start operating in 2022.²

Funding is critical to launch an HSR project as for most countries its construction is beyond the capacity of the national budget. Therefore, governments seek funding through channels such as public private partnerships and foreign investments to realise the project. Vietnam is one of the countries that aspire to build an HSR. Responding to the rising demand, the government first announced the building of the North-South express railway in 2007. The proposed HSR project connects Hanoi and Ho Chi Minh City (HCMC). Initially its cost estimate was US\$33 billion before it was increased to US\$56 billion in 2010. However, the national assembly in the same year rejected the plan citing its high cost, which was then equal to about 50 per cent of Vietnam’s gross domestic product.

In 2016, Deputy Prime Minister Trinh Dinh Dung asked the Ministry of Transport to amend the initial HSR plan. The ministry submitted the feasibility study report of a new HSR plan to the Prime Minister in February 2019. However, the Ministry of Planning and Investment pointed out that the cost was still too high and the budget can be further decreased by lowering the maximum speed to 200km/h. It was reported that the submission of a new HSR plan to the national assembly has been postponed to May 2020 onward.³ There is no publicly available information about further discussion as of this moment.

¹ The International Union of Railways: <https://uic.org/passenger/highspeed/>

² Yamada, Norihiko, “[Laos-China HSR project],” IDE Square, August 2018, https://www.ide.go.jp/Japanese/IDESquare/Overseas/2018/ISQ201830_012.html

³ Sankei Business, “[Vietnam HSR plan wanders],” 19 December 2019, <https://www.sankeibiz.jp/macro/news/191219/mcb1912190500010-n1.htm>

Vietnam's HSR plan outlines a route roughly 1,560km long, stretching from Hanoi to HCMC with 24 stations (Figure 1). The plan is to divide the whole route into three sections and to build two of them – from Hanoi to Vinh and from Nha Trang to HCMC – first in 2020-2030 at a cost of US\$24 billion, while the remaining section will be completed and operational by 2040-2045.



Note: Red circles represent the population density of each city where the major stations are planned. Source: Compiled by authors.

Figure 1. The planned route of the High-Speed Rail in Vietnam

Long-distance Transportation in Vietnam

Travelling between Hanoi and HCMC takes over 35 hours by bus and more than 30 hours by conventional railway that runs just four times per day.⁴ In contrast, there are 50 flights per day with travelling time of just two hours. This makes the Hanoi-HCMC route the busiest domestic route in Southeast Asia and the seventh busiest in the world with seven million passengers annually.⁵

In general, railway travel time correlates negatively with the share of people using rail transport instead of aeroplanes.⁶ Even with the fastest HSR, the travel time between Hanoi and HCMC is estimated to be five and a half hours, which would predict a rail share below 10 per cent based on estimates of city connections in Europe and Japan. This suggests that people would not use an HSR to travel between Hanoi and HCMC.

However, when considering the two sections – the North section from Hanoi to Vinh and the South section from Nha Trang to HCMC – separately, the travel time is estimated to be one and a half hours and two hours respectively. The predicted rail share for each section would then increase to above 80 per cent, improving the prospect of the HSR's usage dramatically.

⁴ Vietnam Railway: <https://vietnam-railway.com>

⁵ Nikkei Asian Review, "Vietnam revives \$58bn high-speed rail project despite cost hurdle," 16 January 2019.

⁶ Nash, Christopher. "When to invest in high speed rail." *Journal of Rail Transport Planning & Management* 5, No.1, pp.12-22, 2015.

The Relationship Between Population Density and Profit Margin

For an HSR project to be profitable, it is essential to have a high population density. For the five railway companies operating HSR in Japan, the average profit margin correlates positively with the population density (see Figure 2).⁷ The Central Japan Railway Company (JR Central) has, by far, the highest average profit margin operating an HSR between Tokyo and Osaka. The other companies also have a positive profit margin except for JR Hokkaido, which runs deficits on non-HSR lines. For Vietnam’s HSR, the projected population density for 2034 – based on the provinces or municipalities where the stations are planned – is the lowest for the Middle section and the highest for the South section.⁸ The predicted profit margin for the South section is as high as for JR West and positive for the North and Middle sections (see Figure 2). However, this assumes that Vietnam’s HSR would have the same business model as the JR companies in Japan.

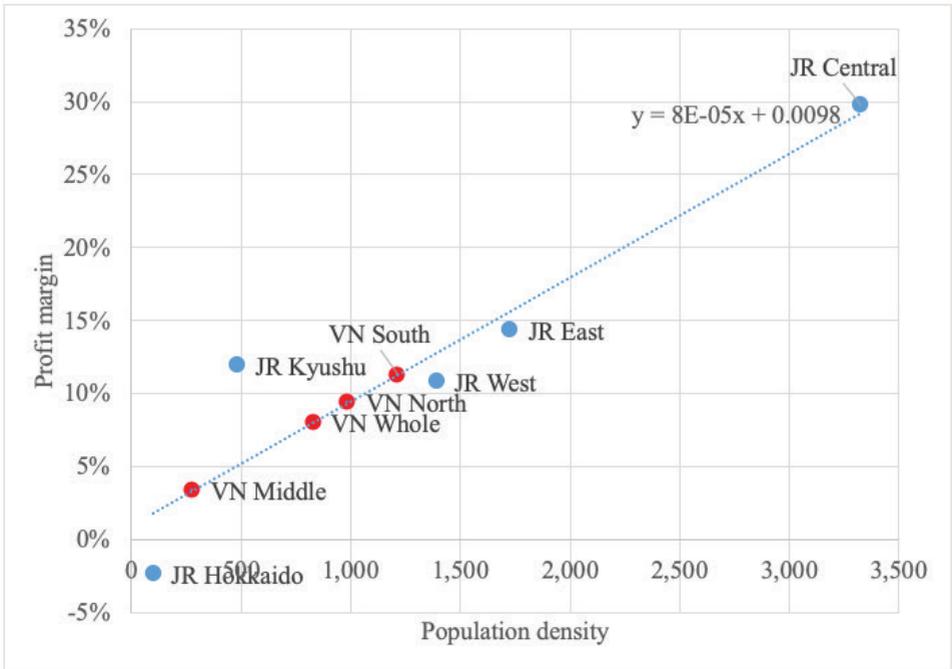


Figure 2: Population density (ppl/km²) of the prefectures along the railway in 2017 and the average profit margin of the Japanese railway companies between 2014 and 2017 (Source: Railway companies’ securities report)

⁷ The population density of each HSR company is calculated based on the population density of the prefectures where the main stations are located. The profit margin is calculated as ordinary income divided by operating revenues.

⁸ Ministry of Planning and Investment, General Statistic Office, “Population projections for Vietnam 2009-2049,” February 2011.

Examining the source of operating income for the JR companies reveals a diversified business model. The ratio of operating income of the transport sector to the total operating income is the highest for JR Central at 95 per cent on average between 2015 and 2017, followed by JR East at 71 per cent, JR West at 29 per cent, and JR Kyushu at 45 per cent (see Table 1). JR Hokkaido has the lowest population density and records net loss every year; the ratio reached 126 per cent in 2017 – meaning that the deficit in the transport sector exceeds the total deficit and other businesses are making up for the deficit. The operating income of the transport sector includes not only HSR service but also other transportation service such as conventional railways and buses. Only JR Central generates its profits almost exclusively from transport business. In fact, the ratio of the Shinkansen revenues to the total revenues in the transport sector is the highest for JR Central at more than 90 per cent while the other companies earn their revenues as much as or more from conventional railways and buses (See Table 2). Hence, we can see that through diversification, railway companies are able to earn their profit from various other businesses such as hotel, retail, and real estate.

Fiscal year	JR Hokkaido	JR East	JR Central	JR West	JR Kyushu
2015	14%	71%	96%	69%	no data
2016	54%	70%	96%	69%	44%
2017	126%	71%	94%	68%	46%

Table 1: The operating income of the transport sector to the total operating income

Fiscal year	JR Hokkaido	JR East	JR Central	JR West	JR Kyushu
2015	14%	32%	92%	51%	no data
2016	11%	32%	92%	51%	34%
2017	11%	32%	92%	52%	36%

Table 2: The ratio of the Shinkansen revenues to the total revenues from passenger tickets
(Source: Railway companies' securities report)

The results from the JR companies suggest that it cannot be assumed Vietnam's HSR would make profits from the HSR business alone. In fact, it is unrealistic based on the projected population for Vietnam in 2034 that any of the sections in Vietnam's HSR will have a population density as high as the route of JR Central. The population density of the North and South sections is projected to be between those of JR Kyushu and JR West, which earns 32 per cent and 54 per cent of operating income from the transport sector respectively. Therefore, Vietnam's HSR would need to earn its income from diversified businesses other than transportation as JR West and JR Kyushu do.

Urbanisation in Vietnam

In 2017, the population of Vietnam was 94 million, and it is projected to reach 100 million in 2024.⁹ The percentage of population in urban areas – only 35.9 per cent in Vietnam compared to over 90 per cent in Japan as of 2018 – is expected to increase in Vietnam (Figure 3). Large cities such as HCMC and Hanoi have already experienced population inflow from rural areas. In addition, there is population inflow in the periphery of cities such as Binh Duong and Bac Ninh which are adjacent to HCMC and Hanoi; suburbanisation is happening around highly populated cities in Vietnam. One of the reasons is the high land price in urban centers.¹⁰ This necessitates transportation networks, which connect urban centers and suburban areas. Therefore, when developing the Vietnam HSR, it is important to develop transportation networks considering accessibility to suburban areas.¹¹

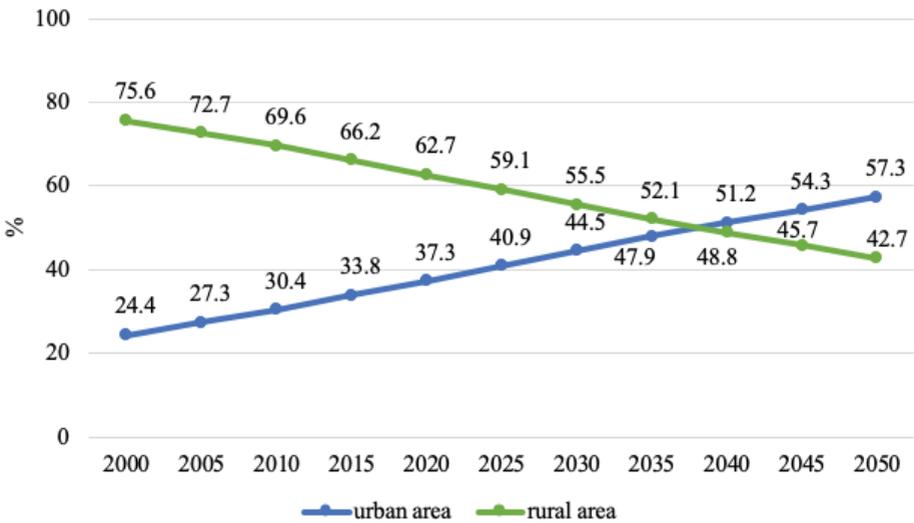


Figure 3: The percentage of population in rural and urban areas in Vietnam
 (Source: The United Nations. (2018) World Urbanization Prospects: The 2018 Revision)

⁹ Ministry of Planning and Investment, General Statistics Office, “Population Projections for Vietnam 2009-2049,” February 2011.

¹⁰ Tanaka, Takashi. “Population movement in Vietnam and a Factor Analysis.” Nihon University Graduate School of Social and Cultural Studies Journal, No.19, pp.185-194, 2018.

¹¹ We calculated the population density in Vietnam by province or municipality which includes both urban and rural area.

Railway Network in Southeast Asia

The United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) proposed the concept of a Trans-Asian Railway in 1960 (See Figure 4). In 1992, Cambodia, China (Yunnan Province and Guangxi Zhuang Autonomous Region), Laos, Myanmar, Thailand, and Vietnam – with the Asian Development Bank (ADB) – entered the Greater Mekong Subregion (GMS) programme of sub-regional economic cooperation.¹² In 2010, “the Strategic Framework for Connecting GMS Railways” was endorsed involving Vietnam’s HSR.¹³ In 2013, China announced the Belt and Road Initiative, which includes plans to build a railway network from Kunming, China, to Singapore through all the countries of mainland Southeast Asia.



Figure 4: The Trans-Asian Railway map (Source: UNESCAP, “Trans-Asian Railway map,” <https://www.unescap.org/our-work/transport/trans-asian-railway/about>)

¹² The Greater Mekong Subregion Economic Cooperation Program, “About the Greater Mekong Subregion,” <https://greatermekong.org/about>

¹³ Duong Thi Nhi. “Vietnam Country Report” in Zen, F. and M. Regan (eds.), Financing ASEAN Connectivity, ERIA Research Project Report FY2013, No.15, pp.397-425, November 2014.

Connecting Ho Chi Minh City to Phnom Penh and Bangkok, and Hanoi to Kunming and Nanning

There is no international railway between Vietnam and Cambodia. However, the high demand for travel from HCMC to Phnom Penh (212km) can be seen in frequent bus (10 to 15 per day) and flight (five per day) connections. From HCMC to Bangkok (745km), there are even 15 flights per day. On the other hand, there is a conventional railway from Hanoi to Kunming (551km) but passengers need to change trains at the Vietnam-China border. From the border city of Hekou to Kunming, there are only four trains per day. From Hanoi to Nanning (323km), there is only one train per day. Overall, there is a higher demand for ground transportation from HCMC to Phnom Penh or Bangkok, than from Hanoi to Kunming or Nanning. The contrast is even sharper for flights. There are only two flights per week from Hanoi to Kunming, and three flights per week from Hanoi to Nanning.

		From Ho Chi Minh City		From Hanoi	
		To Phnom Penh	To Bangkok	To Kunming	To Nanning
Air Distance		212km	745km	551km	323km
Bus	time	6-7 hours	24-34 hours	/	8 hours
	cost	\$ 13-18	\$ 35-40		\$24
	frequency	10-15/day	1/day		3/day
Train	time	/	/	14 hours	12 hours
	cost			\$15-125	\$43-55
	frequency			Hanoi-Laocaj: 10/day Hekou-Kunming: 4/day	1/day
Flight	time	1 hour	1.5 hours	1.5 hours	1 hour
	cost	\$50-120	\$40-130	\$120-180	\$120-150
	frequency	5/day	15/day	2/week	3/week

Table 3: Current options for transportation (Source: Compiled by authors based on Northern Vietnam [<https://north-vietnam.com/>])

It has earlier been indicated that the 1,500km route between Hanoi and HCMC is too long to travel by an HSR. In fact, the route is about three times the distance between Tokyo and Osaka, the main HSR route operated by JR Central. HSR is considered to be the fastest option when the travel distance is between 150km and 800km.¹⁴ When the travel distance is less than 150km, conventional rails are faster than HSRs; when the distance is more than 800km, aeroplanes are faster than HSRs. The distance between HCMC and Phnom Penh (212km) or Bangkok (745km), and between Hanoi and Kunming (551km) or Nanning (323km) falls within the optimal 150-800km range for an HSR.¹⁵ However, the critical question is how the profitability of Vietnam’s HSR changes by connecting to Phnom Penh, Bangkok, Kunming or Nanning.

When Kunming and Nanning are added to the North section, the population density of the North section decreases. On the other hand, when Phnom Penh and Bangkok (Krung Thep) are added to the South section, the population density of the South section more than doubles — reaching 77 per cent of the population density of JR Central, which is higher than other JR companies.¹⁶ Based on this result, the South section when connected to Phom Penh and Bangkok would dramatically increase its prospect for profitability. The same does not apply to the North section when connected to Kunming and Nanning.

	Population density Vietnam only (ppl/km ²)	Population density added neighboring countries (ppl/km ²)	Population density JR Central (ppl/km ²)
North section	987	799	3,324
South section	1,217	2,549	3,324

Table 4: Comparison of population density (Source: United Nations, The World’s Cities in 2018.)

¹⁴ Steer Davies Gleave. “High Speed Rail: International Comparisons, Final Report.” Commission for Integrated Transport, February 2004.

¹⁵ The Middle section is not expected to be connected with neighboring countries by railway networks.

¹⁶ For those additional cities, we used the population projections for 2030 as those were not available for 2034. United Nations, Department of Economic and Social Affairs, Population Division, “The World’s Cities in 2018.”

The South Section of Vietnam High-speed Railway and the Southern Economic Corridor

Thailand and Cambodia have a new railway connection which started operation in April 2019.¹⁷ Between Cambodia and Vietnam, a railway never existed, but both governments have agreed to develop one. Connecting the South section to Phnom Penh and Bangkok would facilitate movement of workers in one of the least developed regions in Southeast Asia. The GMS countries have initiated the Southern Economic Corridor (SEC) with support from the ADB and Japan to facilitate borderless movement of people, goods, and capital.¹⁸ For example, the Tsubasa Bridge (Neak Loeng Bridge) constructed and opened in 2016 was funded by Japan's Official Development Assistance. The bridge spans the Mekong River connecting Cambodia's Kandal and Prey Veng provinces. The completion of the bridge has dramatically reduced the time needed to cross the river, improving the logistic environment along the SEC.¹⁹ Moreover, Japan and the Mekong countries – Cambodia, Laos, Myanmar, Vietnam, and Thailand – have adopted the “Tokyo Strategy 2018 for Japan-Mekong Cooperation,” which prioritises the regional connectivity.²⁰

There are an estimated 3.9 million migrant workers from Cambodia, Laos, Myanmar, and Vietnam in Thailand, and many companies have also started moving their manufacturing base from Thailand to neighboring countries. Currently, the SEC focuses on improving road connections and there is no plan for an HSR. However, there will be demand for more efficient means of transport for both people and goods as there are increasing business ties across borders. Our proposal of extending the HSR network from HCMC to Phnom Penh and Bangkok would improve the transport environment around the area and advance regional economic integration.

¹⁷ Khmer Times, “Thailand, Cambodia to reopen cross-border trains after 45 years,” 21 April 2019.

¹⁸ ASEAN Briefing, “The Southern Economic Corridor: Boosting Trade and Investment in Cambodia,” 11 August 2017.

¹⁹ Japan International Cooperation Agency: https://www.jica.go.jp/aboutoda/2016_ASEAN/vol3_page06/index.html

²⁰ Ministry of Foreign Affairs, “Tokyo Strategy 2018 for Mekong-Japan Cooperation,” 9 October 2018, <https://www.mofa.go.jp/mofaj/files/000406731.pdf>

Conclusion

Currently, the discussion over Vietnam's HSR focuses on the cost of construction. However, our proposal suggests that the Vietnamese authorities need to conduct market research on the potential operational profits of the HSR business. Based on the data from Japanese JR companies, our analysis makes three suggestions for Vietnam's HSR project. First, the project should diversify its business model from transportation service alone to include other businesses such as hotel, real estate, and retail. Our estimates suggest that 32 to 54 per cent of profits must be generated in non-transportation sectors for Vietnam's HSR to be profitable. Second, the HSR stations should connect to other transportation modes with access to suburban areas. This allows efficient and systematic formation of densely populated urban areas when urbanisation is expected to advance in Vietnam. Third, cross-border connections from HCMC to Phnom Penh and Bangkok would increase the prospect for profitability of the HSR as regional integration progresses along the SEC.

Ultimately, the decision to implement projects such as Vietnam's HSR is political. For a country that was once divided into two countries, connecting the north and south directly with the HSR is a national project for unity too. It will not only improve transportation in the country, but also enhance national integration by connecting people in Vietnam economically and socially, and forge a stronger national identity.

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